Vision of the Department
The vision of the Department is to create computing professionals, researchers and entrepreneurs with high technical competency and communication skills by setting high standards in academic excellence and meeting the future needs of the society.

Mission of the Department
The mission of the Department is to
- Provide motivated faculty and state of the art facilities for education and research, both in foundational aspects and emerging computing trends.
- Develop knowledgeable, industry-ready students with pertinent competencies such as problem solving, leadership, and interpersonal skills.
- Inculcate responsibility through sharing of knowledge and innovative computing solutions that benefit the society-at-large.
- Engage in collaborative research with academia and industry for seamless transfer of knowledge resulting in patents, products and commercialization.
- Generate adequate resources for research activities from sponsored projects and consultancy.
PROGRAMME EDUCATIONAL OBJECTIVES:

The objectives of the programme can be broadly defined on three counts:

- To comprehend the fundamental concepts in Computer Science and Engineering and apply the interaction between theory and practice for problem solving.
- To critically analyze current systems and trends, and to develop innovative solutions that cater to the dynamic nature of the computer industry, and lead to entrepreneurial initiatives.
- To pursue lifelong multidisciplinary learning as professional engineers, researchers and scientists and effectively communicate technical information, function effectively on teams, and apply computer engineering solutions within a global, societal, and environmental context.

PROGRAMME OUTCOMES:

Students will be able to:

PO1. **Engineering Knowledge**: Apply mathematical foundations, algorithmic principles, and Computer Science theory in the modelling and design of computer based systems of varying complexity.

PO2. **Problem Analysis**: Critically analyze a problem, identify, formulate and solve problems in the field of Computer Science and Engineering, considering current and future trends.

PO3. **Design/Development of Solutions**: Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical, health and safety, and sustainability in the field of computer engineering.

PO4. **Conduct Investigations of Complex Problems**: Perform experiments and organize, analyze, and interpret data.

PO5. **Modern Tool Usage**: Use current techniques, skills, and tools necessary for computing practice.

PO6. **Engineer and Society**: Apply knowledge and reasoning to assess issues related to social, ethical, legal, economical, health and safety and apply them to professional engineering practice.

PO7. **Environment and Sustainability**: Analyze the local and global impact of computing on individuals, organizations, and society and look at sustained development.

PO8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
PO9. **Individual and Team Work**: Function effectively on teams to accomplish a common goal.

PO10. **Communication**: Communicate effectively with a range of audiences and prepare technical documents and make effective oral presentations.

PO11. **Project Management and Finance**: Demonstrate knowledge of engineering and management principles to develop innovative solutions and manage projects effectively, both as a member and a leader in a team.

PO12. **Life-long Learning**: Recognize the need for and possess an ability to engage in life-long learning, leading to continuing professional development.

**PROGRAM SPECIFIC OUTCOMES**

1. To use mathematical, algorithmic, and theoretical foundations in the study of computing systems.
2. To analyze problem requirements and develop appropriate solutions.
3. To acquire knowledge and skills in emerging technologies.
MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the programme objectives and the outcomes is given in the following table

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## ANNA UNIVERSITY, CHENNAI UNIVERSITY DEPARTMENTS
B.E. COMPUTER SCIENCE AND ENGINEERING
REGULATIONS – 2015
CHOICE BASED CREDIT SYSTEM
CURRICULA AND SYLLABI FOR I - VIII SEMESTERS

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COURSE DESCRIPTION:
This course aims at developing the language skills necessary for the first year students of Engineering and Technology.

OBJECTIVES:
- To identify the language structure needed for various rhetoric functions in a formal context
- To interpret various types of visual materials found in authentic language contexts
- To develop students' writing skills so that they are able to express their thoughts and ideas using appropriate word forms in their writing
- To develop speaking skills of students so that they are able to build up on their interpersonal skills to work as a team.
- To critically analyse any kind of reading materials available in authentic contexts

CONTENTS
UNIT I  GREETING AND INTRODUCING ONESELF  12
Listening - Types of Listening – Listening to Short Talks, conversations; Speaking – Speaking about One’s Place, Important Festivals etc. – Introducing oneself, one’s family/ friend; Reading – Skimming a Passage– Scanning for specific information; Writing - Guided Writing - Free writing on any given topic ( My Favorite Place/ Hobbies/ School Life, Writing about one’s Leisure Time Activities, hometown, etc.); Grammar – Tenses (present and present continuous) - Question types - Regular and Irregular Verbs; Vocabulary – Synonyms and Antonyms.

UNIT II  GIVING INSTRUCTIONS AND DIRECTIONS  12

UNIT III  READING AND UNDERSTANDING VISUAL MATERIAL  12
Listening-Learning to Lectures/Talks and Completing a Task; Speaking – Role play/Simulation Group interaction; Reading – Reading and Interpreting Visual Material; Writing- Jumbled Sentences – Discourse Markers and Cohesive Devices – Essay Writing (cause & effect/ narrative);Grammar – Tenses (perfect), Conditional Clauses –Modal verbs; Vocabulary – Cause and Effect Words; Phrasal Verbs in Context.

UNIT IV  CRITICAL READING AND WRITING  12
Listening - Watching Videos/ Documentaries and Responding to Questions based on them; Speaking Informal and Formal Conversation; Reading –Critical reading (prediction & inference);Writing–Essay writing ( compare & contrast/ analytical) – Interpretation of Visual Materials; Grammar – Tenses (future time reference);Vocabulary – One Word Substitutes (with meanings) – Use of Abbreviations & Acronyms – Idioms in Sentences.

UNIT V  LETTER WRITING AND SENDING E-MAILS  12
Listening- Listening to Programs/Broadcast/ Telecast/ Podcast; Speaking – Giving impromptu Talks, Making Presentations on given Topics- Discussion on the Presentation; Reading – Extensive Reading; Writing- Poster Making – Letter Writing (Formal and E-mail) ;Grammar – Direct and Indirect Speech – Combining Sentences using Connectives; Vocabulary –Collocation;

TEACHING METHODS:
Interactive sessions for the speaking module.
Use of audio – visual aids for the various listening activities.
Contextual Grammar Teaching.
EVALUATION PATTERN:
Internals – 50%
End Semester – 50%

TOTAL: 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Improve their reading and writing skills
- Become fluent and proficient in communicative English
- Improve their interpersonal communication
- Have the capacity to discuss texts, verbally and in written form, with an independent intellectual perspective
- Generate skills in communication through visual imagery and media

TEXTBOOK:

REFERENCES:
3. Redston, Chris and Gillies Cunningham, “Face2Face (Pre-intermediate Student's Book& Workbook)”, Cambridge University Press, 2005

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MA7151 MATHEMATICS – I  
(L T P C) 4 0 0 4
(Common to all branches of B.E. / B.Tech. Programmes in I Semester)

OBJECTIVES:

- The goal of this course is for students to gain proficiency in calculus computations. In calculus, we use three main tools for analyzing and describing the behavior of functions: limits, derivatives, and integrals. Students will use these tools to solve application problems in a variety of settings ranging from physics and biology to business and economics.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To make the students understand and familiarize various techniques of integration.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.
- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.

UNIT I  DIFFERENTIAL CALCULUS  12

UNIT II  FUNCTIONS OF SEVERAL VARIABLES  12

UNIT III  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 IV  MULTIPLE INTEGRALS  12

UNIT V  DIFFERENTIAL EQUATIONS  12
Method of Variation of Parameters – Method of Undetermined Coefficients – Homogenous Equation of Euler’s And Legendre’s Type – System of Simultaneous Linear Differential Equations with Constant Coefficients.

TOTAL: 60 PERIODS

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

- Assimilate ideas of limits and continuity and an ability to calculate with them and apply them.
- Improve the knowledge in algebraic manipulation.
- Have fluency in differentiation.
- Have fluency in integration using standard methods, including the ability to find an appropriate method for a given integral.
- Familiarize the ideas of differential equations and facility in solving simple standard examples.
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**PH7151 ENGINEERING PHYSICS**

(Common to all branches of B.E /B.Tech Programmes) 3 0 0 3

**OBJECTIVE:**

- To introduce the concept and different ways to determine moduli of elasticity and applications.
- To instill the concept of sound, reverberation, noise cancellation, and ultrasonic generation, detection and applications.
- To inculcate an idea of thermal properties of materials, heat flow through materials and quantum physics.
- To promote the basic understanding of interferometers, principles and applications of lasers, optical fibers and sensors.
- To establish a sound grasp of knowledge on the basics, significance and growth of single crystals.

**UNIT I PROPERTIES OF MATTER**

UNIT II ACOUSTICS AND ULTRASONICS

UNIT III THERMAL AND MODERN PHYSICS

UNIT IV APPLIED OPTICS

UNIT V CRYSTAL PHYSICS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Understand different moduli of elasticity, their determination and applications.
- Understand fundamental physical principles underlying the generation and propagation of sound waves in gas and liquid
- Apply the knowledge of basic quantum mechanics, to set up one dimensional Schrodinger’s wave equation and its application to matter wave system
- Describe the basic laser physics, working of lasers, holography and principle of propagation of light in optical fibers
- Recognize various planes in a crystal and describe the structure determination using x-rays. growing single crystals

TOTAL: 45 PERIODS

TEXTBOOKS:

REFERENCES:
OBJECTIVES:
- To develop an understanding about fundamentals of polymer chemistry.
- Brief elucidation on surface chemistry and catalysis.
- To develop sound knowledge photochemistry and spectroscopy.
- To impart basic knowledge on chemical thermodynamics.
- To understand the basic concepts of nano chemistry.

UNIT I  POLYMER CHEMISTRY
Introduction: Functionality - Degree of Polymerization. Classification of Polymers - Natural and Synthetic, Thermoplastic and Thermosetting. Types and Mechanism of Polymerization: Addition (Free Radical, Cationic, Anionic and Living); Condensation and Copolymerization. Properties of Polymers: Tg, Tacticity, Molecular Weight-Weight Average, Number Average and Polydispersity Index. Techniques of Polymerization: Bulk, Emulsion, Solution and Suspension.

UNIT II  SURFACE CHEMISTRY AND CATALYSIS

UNIT III  PHOTOCHEMISTRY AND SPECTROSCOPY

UNIT IV  CHEMICAL THERMODYNAMICS
Second Law: Entropy-Entropy Change for an Ideal Gas, Reversible and Irreversible Processes; Entropy of Phase Transitions; Free Energy and Work Function: Helmholtz and Gibbs Free Energy Functions; Criteria of Spontaneity; Gibbs-Helmholtz Equation; Clausius Clapeyron Equation; Maxwell Relations - Van't Hoff Isotherm and Isochore. Chemical Potential; Gibbs-Duhem Equation- Variation of Chemical Potential with Temperature and Pressure.

UNIT V  NANO CHEMISTRY

TOTAL: 45 PERIODS
OUTCOMES:
Upon Completion of the course, the students will be able to:
- Get familiar with polymer chemistry, surface chemistry and catalysis.
- Know the photochemistry, spectroscopy and chemical thermodynamics.
- Know the fundamentals of nano chemistry.
- Understand the modified chemical or physical properties of the nano structured material.
- Comprehend the concept of structure and concept of polymers.

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GE7151 COMPUTING TECHNIQUES (Common to all branches of Engineering and Technology) 3 0 0 3

OBJECTIVES:
- To learn the basics of computer hardware and software.
- To learn programming using a structured programming language.
- To provide C programming exposure.
- To introduce foundational concepts of computer programming to students of different branches of Engineering and Technology.
- To develop problem solving skills through C programming.

UNIT I INTRODUCTION

UNIT II C PROGRAMMING BASICS

UNIT III ARRAYS AND STRINGS

UNIT IV POINTERS
Macros - Storage Classes – Basic Concepts of Pointers – Pointer Arithmetic - Example Problems
- Basic File Operations

UNIT V  FUNCTIONS AND USER DEFINED DATA TYPES

TOTAL : 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Write C program for simple applications
- Formulate algorithm for simple problems
- Analyze different data types and arrays
- Perform simple search and sort.
- Use programming language to solve problems.

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BASICS SCIENCES LABORATORY

(Common to all branches of B.E. / B.Tech Programmes)

OBJECTIVES:
- To inculcate experimental skills to test basic understanding of physics of materials including properties of matter.
- To inculcate experimental skills to test basic understanding of thermal and optical properties.
- To induce the students to familiarize with experimental determination of velocity of ultrasonic waves, band gap determination.
- To induce the students to familiarize with experimental determination of viscosity of liquids.

PHYSICS LABORATORY: (Any Seven Experiments)
1. Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of disc
2. Non-uniform bending - Determination of young's modulus
3. Uniform bending – Determination of young's modulus
4. Lee's disc Determination of thermal conductivity of a bad conductor
5. Potentiometer-Determination of thermo e.m.f of a thermocouple
6. Laser- Determination of the wave length of the laser using grating
7. Air wedge - Determination of thickness of a thin sheet/wire
8. a) Optical fibre - Determination of Numerical Aperture and acceptance angle
b) Compact disc- Determination of width of the groove using laser.
10. Ultrasonic interferometer – determination of the velocity of sound and compressibility of liquids
11. Post office box - Determination of Band gap of a semiconductor.
13. Viscosity of liquids - Determination of co-efficient of viscosity of a liquid by Poiseuille’s flow

TOTAL: 30 PERIODS

CHEMISTRY LABORATORY) (Minimum of 8 experiments to be conducted)
1. Estimation of HCl using Na2CO3 as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler's method.
4. Determination of chloride content of water sample by argento metric method.
5. Estimation of copper content of the given solution by Iodometry.
6. Determination of strength of given hydrochloric acid using pH meter.
7. Determination of strength of acids in a mixture of acids using conductivity meter.
8. Estimation of iron content of the given solution using potentiometer.
9. Estimation of iron content of the water sample using spectrophotometer (1, 10- Phenanthroline/thiocyanate method).
10. Estimation of sodium and potassium present in water using flame photometer.
12. Pseudo first order kinetics-ester hydrolysis.
14. Determination of CMC.
15. Phase change in a solid.

TOTAL: 30 PERIODS
OUTCOMES:
Upon Completion of the course, the students will be able to:

- Use the different measuring devices and meters to record the data with precision
- Identify the properties of liquids by applying various methods
- Identify the properties of materials using the principles of optics and thermal physics
- Apply different methods to record the contents of water sample
- Record the phase changes of solid

TEXTBOOKS:
2. Laboratory Manual - Department of Chemistry, CEGC, Anna University, 2014.

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GE7161 COMPUTER PRACTICES LABORATORY

OBJECTIVES:

- To search, generate and manipulate data.
- To analyze, present and visualize data.
- To understand the basic programming constructs and articulate how they are used to develop a program with a desired runtime execution flow.
- To articulate where computer programs fit in the provision of computer-based solutions to real world problems.
- To learn to use data structures.

LIST OF EXPERIMENTS
1. Search, generate, manipulate data using MS office/ Open Office
2. Presentation and Visualization – graphs, charts, 2D, 3D
3. Problem formulation, Problem Solving and Flowcharts
4. C Programming using Simple statements and expressions
5. Scientific problem solving using decision making and looping.
6. Simple programming for one dimensional and two dimensional arrays.
7. Solving problems using String functions
8. Programs with user defined functions
9. Program using Recursive Function
10. Program using structures and unions.

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

- Write and compile programs using C programs.
- Write program with the concept of Structured Programming
- Identify suitable data structure for solving a problem
- Demonstrate the use of conditional statement.
- Create applications using user defined data structures and string functions

TOTAL: 60 PERIODS
OBJECTIVES:

- To illustrate the appropriate register of Technical English used in academic and workplace contexts.
- To apply reading strategies like summarising, reviewing etc while reading technical content like journal articles, reports, manuals etc.
- To describe and interpret the data given in one linguistic format and try to explain the same data in another format.
- To listen and speak in formal contexts using appropriate language forms and tone.
- To identify and compare different language characteristics and structures of various types of technical documents like job application, business letters, user manual and reports and apply this knowledge in writing these documents.

UNIT I

ANALYTICAL READING

Listening - Listening to Informal and Formal Conversations; Speaking – Conversation Skills (opening, turn taking, closing) - Explaining How Something Works-Describing Technical Functions and Applications; Reading – Analytical Reading, Deductive and Inductive Reasoning; Writing- Vision Statement – Structuring Paragraphs.

UNIT II

SUMMARISING

Listening- Listening to Lectures/ Talks on Science & Technology; Speaking – Summarizing/ Oral Reporting, Reading – Reading Scientific and Technical Articles; Writing- Extended Definition – Lab Reports – Summary Writing.

UNIT III

DESCRIBING VISUAL MATERIAL

Listening-Listening to a Panel Discussion; Speaking–Speaking at Formal Situations; Reading – Reading Journal Articles - Speed Reading; Writing-Data Commentary-Describing Visual Material- Writing Problem-Process- Solution-The Structure of Problem-Solution Texts- Writing Critiques.

UNIT IV

WRITING/E-MAILING THE JOB APPLICATION

Listening- Listening to/ Viewing Model Interviews; Speaking –Speaking at Different Types of Interviews – Role Play Practice (Mock Interview); Reading – Reading Job Advertisements and Profile of the Company Concerned; Writing- Job Application – Cover Letter – Résumé Preparation.

UNIT V

REPORT WRITING

Listening- Viewing a Model Group Discussion; Speaking –Participating in a Discussion - Presentation; Reading – Case Study - Analyze -Evaluate – Arrive at a Solution; Writing– Recommendations- Types of Reports (Feasibility Report)- Designing and Reporting Surveys- – Report Format.- Writing Discursive Essays.

TEACHING METHODS:

Practice writing
Conduct model and mock interview and group discussion.
Use of audio – visual aids to facilitate understanding of various forms of technical communication.
Interactive sessions.
EVALUATION PATTERN:
Internals – 50%
End Semester – 50%

TOTAL:60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Learn the structure and organization of various forms of technical communication
- Listen and respond to technical content.
- Use different forms of communication in their respective fields.
- Communicate well during job interview
- Demonstrate writing skills for technical reports and job application

TEXTBOOK:

REFERENCES:

MA7251
MATHEMATICS - II
(Common to all branches of B.E. / B.Tech. Programmes in II Semester)

OBJECTIVES:
- To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- To develop an understanding of the standard techniques of complex variable theory in particular analytic function and its mapping property.
- To familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals.
- To acquaint the students with Differential Equations which are significantly used in Engineering problems.
- To make the students appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.
UNIT I MATRICES

UNIT II VECTOR CALCULUS

UNIT III ANALYTIC FUNCTION
Analytic Functions – Necessary and Sufficient Conditions for Analyticity - Properties – Harmonic Conjugates – Construction of Analytic Function - Conformal Mapping – Mapping by Functions w = z + c, az \( \frac{1}{2} \), \( \frac{1}{2} \) - Bilinear Transformation.

UNIT IV COMPLEX INTEGRATION

UNIT V LAPLACE TRANSFORMS

TOTAL: 60 PERIODS

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

- Evaluate real and complex integrals using the Cauchy integral formula and the residue Theorem
- Appreciate how complex methods can be used to prove some important theoretical results.
- Evaluate line, surface and volume integrals in simple coordinate systems
- Calculate grad, div and curl in Cartesian and other simple coordinate systems, and establish identities connecting the quantities
- Use Gauss, Stokes and Greens theorems to simplify calculations of integrals and prove simple results.

TEXT BOOKS:

REFERENCES:
GE7251  ENVIRONMENTAL SCIENCE AND ENGINEERING  L T P C 3 0 0 3

OBJECTIVES:
- To study the facts about environment.
- To find solution to scientific, technological, economic and political environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world.
- To study the dynamic processes and understand the features of the earth's interior.
- To explore how waste management can be implemented.

UNIT I  ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY  14
- Field Study of Common Plants, Insects, Birds
- Field Study of Simple Ecosystems – Pond, River, Hill Slopes, etc.

UNIT II  ENVIRONMENTAL POLLUTION  8
Definition – Causes, Effects and Control Measures of: (A) Air Pollution (B) Water Pollution (C) Soil Pollution (D) Marine Pollution (E) Noise Pollution (F) Thermal Pollution (G) Nuclear Hazards – Soil Waste Management: Causes, Effects and Control Measures of Municipal Solid Wastes – Role of an Individual in Prevention of Pollution – Pollution Case Studies – Disaster Management: Floods, Earthquake, Cyclone and Landslides.
- Field Study of Local Polluted Site – Urban / Rural / Industrial / Agricultural.

UNIT III  NATURAL RESOURCES  10
- Field Study of Local Area to Document Environmental Assets – River / Forest / Grassland / Hill / Mountain.
UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT

UNIT V HUMAN POPULATION AND THE ENVIRONMENT

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

- Have public awareness of environment at infant stage.
- Suggest solutions to control pollution
- Analyze the impact of deforestation.
- Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.

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TOTAL: 45 PERIODS

Attested

DIRECTOR
Centre for Academic Courses
Anna University, Chennai-600 025
OBJECTIVES
- To draw free hand sketches of basic geometrical shapes and multiple views of objects.
- To draw orthographic projections of lines and planes.
- To draw orthographic projections of solids.
- To draw the development of surfaces of objects.
- To draw isometric and perspective views of simple solids.

CONCEPTS AND CONVENTIONS (NOT FOR EXAMINATION)

UNIT I  PLANE CURVES AND FREE HANDSKETCHING  14

UNIT II  PROJECTION OF POINTS, LINES AND PLANESURFACES  14
Orthographic Projection - Principles - Principal Planes - First Angle Projection - Projection of Points. Projection of Straight Lines (only First Angle Projections) Inclined to both the Principal Planes - Determination of True Lengths and True Inclinations by Rotating Line Method and Trapezoidal Method and Traces Projection of Planes (Polygonal and Circular Surfaces) Inclined to both the Principal Planes by Rotating Object Method.

UNIT III  PROJECTION OF SOLIDS  14
Projection of Simple Solids like Prisms, Pyramids, Cylinder, Cone and Truncated Solids when the Axis is Inclined to both the Principal Planes by Rotating Object Method and Auxiliary Plane Method.

UNIT IV  PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES  14
Sectioning of Solids in Simple Vertical Position when the Cutting Plane is Inclined to the one of the Principal Planes and Perpendicular to the other – Obtaining True Shape of Section. Development of Lateral Surfaces of Simple and Sectioned Solids – Prisms, Pyramids Cylinders and Cones. Development of Lateral Surfaces of Solids with Cut-Outs and Holes.

UNIT V  ISOMETRIC AND PERSPECTIVE PROJECTIONS  15

COMPUTER AIDED DRAFTING (DEMONSTRATION ONLY)  3
Introduction to Drafting Packages and Demonstration of their use.

L=45+T=30, TOTAL: 75 PERIODS
OUTCOMES:
Upon Completion of the course, the student will be able to:
- Perform free hand sketching of basic geometrical shapes and multiple views of objects.
- Draw orthographic projections of lines, planes and solids
- Obtain development of surfaces.
- Prepare isometric and perspective views of simple solids.
- Comprehend the different methods of Engineering drawing and apply suitably

TEXT BOOK:

REFERENCES:

Publication of Bureau of Indian Standards:

Special points applicable to University Examinations on Engineering Graphics:
1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day.
OBJECTIVES:

- To understand the basic Electrical and Electronic abstractions on which analysis and design of electrical and electronic circuits and systems are based, including lumped circuit, digital and operational amplifier abstractions.
- To enhance the capability to use abstractions to analyze and design simple electronic circuits.
- To understand how complex devices such as semiconductor diodes and field-effect transistors are modeled and how the models are used in the design and analysis of useful circuits.
- To introduce the basic concepts of DC circuits with Kirchoff’s laws.
- To introduce different methods of circuit analysis using Network theorems and topology.

UNIT I  VOLTAGE AND CURRENT LAWS  9
Nodes, Paths, Loops, and Branches - Kirchoff’s Current Law - Kirchoff’s Voltage Law, Single Loop Circuit, Single Node-Pair Circuit, Series and Parallel Connected Independent Sources, Resistors in Series, and Parallel Voltage and Current Division

UNIT II  CIRCUIT ANALYSIS TECHNIQUES  9

UNIT III  SEMICONDUCTOR DEVICES  6

UNIT IV  RECTIFIERS, AMPLIFIERS AND OSCILLATORS  9
FWR - Filter - Capacitance Input Filter - Choke Input Filter – CE Amplification with and without feedback – Analysis and Frequency Response – CS MOSFET Amplifier – Analysis

UNIT V  OPERATIONAMPLIFIER  12

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

- Perform circuit analysis using various laws and theorems.
- Provide the characteristics and operation of PN junction diode, zener diode, laser diode and tunnel diode.
- Plot the V-I characteristics of BJT and MOSFET devices.
- Analyze the behavior of various amplifiers and oscillators.
- Point out the operation of operational amplifier and perform different applications using it.
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CS7251 PROGRAMMING AND DATASTRUCTURES I

OBJECTIVES:
- To be exposed to pointers in C programming.
- To design, analyze and implement of basic data structures and algorithms using C.
- To solve problems using linear and Non-linear data Structures.
- To judge efficiency trade-offs among alternative data structure implementations or combinations.
- To increase the student’s intuitive understanding of sorting techniques.

UNIT I C POINTERS
Pointers – Arrays and Pointers - Pointers and strings - Pointer and Address Arithmetic – Two - Dimensional Arrays and Pointers - Pointers to Functions - Dynamic Memory Allocation - Unions - Enumeration Types - Bit fields - Files.

UNIT II ARRAY BASED LINEAR DATA STRUCTURES
Data abstraction - Abstract Data Types (ADT) - Array ADT - Linear List ADT (Polynomials) - Stack ADT - Queue ADT - Evaluation of expressions.

UNIT III LINKED LIST BASED LINEAR DATA STRUCTURES
Singly Linked Lists - Linked Stacks and Queues - Polynomial ADT - Circularly Linked Lists - Doubly Linked Lists

UNIT IV NON LINEAR DATASTRUCTURES

UNIT V SORTING

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the student will be able to:
- Apply advance C programming techniques such as pointers, dynamic memory allocation, structures to develop solutions for particular problems.
- Explain how to choose the appropriate data structure to solve a programming problem
- Compare and contrast the benefits of dynamic and static data structures implementations
- Discuss the computational efficiency of the principal algorithms for sorting and searching
- Choose efficient data structures and apply them to solve problems

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GE7162 ENGINEERING PRACTICES LABORATORY
(Common to all Branches of B.E. / B.Tech.
Programmes)

OBJECTIVES:
- To provide exposure to the students with hands-on experience on various Basic Engineering Practices in Civil Engineering.
- To provide exposure to the students with hands-on experience on various Basic Engineering Practices in Mechanical Engineering.
- To provide exposure to the students with hands-on experience on various Basic Engineering Practices in Electrical Engineering.
- To provide exposure to the students with hands-on experience on various Basic Engineering Practices in Electronics Engineering.

GROUP – A (CIVIL & ELECTRICAL)

1. CIVIL ENGINEERING PRACTICES

PLUMBING
Basic pipe connections involving the fittings like valves, taps, coupling, unions, reducers, elbows and other components used in household fittings. Preparation of plumbing line sketches.

37
• Laying pipe connection to the suction side of a pump.
• Laying pipe connection to the delivery side of a pump.
• Practice in connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances.

WOOD WORK
• Sawing, planning and making joints like T-Joint, Mortise and Tenon joint and Dovetail joint.

STUDY
• Study of joints in door panels and wooden furniture
• Study of common industrial trusses using models.

2. ELECTRICAL ENGINEERING PRACTICES 15
• Basic household wiring using Switches, Fuse, Indicator and Lamp etc.,
• Stair case light wiring
• Tube – light wiring
• Preparation of wiring diagrams for a given situation.
• Study of Iron-Box, Fan Regulator and Emergency Lamp

GROUP – B (MECHANICAL AND ELECTRONICS) 15

3. MECHANICAL ENGINEERING PRACTICES
WELDING
• Arc welding of Butt Joints, Lap Joints, and Tee Joints
• Gas welding Practice.
• Basic Machining - Simple turning, drilling and tapping operations.
• Study and assembling of the following:
  a. Centrifugal pump
  b. Mixie
  c. Air Conditioner.

DEMONSTRATION ON FOUNDRY OPERATIONS.
4. ELECTRONIC ENGINEERING PRACTICES 15
• Soldering simple electronic circuits and checking continuity.
• Assembling electronic components on a small PCB and Testing.
• Study of Telephone, FM radio and Low Voltage Power supplies.

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
• Fabricate carpentry components and to lay pipe connections including plumbing works.
• Use welding equipments to join the structures
• Do wiring for electrical connections and to fabricate electronics circuits
• Comprehend the types of the wooden joints and industrial trusses
• Determine the different wiring requirements and prepare the wiring diagram
OBJECTIVES:
- To learn the basic concepts of C.
- To understand and implement basic data structures using C.
- To apply linear and non-linear data structures in problem solving.
- To implement programs using File processing.
- To be exposed to Sorting algorithms.

LIST OF EXPERIMENTS
1. Programs using Arrays and Functions
2. Programs using Structures
3. Array Implementation of Stack and Queue ADTs.
4. Array Implementation of List ADT
5. Programs using Pointers and Dynamic Memory Allocation
6. Linked list Implementation of List, Stack and Queue ADTs.
7. Applications of List, Stack and Queue ADTs.
8. Programs using File Processing
9. Implementation of Binary Trees, Traversal
12. Implementation of Sorting Algorithms

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Implement data structures using C.
- Develop applications based on data structures.
- Implement programs using files.
- Differentiate between the array and list implementation of data structures.
- Choose the appropriate sorting algorithm for any application.

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OBJECTIVES:
- To familiarize the Object Oriented Programming (OOP) concepts, such as abstraction, encapsulation, instances, initializations, polymorphism, overloading, inheritance and generic programming.
- To learn the OOP specific programming languages such as C++ and Java.
- To write programs to solve problems using the OOP language constructs rather than structural programming.
- To understand and know the importance of OOP in real-world problems.
- To familiarize students to create UI applications
- To expose the usage of streams to store and retrieve data

UNIT I  INTRODUCTION TO OBJECT ORIENTED PROGRAMMING AND JAVA
Introduction to OOP – Thinking Object Oriented - Object Oriented Design. Introduction to Java – JVM - Classes and methods – Varieties of Classes – Messages, Instances and Initialization - Constructors and Destructors – Object and Class in java.lang.class - Namespaces – Scope – Method Overloading – Arrays – Type Casting - Constant Objects and Member Functions – Composition - this Pointer – Static Instances.

UNIT II  INHERITANCE AND EXCEPTION HANDLING IN JAVA
Package Access - Java API Packages – Inheritance - Sub Classes and Subclass Types - - Replacement and Refinement – Implications of Inheritance - Exception Handling- Java Exception Hierarchy - Declaring New Exception Types – Assertions - Garbage Collection and Method finalize – String Class - Converting between Types - Inheritance – an Intuitive Description of Inheritance- Subclass, Subtype, and Substitutability – Forms of Inheritance, 'is-a' and 'has-a' rule – Multiple Inheritance

UNIT III  POLYMORPHISM IN JAVA

UNIT IV  FILES AND STREAMS IN JAVA
Files and Streams – Formatted Output - Object Concurrency - Serialization - Generic Collections - Generic Classes and Methods - Visibility and Dependency – Reflection and Introspection - Java Utility Packages and Bit Manipulation – Java Collections.

UNIT V  GUI, MULTIMEDIA AND DATABASE IN JAVA

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Understand the fundamentals of object-oriented programming in Java
- Understand the appropriate roles of subtyping and inheritance, and use them effectively.
- Implement polymorphic code and handle run time errors using exception handling
- Implement concurrent applications using threads.
- Create user-interface applications using GUI components and to understand the event handling principles.
- Identify the generic classes and methods to implement an application
- Use streams to store and retrieve data from database / files
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CS7302 PROGRAMMING AND DATASTRUCTURES II

OBJECTIVES:
- To learn features of C++
- To learn generic data structures using templates
- To increase the student's intuitive understanding of search trees
- To learn advanced tree data structures
- To learn to represent data using graph data structure
- To implement graph algorithms using appropriate data structures

UNIT I INTRODUCTION TO C++
Object Oriented Programming – Native Types and Statements – Functions and Pointers Data Hiding and Member Functions - Object Creation and Destruction.

UNIT II POLYMORPHISM AND GENERIC PROGRAMMING

UNIT III PRIORITY QUEUES AND SEARCH TREES

UNIT IV GRAPHS

UNIT V HASHING AND SEARCHING

TOTAL: 45 PERIODS

41
OUTCOMES:
Upon completion of the course, the students will be able to:
- Analyze the significance of C++.
- Apply appropriate C++ features for problem solving
- Analyze and apply efficient data structures required for an application
- Identify appropriate graph algorithms for solving real-time problems
- Optimize searching by applying hashing techniques

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CS7351
SOFTWARE ENGINEERING
L T P C
3 0 0 3

OBJECTIVES:
- To be aware of generic models to structure the software development process.
- To understand fundamental concepts of requirements engineering and requirements specification.
- To understand different notions of complexity at both the module and system level.
- To be aware of some widely known design methods.
- To understand the role and contents of testing activities in different life cycle phases

UNIT I
SOFTWARE PROCESS MODELS
UNIT II REQUIREMENT ENGINEERING

UNIT III ANALYSIS MODELLING

UNIT IV DESIGN AND TESTING

UNIT V QUALITY AND MAINTENANCE

TOTAL: 45 PERIODS

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

• Select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly define software engineering activities.
• Translate requirements specification into an implementable design, following structured and organized process.
• Design a solution for a given problem using one or more design patterns and implement the design.
• Compile the function on multi-disciplinary teams, to review, document and baseline.
• Analyze testing requirements and perform suitable testing.

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OBJECTIVES:
- To give exposure in the basics of electrical systems
- To understand the concepts behind direct current machines.
- Working principles of alternating current electrical machines are to be studied.
- To know and build mathematical models, block diagrams and signal flow graphs for electrical and mechanical systems.
- To study the time response analysis, frequency response analysis and state models.

UNIT I  INTRODUCTION TO ELECTRICAL ENGINEERING  9

UNIT II  DC MACHINES  9

UNIT III  AC MACHINES  9
Single Phase Transformers : Operating Principle - EMF equation - transformation ratio - Three Phase Induction Motors : Operation - Speed versus Torque Characteristics - Operation and Types of Single Phase Induction Motors - Principle of Synchronous Machines - EMF equation - Introduction to Stepper Motors

UNIT IV  MATHEMATICAL MODELS OF PHYSICAL SYSTEMS  9
Open Loop and Closed Loop Systems - Linear and Non-Linear Systems - Effects of Feedback - Structure of Feedback Control Theory - Differential Equation of Electrical Circuits – Use of Block Diagram and Signal Flow Graphs

UNIT V  TRANSFER FUNCTION AND STATE VARIABLE ANALYSIS  9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Discuss the basics of electric circuits, machines and transformers
- Derive mathematical models of electrical systems
- Identify transfer function and state variables
- Perform analysis on simple real time physical systems.
- Perform state variable analysis

TEXT BOOKS:

REFERENCES:
IT7351  DIGITAL PRINCIPLES AND DESIGN  L T P C  3 0 0 3

OBJECTIVES:
- Learn how to design digital circuits, by simplifying the Boolean functions.
- Learn to design combinational and sequential circuits.
- To study about asynchronous sequential logic.
- Give an idea about designs using PLDs.
- To write code in hardware definition languages for designing larger digital systems.

UNIT I  BOOLEAN ALGEBRA AND LOGIC GATES  9

UNIT II  COMBINATIONAL LOGIC  9

UNIT III  SYNCHRONOUS SEQUENTIAL LOGIC  9

UNIT IV  ASYNCHRONOUS SEQUENTIAL LOGIC  9

UNIT V  MEMORY AND PROGRAMMABLE LOGIC  9

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Design and analyze combinational digital circuits.
- Simplify complex Boolean functions.
- Implement design using MSI chips and PLDs.
- Build digital systems involving combinational & sequential logic and also use HDL to design it.
- Design and analyze asynchronous sequential logic circuits.

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MA7359 ALGEBRA AND NUMBER THEORY L T P C
4 0 0 4

OBJECTIVES:
- To introduce the basic notions of groups, rings, fields which will then be used to solve related problems.
- To introduce the basic notions of polynomial rings, Finite Fields and factorization techniques which will then be used to solve related problems.
- To understand the key points in the theory of numbers.
- To understand the concepts involved in congruence and Diophantine equations.
- To understand classical theorems in Number Theory.

UNIT I GROUPS AND RINGS 12

UNIT II FINITE FIELDS AND POLYNOMIALS 12
Polynomial Rings - Irreducible Polynomials over Finite Fields - Factorization of Polynomials over Finite Fields.

UNIT III DIVISIBILITY THEORY AND CANONICAL DECOMPOSITIONS 12
Division Algorithm - Base-b Representations – Number patterns – Prime and Composite Numbers – GCD – Euclidean Algorithm – Fundamental Theorem of Arithmetic – LCM.

UNIT IV DIOPHANTINE EQUATIONS AND CONGRUENCES 12
Linear Diophantine Equations – Congruence's – Linear Congruence's - Applications: Divisibility tests - Modular Exponentiation - Chinese Remainder Theorem – 2x2 Linear Systems.

UNIT V CLASSICAL THEOREMS AND MULTIPLICATIVE FUNCTIONS 12
Wilson's Theorem – Fermat's Little Theorem – Euler's Theorem – Euler's Phi Functions – Tau and Sigma Functions.

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
- Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
- Demonstrate accurate and efficient use of advanced algebraic techniques.
- Demonstrate their mastery by solving non-trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the text.
- Solve a linear system of equations using direct and iterative methods.
- Formulate linear equations for real life problems and solve them.
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CS7311 DIGITAL LABORATORY

OBJECTIVES:
- To study the pin details and internal logic of standard ICs and test them.
- To learn to construct digital circuits using standard ICs and testing boards.
- To understand the design and implementation of combinational circuits.
- To learn to design and implement sequential circuits like shift registers and counters.
- To expose the students to HDL programming.
- To learn to design and implement a digital system for a given problem (Mini Project).

LIST OF EXPERIMENTS:
1. Verification of Boolean Theorems using basic gates.
2. Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters
3. Design and implement a 4-bit binary adder / subtractor
4. Design and implement Parity generator / checker
5. Design and implement Magnitude Comparator
6. Design and implement an application using multiplexers
7. Design and implement shift – registers
8. Design and implement synchronous counters
9. Design and implement asynchronous counters
10. Coding combinational circuits using HDL.
11. Coding sequential circuits using HDL.
12. Design and implementation of a simple digital system (Mini Project).

TOTAL: 60 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Use theorems and K-maps to simplify Boolean functions
- Design and Implement combinational circuits like arithmetic circuits, decoder and Encoder
- Analyze a given digital circuit – combinational and sequential
- Design synchronous sequential circuits like registers and counters
- Design asynchronous circuits
- Design and Implement a simple digital system for a given specifications

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OBJECTIVES:
- To learn programming constructs of C++.
- To implement the linear and non-linear data structure using STL
- To understand different operations of search trees
- To implement graph traversal and searching algorithms
- Be exposed to searching and sorting algorithms

LIST OF EXPERIMENTS:
1. Array and list implementation of Stack ADT
2. To implement Queue ADT
3. To implement an application of stack/Queue
4. Implement data abstraction by separate compilation of implementation (.h & .cpp) and application (main.cpp)
5. Implement List ADT and use operator overloading to implement functions in List ADT
6. Use inheritance to implement Stack ADT and Queue ADT from List ADT
7. Implement lists using generic classes
8. To implement priority queues – Insert, Delete, Find Min / Max
9. To implement the search trees - Insert, Delete, search
10. Graph representation and traversal
11. Prim’s Algorithm, Kruskal’s algorithm and applications of Depth First Search.
12. Hashing – any two collision resolution techniques-java

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Apply generic programming technique to implement any data structure
- Apply appropriate search trees for an application
- Use graphs in problem solving
- Design and implement an appropriate hashing function for an application
- Discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing.

CS7401 DATABASE MANAGEMENT SYSTEMS

OBJECTIVES:
- To learn the fundamentals and issues in database systems
- To appreciate the design of databases using relational models
- To learn data definition and query languages
- To understand the importance of transaction management in databases
- To emphasize the need for sorting and indexing in databases
- To learn advanced representations of databases suited for real-time applications
UNIT I   INTRODUCTION TO DATABASE SYSTEMS  9
Data - Database Applications - Evolution of Database - Need for Database Management – Data
models - Database Architecture - Key Issues and Challenges in Database Systems

UNIT II   ER AND RELATIONALMODELS  9
ER Models – ER to Relational Mapping – Object Relational Mapping - Relational Model
Constraints - Keys - Dependencies - Relational Algebra - Normalization - First, Second, Third &
Fourth Normal Forms - BCNF – Join Dependencies.

UNIT III  DATA DEFINITION AND QUERYING  8
Basic DDL - Introduction to SQL - Data Constraints - Advanced SQL - Views - Triggers - Database
Security – Embedded & Dynamic SQL

UNIT IV  TRANSACTIONS AND CONCURRENCY  10
Introduction to Transactions - Transaction Systems - ACID Properties - System & Media
Recovery - Need for Concurrency - Locking Protocols – SQL for Concurrency – Log Based
Recovery - Two Phase Commit Protocol - Recovery with SQL - Deadlocks & Managing
Deadlocks

UNIT V   ADVANCED TOPICS IN DATABASES  9
Indexing & Hashing Techniques - Query Processing & Optimization - Sorting & Joins – Database
Tuning - Introduction to Special Topics - Spatial & Temporal Databases – Data Mining and
Warehousing.

TOTAL: 45 PERIODS

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

- Understand and evaluate the role of database management systems in information
  technology and applications.
- Analyse the data requirements and apply ER modelling, derive the database schema using
  conceptual modelling.
- Analyse the issues involved in the design and implementation of a database system.
- Recognise and use contemporary logical design methods and tools for databases and
  implement a database solution to an information technology problem.
- Identify and recommend strategies for managing data security, privacy, audit/control, fraud
  detection, backup and recovery.
- Develop sophisticated queries to extract information from small to large datasets and
  develop insights into future data management tool and techniques.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To study the various ways of analyzing algorithms
- To understand the need for asymptotic notations
- To understand the various algorithm design techniques
- To understand string matching algorithms
- To learn about NP class of problems and their variations

UNIT I ANALYSING ALGORITHMS

UNIT II DIVIDE AND CONQUER & GREEDY DESIGN STRATEGIES

UNIT III DYNAMIC PROGRAMMING AND OTHER DESIGN STRATEGIES

UNIT IV FLOW NETWORKS AND STRING MATCHING

UNIT V NP PROBLEMS

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Analyze any given algorithm and express its complexity in asymptotic notation
- Propose appropriate algorithmic strategy for any given problem
- Design algorithms based on strategy to solve any problem and analyze for its time and space efficiency
- Classify algorithms as deterministic polynomial time and non-deterministic polynomial time
- Analyze, suggest and implement optimal algorithms for deterministic polynomial time problems and approximate algorithms for Non-deterministic polynomial time problems
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CS7451 COMPUTER ARCHITECTURE

OBJECTIVES:
- To identify the functional units in a digital computer system
- To distinguish between the various ISA styles
- To trace the execution sequence of an instruction through the processor
- To compare different approaches used for implementing a functional unit
- To understand the fundamentals of memory and I/O systems and their interaction with the processor
- To evaluate different computer systems based on performance metrics

UNIT I FUNDAMENTALS OF A COMPUTER SYSTEM 12

UNIT II ARITHMETIC FOR COMPUTERS 12

UNIT III BASIC PROCESSING UNIT 12

UNIT IV MEMORY AND I/O 12

52
UNIT V  ILP AND PARALLEL PROCESSING  

TOTAL : 60 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to
- Analyze and Evaluate computer performance & understand how computers represent and manipulate data
- Apply the Boolean algebra, related to designing a computer logic through simple combinational and sequential logic circuits.
- Design a pipeline for consistent execution of instructions with minimum hazards.
- Understand and Compare the properties of shared memory and Memory Management Techniques and cache Memories.
- Generate & evaluate the parallelism both in terms of a single processor and multiple processor.

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OBJECTIVES:
- To analyze the various evolutions of operating systems.
- To learn the basic concepts and roles of an operating system.
- To study the various design issues in developing an operating system.
- To familiarize with the important mechanisms in operating systems.
- To appreciate the emerging trends in operating systems.

UNIT I OPERATING SYSTEMS OVERVIEW 9

UNIT II PROCESS MANAGEMENT 9

UNIT III STORAGE MANAGEMENT 9

UNIT IV I/O SYSTEMS 9

UNIT V CASE STUDY 9

TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Understand the evolution of Operating systems
- Understand the Key concept of Operating Systems
- Analyze the issues in designing Operating Systems
- Analyze the usage and strengths of various algorithms of Operating Systems
- Appreciate the role of various concepts and algorithms towards the performance of the system
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MG7451 PRINCIPLES OF MANAGEMENT L T P C 3 0 0 3

OBJECTIVES:
- To understand the principles and techniques of management
- To understand the basic concepts related to an organization
- To understand the skills, roles and functions of management
- To understand the application tools, techniques, and theories related to planning and motivation
- To understand the application of control techniques and reporting in management

UNIT I INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS 9

UNIT II PLANNING 9

UNIT III ORGANISING 9
UNIT IV  DIRECTING  9

UNIT V  CONTROLLING  9

TOTAL: 45 PERIODS

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

- Gain the ability to learn the different principles and techniques of management in planning, organizing, directing and controlling
- Understand the concepts related to Business
- Demonstrate the roles, skills and functions of management
- Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions
- Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities

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MA7355  PROBABILITY AND QUEUEING THEORY  L T P C
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OBJECTIVES:
- To understand the basics of random variables with emphasis on the standard discrete and continuous distributions.
- To understand the basic probability concepts with respect to two dimensional random variables along with the relationship between the random variables and the significance of the Central Limit theorem.
- To learn the classifications of random processes with emphasis on stationarity of various orders along with strict sense stationarity, wide-sense stationarity and
Upon Completion of the course, the students will be able to:

- Characterize probability models using probability mass (density) functions & cumulative distribution functions.
- Understand the terminology & nomenclature appropriate queueing theory.
- Demonstrate the knowledge and understand the various queueing models.
- Formulate concrete problems using queueing theoretical approaches
- Apply basic probability techniques and models to analyze the performance of computer systems, and, in particular, of networks and queues

UNIT I  RANDOM VARIABLES  12
Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions - Functions of a Random Variable.

UNIT II  TWO - DIMENSIONAL RANDOM VARIABLES  12
Joint Distributions – Marginal and Conditional Distributions – Covariance – Correlation and Linear Regression – Transformation of Random Variables – Central Limit Theorem (For Independent and Identically Distributed Random Variables).

UNIT III RANDOM PROCESSES  12

UNIT IV QUEUEING THEORY  12

UNIT V NON-MARKOVIAN QUEUES AND QUEUEING NETWORKS  12
M/G/1 Queue – Pollaczek Khinchin formula - M/D/1 and M/E\(_{\lambda}/1\) as special cases – Series Queues – Open and Closed Jackson Networks.

TOTAL: 60 PERIODS

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

- To provide the required fundamental concepts in queueing models.
- To make the student acquire sound knowledge of queueing models and apply these techniques in Information and Communication theory, image processing and various fields.

REFERENCES:

TEXT BOOKS:
OBJECTIVES:
- To understand data definitions and data manipulation commands
- To learn about the use of nested and joint queries
- To understand functions, procedures and procedural extensions of databases
- To be familiar with the use of a front end tool
- To understand design and implementation of typical database applications

Experiment the following commands on the Case studies given above:
1. DDL commands:
   a. Creation of tables with appropriate integrity constraints.
   b. Usage of alter, drop commands
2. DML commands:
   a. Data Insertion using different ways
   b. Usage of truncate command
3. SQL Queries
   a. Simple SQL Queries
   b. Nested Queries (IN and NOT IN, EXISTS and NOT EXISTS, UNIQUE and NOT UNIQUE, op ANY, op ALL, op SOME)
   c. NULL value and OUTER JOIN Queries
   d. Aggregation Operators
   e. Grouping and Ordering commands
4. TCL commands:
   a. Setting privileges
   b. Save point, roll back commands
5. Generation of suitable reports.
6. Implementation of suitable front end for querying and displaying the results.

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Use typical data definitions and manipulation commands.
- Design applications to test Nested and Joint Queries
- Implement simple applications that uses Views
- Implement applications that require a Front End Tool and Report Generations
- Critically analyze the use of Tables, Views, functions and Procedures for a realistic database application.
OBJECTIVES:
- To learn shell programming and the use of filters in the UNIX environment.
- To learn to use system calls through C programs.
- To learn to use the file system related system calls.
- To gain knowledge of process creation and communication between processes.
- To learn how process synchronization can be done using semaphores.

LIST OF EXPERIMENTS
1. Basic UNIX commands – learning and usage.
2. Shell Programming.
3. Grep, sed, awk.
4. File system related system calls. (Learn to create, open, read, write, seek into, close files; open, read, write, search, close directories).
5. Process management – Fork, Exec (Learn to create a new process and to overlay an executable binary image on an existing process).
6. Inter-process communication between related processes using pipes.
7. Process synchronization using semaphores (Solutions to synchronization problems like producer consumer problem, dining philosophers’ problem etc...).
8. Inter-process communication among unrelated processes using Shared memory.
9. Inter-process communication among unrelated processes using Message Queues.
10. CPU Scheduling algorithms.

TOTAL: 60 PERIODS

OUTCOMES:
At the end of this course, the students will be able to:
- Apply shell scripting for Problem solving
- Apply system calls for different purposes
- Analyze and solve process synchronization problems
- Use IPC for co-ordination among processes
- Able to choose appropriate algorithms for operations such as CPU Scheduling memory allocation and Page replacement.
OBJECTIVES:
- To understand the division of network functionality into layers.
- To familiarize the functions and protocols of each layer of TCP/IP protocol suite.
- To understand the flow of information from one node to another node in the network.
- To understand the components required to build different types of network.
- To learn concepts related to network addressing.

UNIT I  INTRODUCTION / APPLICATION LAYER  8

UNIT II  TRANSPORT LAYER  9

UNIT III  NETWORK LAYER  10

UNIT IV  DATA LINK LAYER  9

UNIT V  DATA COMMUNICATIONS  9

TOTAL: 45 PERIODS

OUTCOMES:
At the end of this course, the students will be able to:
- Understand/ comprehend the underlying principles of computer networking.
- Study the basic protocols of computer networks, and how they can be used to assist in network design and implementation.
- Develop solutions for networking problems.
- Understand and develop the skills of sub-netting and routing mechanisms.
- Understand and explain Data Communication Systems and its techniques.

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PROGRESS THROUGH KNOWLEDGE

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Attested

DIRECTOR
Centre for Academic Courses
Anna University, Chennai-600 025
OBJECTIVES:
- To learn the architecture and programming of ARM processor
- To learn the architecture and programming of 8051 Microcontroller
- To familiarize with the embedded computing platform design and analysis
- To be exposed to the basic concepts of real time operating systems
- To run and debug programs in an IDE
- To design an embedded processor based system for a real-time application.

UNIT I  INTRODUCTION TO EMBEDDED SYSTEMS AND ARM PROCESSOR 12
Introduction – Complex Systems and Microprocessors - System Design Process – ARM Processor

UNIT II  8051 MICROCONTROLLERS 12

UNIT III  PROCESSES AND OPERATING SYSTEMS 12

UNIT IV  EMBEDDED C PROGRAMMING 12

UNIT V  EMBEDDED COMPUTING PLATFORM DESIGN 12

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Describe the architecture and programming of ARM processor and Microcontroller
- Outline the concepts of Embedded Systems
- Explain the basic concepts of Real Time Operating System design
- Use the Embedded System design techniques to develop an real-time application
- Gain knowledge on Multiprocessors and Networks for Embedded System

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CS7503 OBJECT ORIENTED ANALYSIS AND DESIGN

OBJECTIVES:
- To understand the role of objects in software process models
- To analyze the importance of use cases
- To model the system using standard design diagrams
- To design and manage object based systems
- To study standard OO patterns and their impact on testing

UNIT I INTRODUCTION

UNIT II USECASES
Usecases – Other requirements – Domain Model – System Sequence Diagrams – Operation Contracts - From Requirements to Design

UNIT III DESIGN

UNIT IV ELABORATION

UNIT V PATTERN BASED ANALYSIS AND CASESTUDY

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Understand object fundamentals and create designs using various models
- Study the object constraint language used in design
- Understand and applying patterns, design principles in design
- Analyze design to code conversion, testing and code optimization techniques
- Apply more design patterns and refining logical architecture

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CS7504
THEORY OF COMPUTATION

OBJECTIVES:
- To understand the language hierarchy
- To construct automata for any given pattern and find its equivalent regular expressions
- To design CFG for any given language
- To understand the need for Turing machines and their capability
- To understand undecidable problems and NP problems

UNIT I REGULAR LANGUAGES

UNIT II CONTEXT FREE LANGUAGES

UNIT III TURING MACHINES
UNIT IV  CHOMSKY HIERARCHY
Regular Grammars – Equivalence of Regular Grammar and Finite Automata - Unrestricted Grammars – Equivalence of Type 0 Grammar and Turing Machines – Context Sensitive Languages – Linear Bounded Automata – Equivalence of LBA's and CSG's

UNIT V  UNDECIDABILITY
A Language that is not Recursively Enumerable (RE) – An Undecidable Problem that is RE – Undecidable Problems about Turing Machine – Rice Theorem for Recursive and Recursively Enumerable Languages – Post’s Correspondence Problem (PCP) – Modified Post Correspondence Problem

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Classify languages based on Chomsky hierarchy
- Identify the class of language and design automata or Type x grammar
- Prove equivalence of the different language representations within a class of the Chomsky hierarchy
- Identify the undecidable problems and their class of languages
- Apply and prove a given language is decidable or undecidable

TEXT BOOK:

REFERENCES:
OBJECTIVES:

- To study the classifications and characteristics of signals and systems.
- To acquire knowledge related to Fourier transform and its applications.
- To learn the design of infinite and finite impulse response filters for filtering undesired signals.
- To transform the prototype filter into desired type and realize the filter.
- To understand signal processing concepts in systems having more than one sampling frequency.

UNIT I

SIGNALS AND SYSTEMS


UNIT II

FREQUENCY TRANSFORMATIONS


UNIT III

IIR FILTER DESIGN


UNIT IV

FIR FILTER DESIGN


OUTCOMES:

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

- Analyze and classify signals and systems
- Analyze and apply appropriate frequency transformations for any class of signal
- Analyze and design filters for a given signal processing application
- Identify and compute the errors encountered in a digital signal processing systems
- Design applications that involves signal and image processing
- Justify and apply possible extensions to digital filters for a given application

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CS7511 CASE TOOLS LABORATORY

OBJECTIVES:
- To learn the basics of OO analysis and design skills.
- To be exposed to the UML domain models
- To understand the activity of doing a detailed design with UML including use case, Class, State-chart, activity, sequence
- To learn to map design to code.
- To be familiar with the various testing techniques

LIST OF EXPERIMENTS:
To develop a mini-project by following the 9 exercises listed below:
1. To develop a problem statement.
2. Identify Use Cases and develop the Use Case model.
3. Identify the conceptual classes and develop a domain model with UML Class diagram.
4. Using the identified scenarios, find the interaction between objects and represent them using UML Sequence diagrams.
5. Draw relevant state charts and activity diagrams.
6. Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
7. Develop and test the Technical services layer.
8. Develop and test the Domain objects layer.
9. Develop and test the User interface layer.

SUGGESTED DOMAINS FOR MINI-PROJECT:
1. Passport automation system.
2. Book bank
3. Exam Registration
4. Stock maintenance system.
5. Online course reservation system
6. E-ticketing
7. Software personnel management system
8. Credit card processing
9. e-book management system
10. Recruitment system
11. Foreign trading system
12. Conference Management System
13. BPO Management System
14. Library Management System
15. Student Information System

TOTAL: 60 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Design and implement projects using OO concepts.
- Use the UML analysis and design diagrams.
- Apply appropriate design patterns.
- Create code from design.
- Compare and contrast various testing techniques

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CS7512  COMPUTER NETWORKS LABORATORY  L T P C
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OBJECTIVES:
- To learn socket programming.
- To learn and use network commands.
- To gain knowledge about the working of routing algorithms.
- To use simulation tools to analyze the performance of protocols at different layers in computer networks.
- To be familiar with the contemporary issues in networking technologies

LIST OF EXPERIMENTS
1. Chat Program using TCP Sockets
2. Simulation of HTTP Protocol using TCP Sockets
3. Simulation of DNS using UDP Sockets
4. Simulation of Ping using Raw Sockets
5. Learn to use commands like tcp dump, netstat, ifconfig, nslookup and trace route. Capture ping and trace route PDUs using a network protocol analyzer and examine.
6. Exercise on ARP using live network
7. Devise IP address plan for a mid-size Org network using ideas of subnetting and VLSM. Implement the plan on a simulated network and assign addresses using a DHCP server.
8. Study and configure functionalities of a router and switches (or by simulation)
9. Experiment to understand the concept of Network address translation
10. Simulation of Distance Vector/Link State Routing algorithm
11. Study of TCP/UDP performance using Simulation tool
12. Performance evaluation of Routing protocols using Simulation tool
13. Simulation of error correction code (like CRC)

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Implement protocols using TCP and UDP Sockets.
- Compare the performance of different routing algorithms using simulation tools.
- Configure functionalities of router and switches.
- Compare the performance of different transport layer protocols
- Implement Client/Server Applications
OBJECTIVES:
- To learn the various parsing techniques and different levels of translation
- To learn and understand design issues for all the phases of a compiler
- To learn how to obtain specific object code from source language
- To learn how to optimize the code and schedule for optimal performance
- To learn to parallelize and optimize compilers

UNIT I  FRONT END OF COMPILERS  10
The Structure of Compiler – Lexical Analysis: Role of Lexical Analyzer, Specification and Recognition of Tokens, Syntax Analysis: Top Down Parsing, Bottom up Parsing, LR Parsers: SLR, CLR, and LALR.

UNIT II  INTERMEDIATE CODE GENERATION  9

UNIT III  RUNTIME AND OBJECT CODE GENERATION  9

UNIT IV  CODE OPTIMIZATION  9

UNIT V  SCHEDULING AND OPTIMIZING FOR PARALLELISM  8

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Design the various compiler phases from language specification and identify the issues in different phases
- Analyze the design issues and identify the intermediate code generation that need to be adopted
- Analyze and design the code generators for the specified machine
- Apply the various code optimization techniques and prove the code produced from basic block is optimal
- Analyze the optimization technique for parallelism

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CS7602  MACHINE LEARNING TECHNIQUES  L  T  P  C  3  0  0  3

OBJECTIVES:
- To introduce students to the basic concepts and techniques of Machine Learning.
- To have a thorough understanding of the Supervised and Unsupervised learning techniques.
- To study the various probability based learning techniques.
- To understand the various dimensionality reduction techniques.
- To understand graphical models of machine learning algorithms.

UNIT I  INTRODUCTION

UNIT II  LINEAR MODELS

UNIT III  TREE AND PROBABILISTIC MODELS

70
UNIT IV  DIMENSIONALITY REDUCTION AND EVOLUTIONARY MODELS


UNIT V  GRAPHICAL MODELS


TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Introduce students to the basic concepts and techniques of Machine Learning.
- Have a thorough understanding of the Supervised and Unsupervised learning techniques, design of Neural Networks, etc.
- Apply different models on datasets and design suitable problem solutions
- Study the various probability based learning techniques
- Understand graphical models of machine learning algorithm

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To understand the need and fundamentals of parallel computing paradigms
- To learn the nuances of parallel algorithm design
- To understand the programming principles in parallel and distributed computing architectures
- To learn few problems that are solved using parallel algorithms
- To learn distributed computing incorporating fault tolerance.

UNIT I  INTRODUCTION TO PARALLEL COMPUTING  9

UNIT II  PARALLEL ALGORITHM DESIGN  9

UNIT III  PROGRAMMING USING MESSAGE PASSING AND SHARED ADDRESS SPACE  9

UNIT IV  DISTRIBUTED COMPUTING PARADIGM  9
Paradigms for Distributed applications – Basic algorithms in Message passing Systems – Leader Election in Rings – Mutual Exclusion in Shared Memory.

UNIT V  FAULT TOLERANT DESIGN  9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Understand the need and fundamentals of parallel computing paradigms
- Learn the nuances of parallel algorithm design
- Develop programming knowledge with openMP and MPI.
- Understand the programming principles in parallel and distributed computing architectures
- Design applications by incorporating fault tolerance.
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CS7604 WEB PROGRAMMING L T P C 3 0 0 3

OBJECTIVES:
- To examine some of the most important technologies that are being used today by web developers to build a wide variety of web applications.
- To develop Java-based web programming.
- To highlight the web frameworks in web2.0.
- To build web applications using proven developer tools and message formats.
- To explore several new standards that may play a significant role in the World Wide Web of tomorrow.

UNIT I INTRODUCTION TO THE INTERNET 9

UNITII JAVA PROGRAMMING IN THE INTERNET 9

Attested

DIRECTOR
Centre for Academic Courses
Anna University, Chennai-600 025
UNIT III  DOM, AJAX, JSON

UNIT IV  WEB FRAMEWORKS

UNIT V  WEB SERVICES

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Gain a through knowledge of Internet principles, Web Designing tools
- Build real world applications using Socket Communication, Client side, and Server side Scripting languages
- Build Dynamic web applications using server side PHP Programming and Database connectivity.
- Demonstrate knowledge of DOM and SAX objects that interacts with server-based programs
- Identify the suitable web framework to support the development of web applications including web services.

TEXT BOOKS:

REFERENCES:
1. http://www.w3schools.com
OBJECTIVES:
- Learning tools for compiler writing
- Designing the specification of language constructs
- Learning code generation
- Learning code optimization
- Translate code to specific machine object code

LIST OF EXPERIMENTS
1. Tokenizer with LEX for declarations in C language.
2. Tokenizer with LEX for assignment statement.
3. Parser with LEX and YACC to validate -forl statement.
4. Evaluation of arithmetic expression with LEX and YACC.
5. Symbol table creation from a list of declarations.
6. Syntax tree creation from-if statement.
7. Three address code generation from assignment statement with array references.
8. Three address code generation from "while" statement.
9. Construction of flow graph from list of three address statements.
10. Constant propagation in a flow graph.
11. Translation of three address code to assembly language with fixed number of registers.
12. Stack and heap management at run time.

OUTCOMES:
Upon completion of the course, the students will be able to:
- Implement the token recognizer from token specification
- Implement the parser from the syntax specification
- Implement the intermediate code generator for the specified intermediate language
- Implement simple optimizations
- Implement translator with specific input and object language

TOTAL: 60 PERIODS

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OBJECTIVES:
- Try and develop the most important technologies that are being used today by web developers to build a wide variety of web applications.
- To develop Java based web programming.
- Web applications using technologies such as Java, Javascript, AJAX, Ruby on Rails, Django, Jena, Servlets, PHP, XML, RSS, XSLT, JSON etc.
- To learn and develop web services.
- To build web applications using proven developer tools Dreamweaver/Flex/Silver Light etc.
## LIST OF EXPERIMENTS
1. Using InetAddress class, Socket Programming in Java
2. RMI
3. Client side scripting using
   - XHTML
   - Javascript - DOM
   - CSS
4. XML DTD, Parsers, XSLT, XPATH, SAX
5. Programming with AJAX, JQuery, JSON
6. Server Side programming (implement these modules using any of the server side scripting languages like PHP, Servlets, JSP etc.,
   Gathering form data
   Querying the database
   Response Generation
   Session management
   MySQL/JDBC/Oracle
7. Case Study – Sample Application development
8. Ruby-on-Rails setup and programming
9. Django, Jena – Integrating Databases and applications
10. JAX – RPC
11. WSDL
12. SOAP

### TOTAL: 60 PERIODS

## OUTCOMES:
Upon completion of the course, the students will be able to:
- Apply the Object Oriented features of Java for programming on the internet
- Implement socket programming and Client side scripting in Java
- Design a Web application using various technologies such as Java, XML, AJAX, Servlets, PHP, JSP, Django and Jena.
- Create applications using web services such as WSDL and SOAP
- Develop application using Dreamweaver/Flex/Silver Light etc.

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OBJECTIVES:
- To understand the concept of cloud and utility computing.
- To understand the various issues in cloud computing.
- To familiarize themselves with the lead players in cloud.
- To appreciate the emergence of cloud as the next generation computing paradigm.
- To be able to set up a private cloud.

UNIT I INTRODUCTION
8

UNIT II VIRTUALIZATION
9
Data Center Technology - Virtualization - Characteristics of Virtualized Environments - Taxonomy of Virtualization Techniques – Virtualization and Cloud Computing – Pros and Cons of Virtualization - Implementation Levels of Virtualization - Tools and Mechanisms: Xen, VMWare, Microsoft Hyper-V.

UNIT III CLOUD COMPUTING MECHANISM
9

UNIT IV HADOOP AND MAP REDUCE
10
Apache Hadoop – Hadoop Map Reduce – Hadoop Distributed File System- Hadoop I/O- Developing a Map Reduce Application - Map Reduce Types and Formats - Map Reduce Features– Hadoop Cluster Setup – Administering Hadoop.

UNIT V SECURITY IN THE CLOUD
9

OUTCOMES:
Upon completion of the course, the students will be able to:
- Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
- Identify the architecture, infrastructure and delivery models of cloud computing.
- Explain the core issues of cloud computing such as security, privacy and interoperability
- Choose the appropriate technologies, algorithms and approaches for the related issues.
- Understand the concepts of Big data tool and its analysis techniques

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CS7702  SECURITY IN COMPUTING  L T P C  3 0 0 3

OBJECTIVES:
- To understand security design principles
- To learn secure programming techniques
- To understand the mathematics behind cryptography
- To know the standard algorithms used to provide confidentiality, integrity and authenticity
- To understand the security requirements in operating systems and databases
- To learn about the security applications in wireless environment.

UNIT I  SECURITY DESIGN PRINCIPLES  9

UNIT II  SECURE PROGRAMMING TECHNIQUES  9
Worms and Other Malware – Buffer Overflows – Client State Manipulation – SQL Injection – Password Security – Cross Domain Security in Web Applications – Attack Patterns – Preventing XSRF – Preventing XSS, Preventing XXS.

UNIT III  SYMMETRIC CIPHERS & INTRODUCTION TO NUMBER THEORY  9

UNIT IV  PUBLIC-KEY ENCRYPTION AND HASHFUNCTIONS  9

UNIT V  SECURITY APPLICATIONS  9

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Understand the approaches, trade-offs in security design principles.
- Discuss various types of attacks and their characteristics.
- Learn secure programming techniques
- Apply number theory in public key encryption techniques.
- Design a secure operating system and databases.
- Discuss the various platform security models in wireless environment.

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CS7703 WIRELESS NETWORKS L T P C
3 0 0 3

OBJECTIVES:
- To learn the fundamental technologies that help in the networking of wireless devices.
- To learn about different wireless technologies
- To study the popular Cellular networking technologies
- To learn about the evolution of cellular systems
- To understand the various wireless standards used right from 2G to 5G cellular networks

UNIT I INTRODUCTION AND WIRELESS LANS
OUTCOMES:
Upon completion of the course, the students will be able to:

- Understand and explain the basics of Wireless Communication Networks
- Discuss the features of different protocols for Wireless and Cellular Networks
- Analyse the issues in designing various protocols for wireless & cellular networks
- Understand and appreciate the contribution of various algorithms and protocols towards the performance of wireless systems
- Analyse and compare the importance of various wireless technologies.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To identify the problem based on societal needs
- To interview people on societal problems that require computerization
- To suggest creative solutions to societal problems
- To explore possible alternative solutions
- To estimate risk and develop a prototype

The aim of this course is to encourage the students to identify projects that help in exploring variables that promote creativity and innovation. Each student is expected to choose a real life or socially relevant problem. At the end of the project, students should be familiar with the state of art in their respective fields. They would be able to apply the concepts learnt to relevant research problems or practical applications. This course is to motivate them to learn concepts, models, frameworks, and tools that engineering graduates’ need in a world where creativity and innovation is fast becoming a pre-condition for competitive advantage.

OUTCOMES:
Upon completion of this course, the students will be able to
- Convert user requirements to a software architecture diagram
- Identify and specify the pre-processing necessary to solve a problem
- Suggest optimum solutions by comparing the different solutions from an algorithmic perspective
- Discover the research implications in any societal problem
- Design and use performance metrics to evaluate a designed system
- Perform SWOT and PESTEL Analysis

1. Internals
   a. First Review
      i. Block Diagram of the proposed solution for a societal / creative problem
      ii. New Contribution in terms of modifications to existing algorithm or suggestion of new ones
      iii. Detailed Design of each module
      iv. Evaluation Metrics
      v. Test Cases
   b. Second Review
      i. Implementation - Justifying pros and Cons
      ii. Coding - highlighting what has been reused and what is being written
   c. Third Review
      i. Test Runs
      ii. Performance Evaluation based on Metrics
      iii. Project Documentation

2. Externals
   • Presentation, Viva-Voce, Report submission.
OUTCOMES:
Upon completion of the course, the students will be able to
- Convert user requirements to a software architecture diagram
- Identify and specify the pre-processing necessary to solve a problem
- Suggest optimum solutions by comparing the different solutions from an algorithmic perspective
- Discover the research implications in any societal problem
- Design and use performance metrics to evaluate a designed system
- Perform SWOT and PESTEL Analysis

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CS7712 SECURITY LABORATORY

OBJECTIVES:
- To understand SQL injection and Buffer Overflow
- To understand cross scripting
- To learn to implement the algorithms DES, RSA, SHA-1
- To understand the trusted OS models
- To learn to use tools

LIST OF EXPERIMENTS:
1. Implement the SQL injection attack.
2. Implement the Buffer Overflow attack.
3. Implement Cross Site Scripting and Prevent XSS.
4. Understanding Malwares working and detection.
5. Implement Hacking windows - Windows login password.
7. Implement the Symmetric cryptography algorithm Simplified DES algorithm
8. Implement the public key cryptographic RSA algorithm
9. Implement the Secure hash algorithm.
10. Write a program to implement a set of rules combining the secrecy controls of the Bell-LaPadula with integrity controls of the Biba model
11. Installation of rootkits and study about the variety of options
12. Demonstrate intrusion detection system using any tool.

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to
- Write program to perform SQL injection attack and buffer overflow attack
- Write programs on cryptographic and hashing algorithm.
- Design trusted operating system models.
- Discuss various functionality of root kit.
- Demonstrate the working of intrusion detection system
OBJECTIVES:

- To encourage the students to comprehend the knowledge acquired from first semester to sixth semester of B.E degree course through periodic exercises
- To familiarize students with latest happenings in the area of Computer Science and Engineering
- To learn to write technical content in a well-structured manner
- To familiarize with creation of documentation for existing source code based projects
- To familiarize students with the process of Technical writing using tools for documentation, drawing, compiling etc.

LIST OF EXPERIMENTS

1. Activity – 1
   Periodic tests with Objective Type Questions.

2. Activity – 2
   Write an article / paper based on project works done by the students in their previous semesters, Present a PPT based on the article
   Structure the content using either a standard IEEE template or a standard template base, with the elements viz., equations, algorithms, images, graphs, charts, Tables etc., by using appropriate tools

3. Activity – 3
   Take an existing software project and create – Software source code documentation and Help generation using tools.

Method of Evaluation:

1. Component – 1:
   periodic tests with objective type questions based on their academic syllabi

2. Component – 2:
   Seminars and paper presentations

3. Component – 3:
   Source code documentation and Help generation

TOTAL: 30 PERIODS

OUTCOMES:

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

- Refresh the basic concepts of the subjects in the curriculum
- Acquire knowledge about the latest happenings in the area of Computer Science and Engineering
- Write technical content in a well-structured manner
- Create documentation and help for source code based projects
- Acquire knowledge about a Technical Report
REFERENCES:
4. www.ieee.org/documents/MSW_A4_format.doc
5. Word / Latex / LyX, Adobe Frame Maker, SnagIt, MS Visio
6. Javadoc, ROBO Doc or any other equivalent tools for source code documentation

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CS7001 ADHOC AND SENSOR NETWORKS L T P C 3 0 0 3

OBJECTIVES
- To study the protocols and the functionalities of ad hoc networks
- To understand various applications developed based on ad hoc networking
- To know about sensor networks
- To learn about the security issues in ad hoc and sensor networks
- To learn the protocols used in various layers of sensor networks

UNIT I INTRODUCTION AND MAC PROTOCOLS 9

UNIT II ROUTING PROTOCOLS 9

UNIT III TRANSPORT LAYER AND SECURITY ISSUES 9

UNIT IV MAC AND ROUTING IN WIRELESS SENSOR NETWORKS 9

UNIT V TRANSPORT, QoS AND SECURITY IN WIRELESS SENSOR NETWORKS 9

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Comprehend the challenges and design issues in ad hoc and sensor networks
- Analyze protocols developed for ad hoc and sensor networks
- Evaluate the performance of protocols from a QoS perspective
- List the security issues in Ad-hoc and sensor networks.
- Design and develop new protocols for adhoc and sensor networks.

TEXT BOOKS:

REFERENCES:

CS7002 ADVANCED TOPICS ON DATABASES

OBJECTIVES
- To know advanced concepts in databases in large scale analytics.
- To learn concepts behind parallel, distributed, active, spatial, temporal and object databases.
- To learn reasoning and query processing.
- To understand the challenges in designing multimedia databases.
- To familiarize with state of the art in advanced databases

UNIT I PARALLEL AND DISTRIBUTED DATABASES 9
Large-scale Data Analytics in the Internet Context – Map Reduce Paradigm - Run-time System for Supporting Scalable and Fault-Tolerant Execution - Paradigms: PigLatin and Hive - Parallel Databases versus Map Reduce.

UNIT II INTELLIGENT AND INTERNET DATABASES 9
Active Databases – Syntax and Semantics: Starburst, Oracle, DB2 – Taxonomy – Applications –
Properties – Rule Modularization – Rule Debugging – IDEA Methodology – XML Databases -
XML Databases: XML-Related Technologies - XML Schema- XML Query Languages- Storing
XML in Databases-XML and SQL- Native XML Databases- Web Databases.
UNIT III  TEMPORAL AND OBJECT DATABASES  9
Overview – Data types – Associating Facts – Temporal Query Language – TSQL2 – Time
Ontology –Language Constructs–Architecture–Temporal Support –Object Database and
Change Management – Change of Schema – Implementing Database Updates in O2 –
Benchmark Database Updates – Performance Evaluation.

UNIT IV  COMPLEX QUERIES AND REASONING  9
Logic of Query Languages – Relational Calculi – Recursive Rules – Syntax and Semantics of
– Compilation and Optimization – Recursive Queries in SQL – NoSQL – The Need – Basics –
Interfacing and Interacting with NoSQL.

UNIT V  SPATIAL, TEXT AND MULTIMEDIA DATABASES  9
Traditional Indexing Methods : Secondary Keys, Spatial Access Methods – Text Retrieval –
– Uncertainties in DB, KB and RDB.

TOTAL: 45 PERIODS

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

- Write programs involving query optimization.
- Write programs related to large scale data processing.
- Use Map-Reduce in data analytics.
- Evaluate the performance of temporal and spatial databases.
- Write suitable indexing programs for multimedia databases.
- Critically analyze the state-of-the-art in advanced databases distributed systems.

TEXT BOOKS:
2. Carlo Zaniolo, Stefano Ceri, Christos Faloutsos, Richard T. Snodgrass, V.S.
    Subrahmanian and Roberto Zicari, "Advanced Database Systems", Morgan Kauffmann

REFERENCES:
1. Aris Gkoulalas - Divanis and Abderrahim Labbi, "Large-Scale Data Analytics", Springer
    Science and Business Media, 2014.
2. Abraham Silberschatz, Henry F. Korth and S. Sudharshan, "Database System
3. C.J.Date, A.Kannan and S.Swamynathan, "An Introduction to Database Systems", Eighth
    Education India, 2010.
OBJECTIVES:
- To provide students with a theoretical as well as practical understanding of agile software development practices and how small teams can apply them to create high-quality software.
- To provide a good understanding of software design and a set of software technologies and APIs.
- To do a detailed examination and demonstration of Agile development and testing techniques.
- To understand the benefits and pitfalls of working in an Agile team.
- To understand Agile development and testing.

UNIT I AGILE METHODOLOGY
9

UNIT II AGILE PROCESSES
9

UNIT III AGILITY AND KNOWLEDGE MANAGEMENT
9

UNIT IV AGILITY AND REQUIREMENTS ENGINEERING
9

UNIT V AGILITY AND QUALITY ASSURANCE
9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Realize the importance of interacting with business stakeholders in determining the requirements for a software system
- Perform iterative software development processes: how to plan them, how to execute them.
- Point out the impact of social aspects on software development success.
- Develop techniques and tools for improving team collaboration and software quality.
- Perform Software process improvement as an ongoing task for development teams.
- Show how agile approaches can be scaled up to the enterprise level.

TEXT BOOKS:
REFERENCES:

CS7004 ARTIFICIAL INTELLIGENCE

OBJECTIVES:
- To understand the various characteristics of Intelligent agents
- To learn about the different search strategies in AI
- To learn to represent knowledge in solving AI problems
- To understand the different ways of designing software agents
- To know about the various applications of AI.

UNIT I INTRODUCTION

UNIT II PROBLEM SOLVING METHODS

UNIT III KNOWLEDGE REPRESENTATION

UNIT IV SOFTWARE AGENTS

UNIT V APPLICATIONS

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Use appropriate search algorithms for any AI problem
- Represent a problem using first order and predicate logic
- Provide the apt agent strategy to solve a given problem
- Design software agents to solve a problem
- Design applications for NLP that uses Artificial Intelligence.

TEXT BOOKS:

REFERENCES:

CS7005 BIG DATA ANALYTICS

OBJECTIVES
- To know the fundamental concepts of big data and analytics.
- To explore tools and practices working with big data
- To familiarize with different Recommendation system
- To learn about stream computing.
- To know about the research that requires the integration of large amounts of data.

UNIT I INTRODUCTION TO BIGDATA
Evolution of Big data - Best Practices for Big data Analytics - Big data characteristics - Validating
- The Promotion of the Value of Big Data - Big Data Use Cases- Characteristics of Big Data Applications - Perception and Quantification of Value -Understanding Big Data Storage - A General Overview of High-Performance Architecture - HDFS - Map Reduce and YARN - Map Reduce Programming Model

UNIT II CLUSTERING AND CLASSIFICATION

UNIT III ASSOCIATION AND RECOMMENDATION SYSTEM

UNIT IV GRAPH MEMORY AND STREAM MEMORY

UNIT V NOSQL DATA MANAGEMENT FOR BIG DATA AND VISUALIZATION
NoSQL Databases : Schema-less Models: Increasing Flexibility for Data Manipulation-Key Value Stores- Document Stores - Tabular Stores - Object Data Stores - Graph Databases Hive - Sharding – Hbase – Analyzing big data with twitter - Big data for E-Commerce Big data for blogs - Review of Basic Data Analytic Methods using R.

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Work with big data tools and its analysis techniques
- Design efficient algorithms for mining the data from large volumes
- Design an efficient recommendation system
- Design the tools for visualization
- Learn NoSQL databases and management

TEXT BOOKS:
2. David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph", 2013.

REFERENCES:

CS7006 COMPUTER GRAPHICS THEORY AND PRACTICE

OBJECTIVES:
- To understand the theory behind display technologies and 2D primitive drawing
- To familiarize oneself with Modeling techniques for drawing 3D primitives and viewing
- To learn the theory behind popular rendering algorithms
- To get to understand the fractal theory for modeling complex objects
- To learn and use OpenGL programming to implement the concepts

UNIT I 2D GRAPHICS

UNIT II 3D MODELING AND VIEWING
3D Object representations – Polygonal Mesh Modeling – Bezier Curves and B-Splines - Transformations –3D Viewing

UNIT III RENDERING

UNIT IV FRACTALS AND ANIMATION
UNIT V    GRAPHICS PROGRAMMING WITH OPENGL

OUTCOMES:  
Upon completion of the course, the students will be able to:
- Devise, solve, demonstrate 2D applications of Computer Graphics
- Devise, Solve and demonstrate 3D Modeling, Transformations and Projections
- Appreciate advanced 3D Graphics that leads to visual realism
- Perceive Knowledge on Fractal theory, color models, Animation
- Do programming in OpenGL for drawing basic 3D scenes and add realism

TEXT BOOKS:

REFERENCES:

CS7007    CYBER FORENSICS   L T P C
3    0    0    3

OBJECTIVES:
- To understand the basic concepts and principles of computer forensics
- To identify the smart practices for carrying out forensic investigation
- To understand the legal frameworks and law measures in cyber forensics
- To understand the application of tools and techniques for recovering digital evidence
- To understand the certification requirements and standards for licensing

UNIT I    INTRODUCTION

UNIT II    INVESTIGATIVE SMART PRACTICES
Forensics Investigative Smart Practices – Time and Forensics – Incident closure

UNIT III    LAWS AND PRIVACY CONCERNS
Laws Affecting Forensic Investigations – Search Warrants and Subpoenas – Legislated Privacy Concerns – The admissibility of Evidence – First Response and Digital Investigator

UNIT IV    DATA ACQUISITION AND REPORT WRITING
Data Acquisition – Finding Lost Files – Document Analysis – Case Management and Report Writing – Building a Forensics Workstation

UNIT V    TOOLS AND CASE STUDIES

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Understand the fundamentals of computer forensics
- Identify and apply smart practices for investigation
- Recognize the legal underpinnings and critical ways affecting forensics
- Apply tools and methods to uncover hidden information in digital systems
- Learn current licensing and certification requirements.

TEXTBOOKS:

REFERENCE:

CS7008 DATABASE TUNING  L  T  P  C
OBJECTIVES:
- To get the feel of database tuning basics.
- To learn the concepts of optimizing the database design.
- To write procedures involving query planning.
- To learn to troubleshoot the database issues.
- To understand the usage of benchmark databases for demonstrating database tuning approaches

UNIT I  FUNDAMENTALS OF TUNING

UNIT II  INDEX TUNING
Indexes – Clustering Indexes – Non Clustering Indexes – Composite Indexes – Comparison of Indexing and Hashing techniques – Hot Table – Storage Structure Optimization through Index Tuning.

UNIT III  DESIGN AND QUERY OPTIMIZATION

UNIT IV  INTERFACE AND CONNECTIVITY TUNING
Objects, Application Tools and Performance – Tuning the Application Interface – Bulk Loading Data – Accessing Multiple Databases – ODBC – JDBC Tuning — Case Studies: Tuning E-Commerce Application – Data Warehouse Tuning.
UNIT V  TROUBLESHOOTING


TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Design databases involving normalization
- Write optimized code for accessing multiple databases
- Use tuning tools for different database operations
- Troubleshoot database issues.
- Use benchmark databases for demonstrating concepts behind database tuning

TEXT BOOKS:

REFERENCES:

CS7009  GAME THEORY

OBJECTIVES:
- To get introduced to the fundamental concepts of game design and development
- To learn the underlying theory of 2D and 3D Computer Graphics principles and algorithms for game design
- To learn the processes, mechanics, issues in game design
- To understand the architecture of game engines
- To develop and implement simple games using standard APIs

UNIT I  INTRODUCTION

Elements of Game Play – Artificial Intelligence – Getting Input from the Player - Sprite Programming – Sprite Animation - Multithreading – Importance of Game Design – Game Loop.

UNIT II  3D GRAPHICS FOR GAME PROGRAMMING

Coordinate Systems, Ray Tracing, Modeling in Game Production, Vertex Processing, Rasterization, Fragment Processing and Output Merging, Illumination and Shaders, Parametric Curves and Surfaces.

UNIT III  GAME DESIGNPRINCIPLES

Character Development, Story Telling, Narration, Game Balancing, Core mechanics, Principles of level design, Genres of Games, Collision Detection, Game Logic, Game AI, Path Finding, Case study : Tetris.

UNIT IV  GAMING ENGINEDESIGN

Renderers, Software Rendering, Hardware Rendering, and Controller Based Animation, Spatial Sorting, Level of Detail, Collision Detection, Standard Objects, and Physics, Case study : The Sims
UNIT V  GAME DEVELOPMENT
Developing 2D and 3D Interactive Games Using OpenGL, DirectX – Isometric and Tile Based Games, Puzzle Games, Single Player Games, Multi-Player Games. Case study: Mine craft.

TOTAL : 45 PERIODS

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

- Understand the essential elements of Game Design and Game Play
- Understand the Core Concepts of Graphics for Game Design and Development
- Familiarize oneself with Game Design Principles and process
- Understand the essential components of Game Engine for Designing and Developing Games
- Develop Interactive 2D/3D Games

TEXT BOOKS:

REFERENCES:
**OBJECTIVES:**
- To understand the basics of programming for heterogeneous architectures
- To know programming for massively parallel processors
- To understand the issues in mapping algorithms for GPUs
- To introduce different GPU programming models
- To understand the need for Synchronization and perform synchronization for parallel programming

**UNIT I GPU ARCHITECTURE**
Understanding Parallelism with GPU – Typical GPU Architecture - CUDA Hardware Overview - Threads, Blocks, Grids, Warps, Scheduling - Memory Handling with CUDA: Shared Memory, Global Memory, Constant Memory and Texture Memory.

**UNIT II GPU PROGRAMMING**

**UNIT III PROGRAMMING ISSUES**

**UNIT IV ALGORITHMS ON GPU**
Parallel Patterns: Convolution, Prefix Sum, Sparse Matrix - Matrix Multiplication - Programming Heterogeneous Cluster - CUDA Dynamic Parallelism.

**UNIT V OTHER GPU PROGRAMMING MODELS**
Introducing OpenCL, OpenACC, Thrust.

**OUTCOMES:**
Upon completion of the course, the students will be able to:
- Describe GPU Architecture
- Write programs using CUDA
- Implement algorithms in GPUs to get maximum occupancy and throughput
- Program in any heterogeneous programming model
- Perform synchronization for parallel processing.

**TEXT BOOKS:**

**REFERENCES:**
OBJECTIVES:
- To understand the necessity to adopt green computing practices
- To understand the green IT methodologies for creation and management of green assets
- To understand the role and efficiency of green grids in Green IT
- To understand the role and adoption of Environmentally Responsible Business Strategies in Green IT
- To understand the various Green Compliance Protocols, standards, audits and emerging carbon issues in green IT

UNIT I  FUNDAMENTALS  9

UNIT II  GREEN ASSETS AND MODELING  9

UNIT III  GRID FRAMEWORK  9

UNIT IV  GREEN COMPLIANCE  9

UNIT V  GREEN INITIATIVES WITH IT and CASE STUDIES  9
Green Initiative Drivers and Benefits with IT - Resources and Offerings to Assist Green Initiatives. - Green Initiative Strategy with IT - Green Initiative Planning with IT - Green Initiative Implementation with IT - Green Initiative Assessment with IT. The Environmentally Responsible BusinessStrategies(ERBS)–CaseStudyScenariosforTrialRuns–CaseStudies–Applying Green IT Strategies and Applications to a Home, Hospital, Packaging Industry and Telecom Sector

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Explain the necessity of Green IT.
- Outline methodologies for creating Green Assets and their management.
- Appreciate the use of Grid in Green IT.
- Develop case studies related to Environmentally Responsible Business Strategies.
- Understand the Green Compliance Protocols, standards, audits and emerging carbon issues in green IT

TEXT BOOKS:

REFERENCES:

CS7012 INFORMATION RETRIEVAL TECHNIQUES  L  T  P  C
OBJECTIVES:
- To learn the concepts behind IR
- To acquire knowledge on document representation
- To understand the operation of web search
- To learn the algorithms related to text classification, indexing and searching
- To practice developing IR models

UNIT I  INTRODUCTION

UNIT II  MODELING AND RETRIEVAL EVALUATION

UNIT III  TEXT CLASSIFICATION, INDEXING AND SEARCHING

UNIT IV  WEB RETRIEVAL AND WEBCRAWLING

UNIT V  TYPES OF IR AND APPLICATIONS

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Use an open source search engine framework and explore its capabilities
- Represent documents in different ways and discuss its effect on similarity
- Utilize indexing and Searching
- Design and implement an innovative feature in a search engine
- Develop an effective IR model
TEXTBOOKS:

REFERENCES:

CS7013 INFORMATION VISUALIZATION TECHNIQUES 

OBJECTIVES:
- To understand perception based modelling
- To comprehend techniques for Visualization of Information spaces
- To familiarize the multidimensional Visualization
- To understand the abstraction techniques using textual mode
- To Know how to create interactive visual interfaces

UNIT I FOUNDATIONS FOR DATA VISUALIZATION   9
Visualization Stages – Experimental Semiotics Based on Perception Gibson’s Affordance Theory – A Model of Perceptual Processing – Types of Data.

UNIT II COMPUTER VISUALIZATION    9

UNIT III MULTIDIMENSIONAL VISUALIZATION   9

UNIT IV TEXTUAL METHODS OF ABSTRACTION  9
From Graphics to Pure Text – Figure Captions in Visual Interfaces – Interactive 3D Illustrations with Images and Text – Related work – Consistency of rendered – Images and their Textual labels – Architecture – Zoom Techniques for Illustration Purpose – Interactive Handling of Images and Text.

UNIT V ABSTRACTION IN TIME AND INTERACTIVE SYSTEMS  9

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Observe and analyze perception based on Modelling Techniques for the given domain
- Use any available computer based tools to visualize large information spaces
- Appreciate the use and applicability of multidimensional visualization for specific domains
- Design and perform image annotation and use it appropriate application context
- Explore tools and understand the usage contexts for designing creative visual interfaces

TEXT BOOKS:

REFERENCE:

CS7014 MICROPROCESSORS AND INTERFACING L T P C
3 0 0 3

OBJECTIVES:
- To study the basic architectures and operational features of various processors
- To learn assembly language programming
- To design and understand the multiprocessor configurations
- To understand the interfacing concepts of the peripheral devices with processors
- To know about advanced microprocessors

UNIT I THE 8086 MICROPROCESSOR 9

UNIT II 8086 SYSTEM DESIGN 9
8086 Signals – Basic Configurations –Max and Min Modes – System Bus Timing –System Design Using 8086. Multiprocessor Configurations – Coprocessor, Closely Coupled and Loosely Coupled Configurations

UNIT III I/O INTERFACING 9

UNIT IV 80286, 80386 AND 80486 MICROPROCESSORS 9

UNIT V ADVANCED MICROPROCESSORS 9
Introduction to the Pentium Microprocessor –Special Pentium Registers –Pentium Memory Management - Instruction Set - Enhancements in Pentium Pro - Pentium II - Pentium III - Pentium IV Processors - Introduction to Multi Core Processors.

TOTAL : 45 PERIODS

99
OUTCOMES:
Upon completion of the course, the students should be able to:
- Explain the internal architecture of the 8086 microprocessor
- Write Assembly Language Programs with 8086
- Perform Interfacing with the 8086 microprocessor
- Perform system design using 8086
- Point out the salient features of the Architectures of advanced processors - 80386, 80486, Pentium I, II, III, IV microprocessors
- Compare and contrast the features of different processors.

TEXT BOOKS:

REFERENCES:
2. India Pvt. Ltd., 2001

CS7015 MOBILE COMMUNICATIONS

OBJECTIVES:
- To provide the student with an understanding of advanced multiple access techniques
- Discuss basic technical standards related to WiFi and sensor networks.
- To enable the student to synthesis and analyze wireless and mobile cellular communication system
- To understand the underlying concepts and protocols of mobile network and mobile transport layer.
- Provide knowledge of routing mechanisms and the three classes of approaches: proactive, on-demand, and hybrid

UNIT I INTRODUCTION

UNIT II WIRELESS LAN

UNIT III WIRELESS SYSTEMS
UNIT IV MOBILE NETWORK LAYER
Mobile Internet Protocol - IP Packet Delivery - Tunneling and Encapsulation - Reverse Tunneling –
DHCP - IPv6 - Security Concerns – Mobile IPv6 – Overview – Basic Operation – Header Extension –
Alignment Requirements – Home Address Option – Type 2 Routing Header – Mobility Header –
Mobility Options – Neighbor Discovery Messages – Procedure of Mobile IPv6 – Route Optimization –
Movement Detection – Dynamic Home Agent Address Discovery – Mobile Prefix
Solicitation / Advertisement – Relationship with IPsec

UNIT V TRANSPORT LAYER AND APPLICATIONS
Traditional TCP – TCP Improvements for Mobile Devices – TCP over 2.5/3G Wireless Networks –
Wireless Application Protocol (WAP) – Mobile Applications.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
• Explain the features of smart mobiles and other smart devices
• Develop applications for Android and iOS
• Explain protocols related to routing in mobile networks
• Understand the medium access techniques in GSM, wireless LAN, UMTS handoff, mobility and location management systems.
• Analyze the data transfer at network and transport layer in the wireless network.

TEXT BOOKS:

REFERENCES:

CS7016 NATURAL LANGUAGE PROCESSING

OBJECTIVES:
• To learn the fundamentals of natural language processing
• To appreciate the use of CFG and PCFG in NLP
• To implement basic grammar rules for English Language
• To understand the role of semantics and pragmatics
• To overview the variety of applications of NLP

UNIT I INTRODUCTION

UNIT II SPEECH
Speech – Phonetics - Speech Synthesis - Automatic Speech Recognition - Speech Recognition - Advanced Topics - Computational Phonology
UNIT III  SYNTAX  9

UNIT IV  SEMANTICS AND PRAGMATICS  9
The Representation of Meaning - Computational Semantics - Lexical Semantics - Computational Lexical Semantics - Computational Discourse

UNIT V  APPLICATIONS  9
Information Extraction - Question Answering and Summarization - Dialogue and Conversational Agents - Machine Translation

TOTAL :45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Tag a given text with basic language features
- Design an innovative application using NLP components
- Implement a rule based system to tackle morphology/syntax of a language
- Design a tag set to be used for statistical processing for real-time applications
- Compare and contrast use of different statistical approaches for different types of NLP applications.

TEXT BOOKS:

REFERENCES:
### UNIT II SEMANTICS
9

### UNIT III FUNCTIONS
9

### UNIT IV PROGRAMMING TECHNIQUES
9

### UNIT V MODERN PROGRAMMING TECHNIQUES
9

**TOTAL: 45 PERIODS**

**OUTCOMES:**
Upon completion of the course, the students will be able to
- Write programs related to syntax and semantics
- Compare programs between C, Ada, Perl and Small Talk
- Write programs using scripting languages
- Demonstrate event-driven and concurrent programming using prolog
- Apply prolog for developing distributed systems

**TEXT BOOK:**

**REFERENCES:**
OBJECTIVES:
- To understand the roles of the project manager
- To understand the threats and opportunities in project management
- To gain expertise in size, effort and cost estimation techniques
- To understand the techniques available to keep the project's aims and objectives under control
- To understand how to approach non-technical problems
- To appreciate management issues like team structure, group dynamics

UNIT I  INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT  9

UNIT II  PROJECT EVALUATION  9

UNIT III  ACTIVITY PLANNING  9

UNIT IV  MONITORING AND CONTROL  9

UNIT V  MANAGING PEOPLE AND ORGANIZING TEAMS  9

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Comprehend the roles of the project manager.
- Identify the threats and opportunities in project management.
- Gain knowledge about size, effort and cost estimation techniques
- Apply the techniques available to keep the project's aims and objectives, under control
- Analyze the different approaches of non-technical problems
- Appreciate the management issues like team structure, group dynamics.

TEXT BOOK:

REFERENCES:
OBJECTIVES:
- To introduce object oriented programming using an easy-to-use language.
- To use iterators and generators.
- To test objects and handle changing requirements.
- To be exposed to programming over the web.
- To learn how to read and write files in Python.

UNIT I  INTRODUCTION TO PYTHON  9

UNIT II  STRINGS  9
Strings - Unicode - Formatting - String Methods - Bytes - Encoding - Regular Expressions - Verbose - Case Studies

UNIT III  CLASSES  9
Closures - List of Functions - List of Patterns - File of Patterns - Generators - Defining Classes - Instantiating Classes - Instance Variables - Iterators – Itertools - Assert - Generator Expressions

UNIT IV  TESTING AND FILES  9
Test Case - Testing Invalid Inputs - Refactoring - Handling Changing Requirements - Reading and Writing Text Files - Binary Files - Stream Objects - Standard Input, Output and Error.

UNIT V  XML, SERIALIZATION AND WEBSERVICES  9
XML - Atom Feed - Parsing XML - Searching for Nodes - lxml - Generation – Serializing Objects - Pickle Files - Versions - Debugging - Serializing to JSON - HTTP Web Services - Features – httplib2

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to
- Understand the concepts of Object Oriented Programming
- Use generators and Iterators
- Develop test cases and handle refactoring
- Integrate scripts with python packages
- Use objects in web applications

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To understand the how software agents reduce information overhead.
- To gain knowledge in design and architectural frameworks and methodology.
- To know Distributed multi-agent concepts and its Variaty.
- To understand the factors to be considered due to security challenges.
- To get practical application insights with real-world problems.

UNIT I  INTRODUCTION TO AGENTS
Agent Characteristics - Object vs. Agent. Agent Types - Interacting with Agents - Agent From Direct Manipulation to Delegation - Interface Agent, Metaphor with Character – Problem Solving Agent, Rational Agent. Direct Manipulation versus Agent Path to Predictable.

UNIT II  AGENT-BASED MODELING, ANALYSIS AND DESIGN METHODOLOGIES

UNIT III  DISTRIBUTED MULTI-AGENTS

UNIT IV  SECURITY AND ANONYMITY IN AGENTS

UNITV APPLICATIONS

TOTAL :45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Identify and explore the advantages of agents
- Design the architecture for an agent
- Design the agent in details in a view for the implementation
- Design communicative actions with agents.
- Design typical agents using a tool for different types of applications

TEXTBOOKS:

REFERENCES:

107
Upon completion of the course, the students will be able to:

- Critically analyze and appreciate the evolution of software defined networks
- Point out the various components of SDN and their uses
- Explain the use of SDN in the current networking scenario
- Design and develop various applications of SDN
- Explain the concepts and principles behind software defined networks.

**REFERENCES:**

OBJECTIVES:
- To understand the basics of software quality
- To learn and apply the metrics related to software quality
- To emphasize the importance of testing in SDLC
- To differentiate the test case view for functional and structural testing
- To gain insight into automation

UNITI  INTRODUCTION TO SOFTWARE QUALITY

UNITII  SOFTWARE QUALITY METRICS AND RELIABILITY

UNITIII  TEST CASE DESIGN

UNITIV  TEST MANAGEMENT

UNITV  CONTROLLING AND MONITORING

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Assess Quality standards of various software using Software Quality Metrics
- Judge the use of infrastructure components and use configuration items for Quality control.
- Differentiate between Functional and Structural Testing practices
- Test a given application using various testing methods.
- Develop test cases to remove bugs

TEXT BOOKS:

REFERENCES:

CS7071  DATA WAREHOUSING AND DATA MINING  

OBJECTIVES:
- To make the students to understand data mining principles and techniques
- To discover the knowledge imbibed in the high dimensional system.
- To study algorithms for finding the hidden interesting patterns in data.
- To expose the students to the concepts of Data warehousing Architecture and Implementation.
- To study the overview of developing areas – Web mining, Text mining and Big Data Mining Tools of Data mining.

UNIT I  INTRODUCTION TO DAWAREHOUSING  
Evolution of Decision Support Systems - Data Warehousing Components – Building a Data Warehouse, Data Warehouse and DBMS, Data Marts, Metadata, Multidimensional Data Model, OLAP vs. OLTP, OLAP Operations, Data Cubes, Schemas for Multidimensional Database: Stars, Snowflakes and Fact Constellations.

UNIT II  DATAWAREHOUSE PROCESS AND ARCHITECTURE  
Types of OLAP Servers, 3 –Tier Data Warehouse Architecture, Distributed and Virtual Data Warehouses, Data Warehouse Implementation, Tuning and Testing of Data Warehouse, Data Staging (ETL) Design and Development, Data Warehouse Visualization, Data Warehouse Deployment, Maintenance, Growth, Business Intelligence Overview - Data Warehousing and Business Intelligence Trends - Business Applications - Tools - SAS

UNIT III  INTRODUCTION TO DATA MINING  
Data Mining - KDD versus Data Mining, Stages of the Data Mining Process - Task Primitives, Data Mining Techniques - Data Mining Knowledge Representation – Data Mining Query Languages, Integration of a Data Mining System with a Data Warehouse – Issues, Data preprocessing – Data Cleaning, Data Transformation, Feature Selection, Dimensionality Reduction, Discretization and Generating Concept Hierarchies - Mining Frequent Patterns Association- Correlation.

UNIT IV  CLASSIFICATION AND CLUSTERING  
Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods - Clustering techniques – Partitioning Methods - k-means-Hierarchical Methods - Distance-based Agglomerative and Divisible Clustering, Density-Based Methods – Expectation Maximization - Grid Based Methods – Model-Based Clustering Methods – Constraint – Based Cluster Analysis – Outlier Analysis.

UNIT V  TRENDS IN DATAMINING AND BIG DATA MINING  
Introduction to Big Data-Case Studies on Big Data Mining Tools: Apache Hadoop, Apache Mahout and R - Mining Complex Data Objects, Spatial Databases, Temporal Databases, Multimedia Databases, Time Series and Sequence Data; Text Mining – Web Mining- Application and Trends in Data Mining

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Build a data warehouse for a real-world system
- Write programs for classification and clustering
- Evaluate various mining techniques on complex data objects
- Verify a data using a various data mining methods.
- Develop applications using Big Data Mining Tools.

TEXT BOOKS:

REFERENCES:

CS7072 GRAPH THEORY
OBJECTIVES:
- To comprehend graphs as modeling and analysis tool
- To introduce various data structures with graph theory
- To learn fundamentals behind principle of counting and combinatorial.
- To learn about the distinguishing features of various graph algorithms.
- To study the applications of graphs in solving engineering problems.

UNIT I INTRODUCTION

UNIT II TREES, CONNECTIVITY & PLANARITY

UNIT III MATRICES, COLOURING AND DIRECTED GRAPH

UNIT IV PERMUTATIONS & COMBINATIONS
UNIT V  GENERATINGFUNCTIONS  9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Write programs involving basic graph algorithms
- Write programs for graph coloring
- Differentiate the potential use of directed and undirected graphs
- Learn about the distinguishing features of various graph algorithms
- Study the applications of graphs in solving engineering problems

TEXT BOOKS:

REFERENCES:

CS7073  MULTIMEDIA TOOLS AND TECHNIQUES  L T P C
3 0 0 3

OBJECTIVES:
- To comprehend the building blocks of multimedia.
- To learn how to use multimedia on the web
- To know and use authoring metaphors and tools concerned
- To learn data compression techniques and theory behind
- To have an understanding of the domains, platforms of multimedia applications

UNIT I  BASIC ELEMENTS  9

UNIT II  MULTIMEDIA ON THE WEB  9

UNIT III  AUTHORING and TOOLS  9
UNIT IV DATA COMPRESSION

UNIT V MULTIMEDIA APPLICATIONS
Multimedia Databases – Content Based Information Retrieval, Multimedia Communications - Multimedia Information Sharing and Retrieval – Applications – Social Media Sharing, Online Social Networking - Virtual Reality - Multimedia for Portable Devices, Collaborative Multimedia Applications

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Grasp on basic elements of multimedia
- Explain the importance of web based multimedia usage
- Use and apply authoring tools for web and e-learning
- Analyze and apply simple data compression techniques in both lossless and lossy categories.
- Apply the knowledge to analyze, understand and design domain specific multimedia applications

TEXT BOOK:

REFERENCES:
4. www.Webstyleguide.com

CS7074 SOFT COMPUTING

OBJECTIVES:
- To give students knowledge of soft computing theories fundamentals,
- To learn the fundamentals of non-traditional technologies and approaches to solving hard real-world problems.
- To learn and apply artificial neural networks, fuzzy sets and fuzzy logic, and genetic algorithms in problem solving and use of heuristics based on human experience
- To introduce the ideas of fuzzy sets, fuzzy logic To become familiar with neural networks that can learn from available examples and generalize to form appropriate rules for inferencing systems
- To familiarize with genetic algorithms and other random search procedures useful while seeking global optimum in self-learning situations

UNIT I NEURAL NETWORKS - I

113
UNIT II NEURAL NETWORKS - II  9

UNIT III FUZZY LOGIC - I  9

UNIT IV FUZZY LOGIC – II  9
(Fuzzy Membership, Rules) Membership Functions, Interference in Fuzzy Logic, Fuzzy If-Then Rules, Fuzzy Implications and Fuzzy Algorithms, Fuzzifications and Defuzzifications, Fuzzy Controller, Industrial Applications

UNIT V GENETIC ALGORITHM  9

TOTAL :45 PERIODS

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

- Awake the importance of tolerance of imprecision and uncertainty for design of robust and low-cost intelligent machines.
- Acquire knowledge of soft computing theories fundamentals and so they will be able to design program systems using approaches of these theories for solving various real-world problems.
- Try and integrate the knowledge of neural networks, fuzzy logic, genetic algorithms, probabilistic reasoning and rough sets.
- Gain knowledge on hybrid systems, which are combinations of neural networks, fuzzy logic and genetic algorithms.
- Discover knowledge to develop genetic algorithm to solve various applications.

TEXT BOOKS:

REFERENCES:
1. Simon Haykin, "Neural Networks", Prentice Hall of India, 1999
CS7075 WEB DESIGN AND MANAGEMENT

OBJECTIVES:
- To learn the concepts of Web design patterns.
- To learn the concepts of Web page design.
- To understand and learn the scripting languages with design of web applications.
- To apprehend the Pre-Production Management of web design management
- To learn the maintenance and evaluation of web design management

UNIT I SITE ORGANIZATION AND NAVIGATION 9

UNIT II ELEMENTS OF PAGE DESIGN 9

UNIT III SCRIPTING LANGUAGES AND ANIMATION USING FLASH F 9

UNIT IV PRE-PRODUCTION MANAGEMENT 9

UNIT V PRODUCTION, MAINTENANCE AND EVALUATION 9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Identify the various issues of web design process and evaluation
- Understand the importance of the web as a medium of communication
- Develop simple web applications using scripting languages
- Develop skills in analyzing the usability of a web site
- Create and maintain responsive websites and employ strategies with user-centered design methodologies.

TEXT BOOKS:

REFERENCES:

**GE7071**

**DISASTER MANAGEMENT**

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**OBJECTIVES:**
- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

**UNIT I**

**INTRODUCTION TO DISASTERS**

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks
- Disasters: Types of Disasters
  - Earthquake, Landslide, Flood, Drought, Fire etc.
  - Classification, Causes, Impacts including Social, Economic, Political, Environmental, Health, Psychosocial, etc.
- Differential Impacts in Terms of Caste, Class, Gender, Age, Location, Disability
- Global Trends in Disasters: Urban Disasters, Pandemics, Complex Emergencies, Climate Change
- Dos and Don'ts During Various Types of Disasters.

**UNIT II**

**APPROACHES TO DISASTER RISK REDUCTION (DRR)**

Disaster cycle - Phases, Culture of Safety, Prevention, Mitigation and Preparedness Community based DRR, Structural-Nonstructural Measures, Roles and responsibilities of community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders - Institutional Processes and Framework at State and Central Level - State Disaster Management Authority (SDMA) – Early Warning System – Advisories from Appropriate Agencies.

**UNIT III**

**INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT**

Factors Affecting Vulnerabilities, Differential Impacts, Impact of Development Projects such as Dams, Embankments, and Changes in Land-use etc.
- Climate Change Adaptation - IPCC Scenario and Scenarios in the Context of India - Relevance of Indigenous Knowledge, Appropriate Technology and Local Resources.

**UNIT IV**

**DISASTER RISK MANAGEMENT IN INDIA**


**UNIT V**

**DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS**

Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and Field Works Related to Disaster Management.

**OUTCOMES:**
Upon completion of the course, the students will be able to:
• Differentiate the types of disasters, causes and their impact on environment and society
• Assess vulnerability and various methods of risk reduction measures as well as mitigation.
• Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.

TEXT BOOKS:

REFERENCES:
1. Govt. of India: Disaster Management Act, Government of India, 2005
OBJECTIVES:

- To understand the global trends and development methodologies of various types of products and services
- To conceptualize, prototype and develop product management plan for a new product based on the type of the new product and development methodology integrating the hardware, software, controls, electronics and mechanical systems
- To understand requirement engineering and know how to collect, analyze and arrive at requirements for new product development and convert them in to design specification
- To understand system modeling for system, sub-system and their interfaces and arrive at the optimum system specification and characteristics
- To develop documentation, test specifications and coordinate with various teams to validate and sustain up to the EoL (End of Life) support activities for engineering customer

UNIT I  FUNDAMENTALS OF PRODUCT DEVELOPMENT  

UNIT II  REQUIREMENTS AND SYSTEM DESIGN  

UNIT III  DESIGN AND TESTING  

UNIT IV  SUSTAINANCE ENGINEERING AND END-OF-LIFE(EoL) SUPPORT  

UNIT V  BUSINESS DYNAMICS – ENGINEERING SERVICES INDUSTRY  

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Define, formulate and analyze a problem
- Solve specific problems independently or as part of a team
- Gain knowledge of the Innovation & Product Development process in the Business Context
- Work independently as well as in teams
- Manage a project from start to finish

TEXTBOOKS:
1. Book specially prepared by NASSCOM as per the MoU.

REFERENCES:

GE7074 HUMAN RIGHTS L T P C
3 0 0 3

OBJECTIVES:
- To sensitize the Engineering students to various aspects of Human Rights.
- To familiarize students with the origins and assumptions of international human rights law
- To expose students the importance of Human Rights act
- To understand the principles of Human Rights in India
- To expose students the role of NGO’s

UNIT I

UNIT II

UNIT III
Theories and Perspectives of UN Laws – UN Agencies to Monitor and Compliance.

UNIT IV
Human Rights in India – Constitutional Provisions / Guarantees.

UNIT V

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Sensitize various aspects of Human Rights
- Understand the principles and institutions of international human rights law, including their origins, assumptions, contents, limits and potential
- Understand the importance of the Human Rights Act 1998
- Understand the role of human rights in contemporary issues relating to terrorism, religion, ethnicity, gender and development
- Analyse a country’s situation or an international situation in terms of human rights and formulate human rights-based initiatives and policies

REFERENCES:

GE7351 ENGINEERING ETHICS AND HUMAN VALUES

OBJECTIVES
- To emphasize into awareness on Engineering Ethics and Human Values.
- Resolve the moral issues in the profession.
- To understand social responsibility of an engineer.
- To appreciate ethical dilemma while discharging duties in professional life.
- Judge a global issue by presenting an optimum solution.

UNIT I HUMAN VALUES

UNIT II ENGINEERING ETHICS

UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION
Engineering as Experimentation - Engineers as Responsible Experimenters - Codes of Ethics - Importance of Industrial Standards - A Balanced Outlook on Law – Anticorruption - Occupational Crime - The Challenger Case Study.

UNIT IV ENGINEER’S RIGHTS AND RESPONSIBILITIES ON SAFETY

UNIT V GLOBAL ISSUES

TOTAL: 45 PERIODS
OUTCOMES:
- To emphasize into awareness on Engineering Ethics and Human Values
- To understand social responsibility of an engineer
- To appreciate ethical dilemma while discharging duties in professional life.
- To develop critical thinking skills and professional judgements
- To develop professional ethical identity to carry forward in their working life

TEXT BOOKS:

REFERENCES:

GE7652 TOTAL QUALITY MANAGEMENT L T P C 3 0 0 3

AIM:
To provide comprehensive knowledge about the principles, practices, tools and techniques of Total quality management.

OBJECTIVES:
- To understand the basic concepts, contribution of gurus, barriers and benefits of TQM
- To understand the basics principles of TQM
- To understand the analysis and applications of tools and techniques in TQM
- To understand the various concepts of TQM, quality concepts related to manufacturing and service processes.
- To understand the quality standards and systems in TQM

UNIT I INTRODUCTION 9
Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of Product and Service Quality –Definition of TQM - Basic Concepts of TQM — Gurus of TQM (Brief introduction) - TQM Framework- Barriers to TQM –Benefits of TQM.

UNIT II TQM PRINCIPLES 9

UNIT III TQM TOOLS AND TECHNIQUES I 9
UNIT IV  TQM TOOLS AND TECHNIQUES II  9
Quality Circles – Quality Function Deployment (QFD) – Taguchi Quality Loss Function – TPM –
Concepts, Improvement Needs – Performance Measures-- Cost of Quality - BPR.

UNIT V  QUALITY MANAGEMENT SYSTEM  9
Introduction — Benefits of ISO Registration — ISO 9000 Series of Standards — Sector-Specific
Standards — AS 9100, TS16949 and TL 9000 — ISO 9001 Requirements — Implementation —
Documentation — Internal Audits — Registration - ENVIRONMENTAL MANAGEMENT SYSTEM:
Introduction — ISO 14000 Series Standards — Concepts of ISO 14001 — Requirements of ISO
14001 — Benefits of EMS.

OUTCOMES:
Upon completion of the course, the students will be able to:
• Gain basic knowledge in total quality management relevant to both manufacturing and
service industry including IT sector.
• Implement the basic principles of TQM in manufacturing and service based organization.
• Apply the tools and techniques-I of quality management to Manufacturing and services
processes.
• Explore industrial applications of Quality function deployment, Taguchi quality concepts
and TP and apply the tools and techniques-II of quality management to manufacturing and
services processes.
• Gain the knowledge on various ISO standards and quality systems.

TEXT BOOK:
1. Dale H. Besterfield, Carol B. Michna, Glen H. Besterfield, Mary B.Sacre, Hemant
Urdhwareshe and Rashmi Urdhwareshe, “Total Quality Management”, Pearson Education,

REFERENCES:
2003.
India,2006.

IT7071  DIGITAL IMAGE PROCESSING  L T P C
3 0 0 3

OBJECTIVES:
• To learn about the basic concepts of digital image processing and various image
transforms.
• To familiarize the student with the image enhancement techniques
• To expose the student to a broad range of image processing techniques and their
applications.
• To appreciate the use of current technologies those are specific to image processing
systems.
• To expose the students to real-world applications of image processing.

UNIT I  FUNDAMENTALS OF IMAGE PROCESSING  9
Introduction – Applications of Image Processing - Steps in image processing Applications –
Digital imaging system- Sampling and Quantization - Pixel connectivity – Distance measures
Color fundamentals and models - File Formats, Image operations.
UNIT II IMAGE ENHANCEMENT AND IMAGE RESTORATION  

UNIT III MULTI RESOLUTION ANALYSIS AND COMPRESSION  

UNIT IV IMAGE SEGMENTATION AND FEATURE EXTRACTION  

UNIT V IMAGE CLASSIFICATION AND APPLICATIONS OF IMAGE PROCESSING  

TOTAL: 45 PERIODS

OUTCOMES:
On Completion of the course, the students should be able to:
- Implement basic image processing algorithms
- Design an application that uses different concepts of Image Processing
- Apply and develop new techniques in the areas of image enhancement- restoration- segmentation- compression-wavelet processing and image morphology.
- Critically analyze different approaches to different modules of Image Processing.
- Analyze and design solutions to problems associated with clustering, classification and use other general techniques

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
To learn about the design of TCP/IP Protocol structure
To learn about the implementation of TCP and IP functionalities in the form of data structures
To learn about how TCP handles input and output with synchronization
To learn about the importance of timers and how it is managed in a TCP communication.
To learn about the functionality of ICMP error processing routines.

UNITI FUNDAMENTALS

UNITII ARP ANDIP
Structure of TCP/IP in OS - Data Structures for ARP - Cache Esign and Management – IP Software Design and Organization - Sending a Datagram to IP.

UNIT III IP ROUTING IMPLEMENTATION
Routing Table - Routing Algorithms - Fragmentation and Reassembly - Error Processing (ICMP) - Multicast Processing (IGMP)

UNIT IV TCP I/O PROCESSING AND FSM

UNITV TCP TIMER AND FLOWCONTROL

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
Learn the fundamentals of internetworking
Have knowledge on the data structures of ARP, IP and TCP software design
Analyze the routing of packets by routers using its table contents

TEXT BOOKS:

REFERENCE:
OBJECTIVES:
- To learn about the design of the UNIX operating system.
- To become familiar with the various data structures used in the UNIX operating systems.
- To learn the various low-level algorithms used in UNIX.
- To understand the fundamental concepts of system calls in the UNIX operating system.
- To know the working of internal algorithms of the UNIX operating system.

UNIT I  OVERVIEW
Advantages and Disadvantages of the Buffer Cache.

UNIT II  FILE SUBSYSTEM
Internal Representation of Files: Inodes – Structure of a Regular File – Directories – Conversion of a Path Name to an Inode – Super Block – Inode Assignment to a New File – Allocation of Disk Blocks.

UNIT III  SYSTEM CALLS FOR THE FILE SYSTEM

UNIT IV  PROCESSES

UNIT V  MEMORY MANAGEMENT AND I/O

TOTAL: 45 PERIODS

OUTCOMES:
On Completion of the course, the students should be able to:
- Learn about the design of the UNIX operating system.
- Become familiar with the various data structures used.
- Learn the various low-level algorithms used in UNIX.
- Design and implement the subsystems of an operating system.
- Explain the data structures of an open source operating system.

TEXT BOOK:

REFERENCES: