PROGRAMME EDUCATIONAL OBJECTIVES:
The objectives of a programme can be broadly defined on five counts:

1. Prepare students to comprehend the fundamental concepts in Computer Science and Engineering
2. Enable students to apply the interaction between theory and practice for problem solving
3. Equip students to critically analyze current trends and learn future issues from a system perspective at multiple levels of detail and abstraction
4. Motivate students to continue to pursue lifelong multidisciplinary learning as professional engineers and scientists and effectively communicate technical information, function effectively on teams, and develop and apply computer engineering solutions within a global, societal, and environmental context
5. Prepare students to critically analyze existing systems in a specific area and develop innovative solutions that cater to the dynamic nature of the computer industry, and may lead to entrepreneurial initiatives.

PROGRAMME OUTCOMES:
Students will be able to:

a) Apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer based systems of varying complexity.

b) Critically analyze a problem, identify, formulate and solve problems in the field of Computer Science and Engineering considering current and future trends.

c) 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.

d) Function effectively on teams to accomplish a common goal.

e) Communicate effectively with a range of audiences and prepare technical documents and make effective oral presentations.

f) Analyze the local and global impact of computing on individuals, organizations, and society.

g) Recognize the need for and possess an ability to engage in lifelong learning, leading to continuing professional development.

h) Use current techniques, skills, and tools necessary for computing practice.

i) Demonstrate advanced knowledge of a selected area within the computer science discipline.

j) Critically analyze existing systems in an area of specialization and develop innovative solutions.
MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES

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

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### EMPLOYABILITY ENHANCEMENT COURSES (EEC)

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# SUMMARY

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*Note: The table represents the credits as per semester for different subject areas.*
COURSE DESCRIPTION:
This course aims at developing the language skills necessary for the first year students of Engineering and Technology.

OBJECTIVES:
- To develop the four language skills – Listening, Speaking, Reading and Writing.
- To improve the students’ communicative competence in English.
- To teach students the various aspects of English language usage.

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- Listening 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
LEARNING OUTCOMES:
- Students will improve their reading and writing skills
- Students will become fluent and proficient in communicative English
- Students will be able to improve their interpersonal communication

TEXTBOOK:

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

MA7151 MATHEMATICS – I
(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 make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.

UNIT I DIFFERENTIAL CALCULUS

UNIT II FUNCTIONS OF SEVERAL VARIABLES

UNIT III INTEGRAL CALCULUS
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.
- Improved facility in algebraic manipulation.
- Fluency in differentiation.
- 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.

TEXTBOOKS:

REFERENCES:

PH7151  
ENGINEERING PHYSICS
(L T P C)
(3 0 0 3)
(Common to all branches of B.E / B.Tech Programmes)

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 9

UNIT II ACOUSTICS AND ULTRASONICS 9

UNIT III THERMAL AND MODERN PHYSICS 9

UNIT IV APPLIED OPTICS 9

UNIT V CRYSTAL PHYSICS 9

OUTCOME:
• The students will understand different moduli of elasticity, their determination and applications.
• The students will gain knowledge on the properties of sound, noise cancellation, and production, detection and applications of ultrasonics.
• The students will acquire sound knowledge on thermal expansion and thermal conductivity of materials. Further they will gain an idea of quantum physics.
• The students will gain knowledge on interferometers, lasers and fiber optics.
• The students will secure knowledge on the basics of crystal structures and their significance. Further they gain basic ideas of growing single crystals.

TEXTBOOKS:
REFERENCES:

CY7151 ENGINEERING CHEMISTRY L T P C
3 0 0 3

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 9
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 9

UNIT III PHOTOCHEMISTRY AND SPECTROSCOPY 9

UNIT IV CHEMICAL THERMODYNAMICS 9
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 NANOCHEMISTRY

OUTCOMES:
Upon Completion of the course, the students will be able to:
• Will be familiar with polymer chemistry, surface chemistry and catalysis.
• Will know the photochemistry, spectroscopy and chemical thermodynamics.
• Will know the fundamentals of nano chemistry.

TEXTBOOKS:

REFERENCES:
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.

TEXTBOOKS:

REFERENCES:

BS7161 BASIC SCIENCES LABORATORY (Common to all branches of B.E. / B.Tech Programmes) 0 0 4 2

OBJECTIVES:

• To inculcate experimental skills to test basic understanding of physics of materials including properties of matter, thermal and optical properties.
• To induce the students to familiarize with experimental determination of velocity of ultrasonic waves, band gap determination and 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
OUTCOME:
Upon completion of the course, the students will be able
• To determine various moduli of elasticity and also various thermal and optical properties of materials.
• To determine the velocity of ultrasonic waves, band gap determination and viscosity of liquids.

(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 argentometric 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-Phenanthrol/ 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:
• The hands on exercises undergone by the students will help them to apply physics principles of optics and thermal physics to evaluate engineering properties of materials.

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

GE7161      COMPUTER PRACTICES LABORATORY       L   T   P   C
0   0   4   2

OBJECTIVES:
• 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 user defined 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.

TOTAL: 60 PERIODS

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.

HS7251 TECHNICAL ENGLISH

OBJECTIVES:
- To enable students acquire proficiency in technical communication.
- To enhance their reading and writing skills in a technical context.
- To teach various language learning strategies needed in a professional environment.

CONTENTS:
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 - Analyse -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:
- Students will learn the structure and organization of various forms of technical communication.
- Students will be able to listen and respond to technical content.
- Students will be able to use different forms of communication in their respective fields.

TEXTBOOK:

REFERENCES:

MA7251 MATHEMATICS - II L T P C
(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 acquaint the student with the concepts of vector calculus, needed for problems in all engineering disciplines.
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow of the electric current.
- To make the student 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
12

UNIT II VECTOR CALCULUS
12
UNIT III  ANALYTIC FUNCTION
Analytic Functions – Necessary and Sufficient Conditions for Analyticity - Properties – Harmonic Conjugates – Construction of Analytic Function - Conformal Mapping – Mapping by Functions \( w = z + c, \ az, \ \frac{1}{z}, \ z^2 \) - 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 these 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 the study of nature and the facts about environment.
- To find and implement scientific, technological, economic and political solutions to 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; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth’s interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

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

UNIT II  ENVIRONMENTAL POLLUTION
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
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:
Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.
- Public awareness of environment at infant stage.
- Ignorance and incomplete knowledge has lead to misconceptions.
- Development and improvement in standard of living has lead to serious environmental disasters.

TEXT BOOKS:

REFERENCES:

GE7152 ENGINEERING GRAPHICS

OBJECTIVES
- To develop in students, graphic skills for communication of concepts, ideas and design of engineering products and expose them to existing national standards related to technical drawings.

CONCEPTS AND CONVENTIONS (NOT FOR EXAMINATION)
UNIT I        PLANE CURVES AND FREE HANDSKETCHING  14

UNIT II        PROJECTION OF POINTS, LINES AND PLANE SURFACES  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.

TEXT BOOK:

REFERENCES:
EC7253 ELECTRONIC DEVICES AND CIRCUITS FOR COMPUTER ENGINEERS

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.

UNIT I VOLTAGE AND CURRENT LAWS

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


UNIT III SEMICONDUCTOR DEVICES

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

UNIT V        OPERATION AMPLIFIER

TOTAL: 45 PERIODS

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.

TEXT BOOKS:

REFERENCES:

CS7251        PROGRAMMING AND DATA STRUCTURES I

OBJECTIVES:
- 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.

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 9
Singly Linked Lists - Linked Stacks and Queues - Polynomial ADT - Circularly Linked Lists - Doubly Linked Lists

UNIT IV NON LINEAR DATA STRUCTURES 9

UNIT V SORTING 9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student will be able to:
• To apply advance C programming techniques such as pointers, dynamic memory allocation, structures to develop solutions for particular problems.
• To explain how to choose the appropriate data structure to solve a programming problem
• To compare and contrast the benefits of dynamic and static data structures implementations

TEXT BOOKS:

REFERENCES:

GE7162 ENGINEERING PRACTICES LABORATORY L T P C
(Common to all Branches of B.E. / B.Tech. Programmes) 0 0 4 2

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

GROUP – A (CIVIL & ELECTRICAL)
1. CIVIL ENGINEERING PRACTICES 15
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.
• 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
• 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:

• Ability to fabricate carpentry components and to lay pipe connections including plumbing works
• Ability to use welding equipments to join the structures
• Ability to do wiring for electrical connections and to fabricate electronics circuits
OBJECTIVES:
- To understand and implement basic data structures using C
- To apply linear and non-linear data structures in problem solving.

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
10. Operations on Binary Trees
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

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.

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:  
• Design problem solutions using Object Oriented techniques.  
• Apply the concepts of data abstraction, encapsulation, polymorphism, overloading, and inheritance for problem solutions.  
• Use the OOP concepts of C++ and Java appropriately in problem solving.

TEXT BOOKS:

REFERENCES:
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

OUTCOMES:
Upon completion of the course, the students will be able to:
- Implement data structure using C++
- Suggest appropriate tree/graph data structure for any given data set.
- Apply hashing concepts for a given problem
- Modify or suggest new data structure for an application
- Appropriate choose the sorting algorithm

TEXT BOOKS:

REFERENCES:
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 notion 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

OUTCOMES:
Upon completion of the course, the students will be able to:
- To differentiate the perspective of various software process models.
- To elicit the requirements for real-time problems.
- To compile a SRS pertaining to industry standards.
- To create a behavioral model from the set of requirements.
- To develop a user-interface design for the given system.
- To outline various software metrics and their context in measuring software programs.
- To estimate the software cost.

TEXT BOOKS:
2. [Additional text provided here]
REFERENCES:

EE7306 ELECTRICAL ENGINEERING AND CONTROL SYSTEMS

OBJECTIVES:
• To give exposure of a basic concept of electrical systems
• To introduce the concept of stationary and rotating electrical machines
• To provide idea for block diagram representation and reduction
• Time response analysis of LTI systems and steady state error.

UNIT I INTRODUCTION TO ELECTRICAL ENGINEERING

UNIT II DC MACHINES

UNIT III AC MACHINES
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
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

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.

TEXT BOOKS:
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


UNIT II COMBINATIONAL LOGIC


UNIT III SYNCHRONOUS SEQUENTIAL LOGIC


UNIT IV ASYNCHRONOUS SEQUENTIAL LOGIC


UNIT V MEMORY AND PROGRAMMABLE LOGIC


OUTCOMES:

On Completion of the course, the students should be able to:

- Design and analyze digital circuits.
- Simplify complex Boolean functions.
- Implement design using MSI chips and PLDs.
- Build digital systems involving combinational and sequential logic.

TEXT BOOK:

REFERENCES:

MA7359 ALGEBRA AND NUMBER THEORY

OBJECTIVES:
- To introduce the basic notions of groups, rings, fields which will then be used to solve related problems.
- To examine the key questions in the Theory of Numbers.
- To give an integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.

UNIT I GROUPS AND RINGS

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

UNIT III DIVISIBILITY THEORY AND CANONICAL DECOMPOSITIONS
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
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
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.
- The students should be able to demonstrate their mastery by solving non-trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the text.

TEXT BOOKS:
REFERENCES:

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
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, FindMin / 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

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
- 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 RELATIONAL MODELS

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

TOTAL: 60 PERIODS
UNIT IV  TRANSACTIONS AND CONCURRENCY  10

UNIT V  ADVANCED TOPICS IN DATABASES  9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Classify modern and futuristic database applications based on size and complexity
- Map ER model to Relational model
- Write queries using normalization criteria
- Compare and contrast various indexing strategies in different database systems
- Appraise how advanced databases differ from traditional databases.

TEXT BOOKS:

REFERENCES:

CS7402  DESIGN AND ANALYSIS OF ALGORITHMS  L  T  P  C  3 0 0 3
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  9
UNIT II  DIVIDE AND CONQUER & GREEDY DESIGN STRATEGIES  9
Analysis of Quick Sort, Merge Sort – Quick Sort Randomized Version – Sorting in Linear Time
- Lower Bounds for Sorting - Selection in Expected Linear Time - Selection in Worst case
Linear Time – Greedy Algorithms - Elements of Greedy Strategy - Huffman Code, Dijkstra’s
Shortest Path Algorithm.

UNIT III  DYNAMIC PROGRAMMING AND OTHER DESIGN STRATEGIES  9
Dynamic Programming – Matrix Chain Multiplication - Elements of Dynamic programming –
Longest Common Sequences – Warshall’s and Floyd’s Algorithm – Transitive Closure - All
Pairs Shortest Path Algorithm – Analysis – Backtracking – Graph Coloring Problem - Branch
and Bound Strategy - Knapsack Problem.

UNIT IV  FLOW NETWORKS AND STRING MATCHING  9
Flow Networks – Ford Fulkerson Method - String Matching - Naive String Matching Algorithm
– Knuth Morris Pratt Algorithm - Analysis.

UNIT V  NP PROBLEMS  9
NP-Completeness – Polynomial Time Verification – Theory of Reducibility - Circuit
Satisfiability – NP - Completeness Proofs – NP Complete Problems: Vertex Cover, Hamiltonian
Cycle and Traveling Salesman Problems – Approximation Algorithms – Approximation Algorithms to Vertex - Cover and Traveling Salesman Problems

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Propose the correct algorithmic strategy to solve any problem
- Write algorithms for any problem based on the strategy
- Analyze any given algorithm and express its complexity in asymptotic notation
- Identify any problem as belonging to the class of P, NP-Complete or NP-Hard
- Propose approximation algorithm for any NP problem

TEXT BOOKS:
2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, “Fundamentals of Computer

REFERENCES:
2. Alfred V Aho, John E Hopcroft and Jeffrey D Ullman, “The Design and Analysis of

CS7451  COMPUTER ARCHITECTURE  L  T  P  C
4  0  0  4

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

UNIT V  
ILP AND PARALLEL PROCESSING  12

OUTCOMES:
Upon completion of the course, the students will be able to
- Identify the functional units of a computer system and their operation
- Point out the various metrics of performance
- Critically analyze the different types of ISA styles
- Explain the data path and control path implementation of a processor
- Discuss the implementations of various functional units
- Point out the characteristics of the memory and I/O systems and discuss their design

TEXTBOOK:

REFERENCES:
OBJECTIVES:
- To learn the concepts of operating systems.
- To learn about the various issues in operating systems.
- To familiarize with the important mechanisms in operating systems.
- To appreciate the emerging trends in operating systems.

UNIT I OPERATING SYSTEMS OVERVIEW

UNIT II PROCESS MANAGEMENT

UNIT III STORAGE MANAGEMENT

UNIT IV I/O SYSTEMS

UNIT V CASE STUDY

TOTAL: 45 PERIODS

OUTCOMES:
On Completion of the course, the students should be able to:
- Articulate the main concepts, key ideas, strengths and limitations of operating systems
- Explain the core issues of operating systems
- Know the usage and strengths of various algorithms of operating systems

TEXT BOOK:
REFERENCES:

MG7451 PRINCIPLES OF MANAGEMENT  L  T  P  C
3  0  0  3

OBJECTIVES:
• To study the Evolution of Management
• To study the functions and principles of management
• To learn the application of the principles in an organization.

UNIT I INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS
Definition of Management – Science or Art – Manager vs. Entrepreneur- Types of Managers-
Managerial Roles and Skills – Evolution of Management –Scientific, Human Relations,
System and Contingency Approaches– Types of Business Organization- Sole Proprietorship,
Partnership, Company- Public and Private Sector Enterprises- Organization Culture and
Environment – Current Trends and Issues in Management.

UNIT II PLANNING
and Techniques – Decision Making Steps and Process

UNIT III ORGANISING
Structure – Types – Line and Staff Authority – Departmentalization – Delegation of Authority
– Centralization and Decentralization –Job Design – Human Resource Management –HR
Planning, Recruitment, Selection, Training and Development, Performance Management,
Career Planning and Management.

UNIT IV DIRECTING
Foundations of Individual and Group Behavior– Motivation – Motivation Theories –
Motivational Techniques – Job Satisfaction – Job Enrichment – Leadership – Types and
Theories of Leadership – Communication – Process of Communication – Barrier in
Communication – Effective Communication – Communication and IT.

UNIT V CONTROLLING
System and Process of Controlling – Budgetary and Non-Budgetary Control Techniques –
Use of Computers and IT in Management Control – Productivity Problems and Management
– Control and Performance – Direct and Preventive Control – Reporting.

TOTAL: 45 PERIODS

OUTCOMES:
• The student would have gained the ability to learn the different principles and
  techniques of management in planning, organizing, directing and controlling.
TEXT BOOKS:

REFERENCES:

MA7355 PROBABILITY AND QUEUEING THEORY

OBJECTIVES:
- To provide the required fundamental concepts in probability and queueing models and apply these techniques in networks, image processing etc.
- Acquire skills in analyzing queueing models.

UNIT I RANDOM VARIABLES
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
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

UNIT IV QUEUEING THEORY

UNIT V NON-MARKOVIAN QUEUES AND QUEUEING NETWORKS
M/G/1 Queue – Pollaczek Khinchin formula - M/D/1 and M/E_k/1 as special cases – Series Queues – Open and Closed Jackson Networks.

TOTAL: 60 PERIODS

OUTCOMES:
- Students will be able characterize probability models using probability mass (density) functions & cumulative distribution functions.
- Students will be able to understand the terminology & nomenclature appropriate queueing theory.
- Students will demonstrate the knowledge and understand the various queueing models.
- Students will be able to formulate concrete problems using queueing theoretical approaches.
TEXT BOOKS:

REFERENCES:

CS7411 DATABASE MANAGEMENT SYSTEMS LABORATORY L T P C
0 0 4 2

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 data bases
- To be familiar with the use of a front end tool
- To understand design and implementation of typical data base 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.
CS7412  OPERATING SYSTEMS LABORATORY  L  T  P  C  0  0  4  2

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 system calls for different purposes.
- Analyze and solve process synchronization problems.
- Use IPC for co-ordination among processes.

CS7501  DATA COMMUNICATION AND COMPUTER NETWORKS  L  T  P  C  3  0  0  3

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

UNIT II  TRANSPORT LAYER
UNIT III  NETWORK LAYER

UNIT IV  DATA LINK LAYER

UNIT V  DATA COMMUNICATIONS

TOTAL: 45 PERIODS

OUTCOMES:
- Ability to trace the flow of information from one node to another node in the network.
- Develop own protocol.
- Ability to choose functionalities at each layer for different applications.
- Evaluate the protocols in network layer from QoS perspective.

TEXT BOOKS:

REFERENCES:
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

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 system design techniques to develop software for embedded systems.
- Differentiate between the general purpose operating system and the real time operating System.
- Model real-time applications using embedded-system concepts.

TEXT BOOKS:
REFERENCES:

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 CASE STUDY

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Apply object oriented concepts to design
- Improvise on creative design using object orientation
- Identify and analyze evolutionary requirements to design
- Deploy different UML package diagrams
- Explain the process of OO design and its application to testing.
TEXT BOOKS:

REFERENCE:

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:
- Construct automata, regular expression for any pattern.
- Write Context free grammar for any construct.
- Design Turing machines for any language.
- Propose computation solutions using Turing machines.
- Derive whether a problem is decidable or not.

TEXT BOOK:

REFERENCES:

CS7551 DIGITAL SIGNAL PROCESSING L T P C
3 0 0 3

OBJECTIVES:
- To get an idea on designing analog and digital filters
- 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 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
UNIT V APPLICATIONS

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Perform frequency transforms for signals
- Design IIR and FIR filters
- Write programs using analog and digital filters and to compare the respective output
- Identify finite word length errors in digital filters

TEXT BOOKS:

REFERENCES:

CS7511 CASE TOOLS LABORATORY

OBJECTIVES:
- To learn the basics of OO analysis and design skills.
- To be exposed to the UML design diagrams.
- 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

CS7512  COMPUTER NETWORKS LABORATORY  L  T  P  C
0  0  4  2

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 in different layers in computer networks.

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 tcpdump, netstat, ifconfig, nslookup and traceroute. Capture ping and traceroute 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.

CS7601 COMPILER DESIGN

OBJECTIVES:
- To learn the various parsing techniques and different levels of translation
- To learn how to obtain specific object code from source language
- To learn how to optimize the code and schedule for optimal performance

UNIT I FRONT END OF COMPILERS
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

UNIT III RUNTIME AND OBJECT CODE GENERATION

UNIT IV CODE OPTIMIZATION

UNIT V SCHEDULING AND OPTIMIZING FOR PARALLELISM

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Design compiler phases from language specification.
- Design code generators for the specified machine.
- Apply the various optimization techniques.

TEXT BOOK:

REFERENCES:

CS7602 MACHINE LEARNING TECHNIQUES

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 graphical models of machine learning algorithms

UNIT I INTRODUCTION

UNIT II LINEAR MODELS

UNIT III TREE AND PROBABILISTIC MODELS

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:
- Distinguish between, supervised, unsupervised and semi-supervised learning
- Apply the apt machine learning strategy for any given problem
- Suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem
- Design systems that uses the appropriate graph models of machine learning
- Modify existing machine learning algorithms to improve classification efficiency

TEXT BOOKS:

REFERENCES:

CS7603  PARALLEL AND DISTRIBUTED COMPUTING  L T P C
3 0 0 3

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

UNIT I  INTRODUCTION TO PARALLEL COMPUTING  9

UNIT II  PARALLEL ALGORITHM DESIGN  9
Preliminaries – Decomposition Techniques – Characteristics of Tasks and Interactions – Mapping Techniques for Load Balancing – Methods for Containing Interaction Overheads – Parallel Algorithm Models – Basic Communication Operations – One-to-All Broadcast and All-to-One Reduction – All-to-All Broadcast and Reduction – All-Reduce and Prefix Sum Operations – Scatter and Gather – All-to-All Personalized Communication- Circular Shift – Improving the Speed of some Communication Operations
UNIT III PROGRAMMING USING MESSAGE PASSING AND SHARED ADDRESS SPACE


UNIT IV DISTRIBUTED COMPUTING PARADIGM

Paradigms for Distributed applications – Basic algorithms in Message passing Systems – Leader Election in Rings – Mutual Exclusion in Shared Memory

UNIT V FAULT TOLERANT DESIGN


TOTAL: 45 PERIODS

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

- Apply parallel and distributed computing architectures for any given problem
- Apply problem solving (analysis, design, and development) skills to distributed applications
- Develop applications by incorporating parallel and distributed computing architectures
- Develop applications by incorporating fault tolerance
- Convert a sequential algorithm to a parallel one

TEXT BOOKS:

REFERENCES:
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 web 2.0
- 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

UNIT II  JAVA PROGRAMMING IN THE INTERNET  9

UNIT III  DOM, AJAX, JSON  9

UNIT IV  WEB FRAMEWORKS  9

UNIT V  WEB SERVICES  9

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Develop Java based web programming
- Implement socket programming and Client side scripting in Java
- Point out the differences and similarities between two important meta-languages - XML and JSON.
- Formulate and build extensible web applications using the Model View Controller design pattern.
- Design a Web application using various technologies such as Java, XML, AJAX, Servlets, PHP, JSP, Django and Jena.

TEXT BOOKS:

REFERENCES:
1. http://www.w3schools.com

CS7611 COMPILER LABORATORY

OBJECTIVES:
- Learning tools for compiler writing
- Designing the specification of language constructs
- Learning code generation and optimization

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 “for” 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.

TOTAL: 60 PERIODS

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
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.
- To build web applications using proven developer tools and message formats.
- Web applications using technologies such as Java, Javascript, AJAX, Ruby on Rails, Django, XML, RSS, XSLT, and JSON.

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.
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

UNIT II VIRTUALIZATION
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

UNIT IV HADOOP AND MAP REDUCE
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

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.

TEXT BOOK:
REFERENCES:

CS7702 SECURITY IN COMPUTING

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

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

UNIT III SYMMETRIC CIPHERS & INTRODUCTION TO NUMBER THEORY

UNIT IV PUBLIC-KEY ENCRYPTION AND HASH FUNCTIONS

UNIT V SECURITY APPLICATIONS

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Illustrate the approaches, trade-offs in security design principles.
- Apply number theory in public key encryption techniques.
- Design a secure operating system
- Discuss the various platform security models in a mobile environment.

TEXT BOOKS:

REFERENCES:

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 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

UNIT II WIRELESS NETWORKS
UNIT III  2G, 2.5G CELLULAR NETWORKS

UNIT IV  3G CELLULAR NETWORKS

UNIT V  4G CELLULAR NETWORKS

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
• Explore the concepts of new technologies in wireless networks.
• Demonstrate various protocols of wireless and cellular networks.
• Discuss the features of different wireless networks.

TEXT BOOKS:

REFERENCES:

CS7711  CREATIVE AND INNOVATIVE PROJECT
L  T  P  C
0  0  4  2

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.

TOTAL: 60 PERIODS

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

- Assess the needs of the society
- Describe the background of the problem
- Formulate a problem
- Perform SWOT and PESTEL Analysis
- Frame a policy
- Predict business opportunity
- Design the prototype
- Gain knowledge on system implications.

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-La Padula 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 rootkit.
- Demonstrate the working of intrusion detection system.

CS7713 COMPREHENSION AND TECHNICAL REPORT L T P C 0 0 2 1

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 the process of Technical writing using tools for documentation, drawing, compiling etc.
- To familiarize with creation of documentation for existing source code based projects

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” 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.

REFERENCES:
4. www.ieee.org/documents/MSW_A4_format.doc
5. Word / Latex/ LyX, Adobe Frame Maker, SnagIt, MS Visio
6. Javadoc, ROBODoc or any other equivalent tools for source code documentation

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

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
- To analyze protocols developed for ad hoc and sensor networks
- To evaluate the performance of protocols from a QoS perspective
- To list the security issues in Ad-hoc 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.

UNIT I PARALLEL AND DISTRIBUTED DATABASES 9

UNIT II INTELLIGENT AND INTERNET DATABASES 9

UNIT III TEMPORAL AND OBJECT DATA BASES 9
UNIT IV  COMPLEX QUERIES AND REASONING  9

UNIT V  SPATIAL, TEXT AND MULTIMEDIA DATABASES  9

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:

REFERENCES:

CS7003  AGILE METHODOLOGIES  L T P C
3 0 0 3

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
Theories for Agile Management – Agile Software Development – Traditional Model vs. Agile Model
- Classification of Agile Methods – Agile Manifesto and Principles – Agile Project Management –
Agile Team Interactions – Ethics in Agile Teams - Agility in Design, Testing – Agile
Documentations – Agile Drivers, Capabilities and Values

UNIT II    AGILE PROCESSES
Lean Production - SCRUM, Crystal, Feature Driven Development- Adaptive Software
Development - Extreme Programming: Method Overview – Lifecycle – Work Products, Roles and
Practices.

UNIT III    AGILITY AND KNOWLEDGE MANAGEMENT
Agile Information Systems – Agile Decision Making - Earl’S Schools of KM – Institutional
Knowledge Evolution Cycle – Development, Acquisition, Refinement, Distribution, Deployment ,
Leveraging – KM in Software Engineering – Managing Software Knowledge – Challenges of
Migrating to Agile Methodologies – Agile Knowledge Sharing – Role of Story-Cards – Story-Card
Maturity Model (SMM).

UNIT IV    AGILITY AND REQUIREMENTS ENGINEERING
– Managing Unstable Requirements – Requirements Elicitation – Agile Requirements Abstraction
Model – Requirements Management in Agile Environment, Agile Requirements Prioritization –
Agile Requirements Modeling and Generation – Concurrency in Agile Requirements Generation.

UNIT V    AGILITY AND QUALITY ASSURANCE
Agile Product Development – Agile Metrics – Feature Driven Development (FDD) – Financial and
Production Metrics in FDD – Agile Approach to Quality Assurance - Test Driven Development –
Agile Approach in Global Software Development.

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:
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:
OBJECTIVES

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

UNIT I  INTRODUCTION TO BIG DATA

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 - MapReduce 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:
- This course comprehends basic 2D and 3D Graphics viewing pipeline that includes, Modeling, manipulation and rendering along with advanced Graphics for visual realism, with add on exposure to OpenGL programming and applications.

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

TOTAL: 45 PERIODS
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

OBJECTIVES:

- To understand the fundamentals of Computer Forensics and computing Investigations.
- To recognize the legal underpinnings and critical laws affecting forensics
- To apply the tools and methods to uncover hidden information in digital systems.
- To learn about current licensing and certification requirements to build the career in digital forensic.

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:
• To analyze the digital investigation and find the evidence for the given problem.
• Working with court – approved tools / Hardware tools / Nontechnical tools and to prepare the report based on law and privacy concerns.
• Analyze applications of real time scenario.

TEXTBOOKS:

REFERENCE:

CS7008 DATABASE TUNING L T P C 3 0 0 3

OBJECTIVES:
• To get the feel of basics of database tuning.
• To learn concepts behind database design optimization.
• To write procedures involving query planning.

UNIT I FUNDAMENTALS OF TUNING 9

UNIT II INDEX TUNING 9
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 9

UNIT IV INTERFACE AND CONNECTIVITY TUNING 9
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 9

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 familiarize with the process of game design and development
- To learn the processes, mechanics, issues in game design
- To understand the architecture of game programming
- To know about game engine development, modeling, techniques and frameworks

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 DESIGN PRINCIPLES
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 ENGINE DESIGN
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.

OUTCOME:
Upon completion of the course, the students will be able to:
- Develop game programming skills and create interactive games.
TEXT BOOKS:

REFERENCES:

CS7010 GPU ARCHITECTURE AND PROGRAMMING L T P C
3 0 0 3

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

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.

TOTAL: 45 PERIODS

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
TEXT BOOKS:

REFERENCES:

CS7011 GREEN COMPUTING L T P C
3 0 0 3

OBJECTIVES:
- To acquire knowledge to adopt green computing practices
- To minimize negative impacts on the environment
- To learn about energy saving practices
- To understand the impact of e-waste and carbon waste.

UNIT I FUNDAMENTALS

UNIT II GREEN ASSETS AND MODELING

UNIT III GRID FRAMEWORK

UNIT IV GREEN COMPLIANCE

UNIT V GREEN INITIATIVES WITH IT and CASE STUDIES
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 Business Strategies (ERBS) – Case Study Scenarios for Trial Runs – Case Studies – 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:

- To explain the necessity of Green IT
- To outline methodologies for creating Green Assets and their management
- To appreciate the use of Grid in Green IT
- To develop case studies related to Environmentally Responsible Business Strategies

TEXT BOOKS:

REFERENCES:

CS7012 INFORMATION RETRIEVAL TECHNIQUES

OBJECTIVES:
- To learn the concepts behind IR
- To understand the operation of web search
- To learn the algorithms related to text classification, indexing and searching

UNIT I INTRODUCTION

UNIT II MODELING AND RETRIEVAL EVALUATION

UNIT III TEXT CLASSIFICATION, INDEXING AND SEARCHING

UNIT IV WEB RETRIEVAL AND WEB CRAWLING
UNIT V   TYPES OF IR AND APPLICATIONS 9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- To use an open source search engine framework and explore its capabilities
- To represent documents in different ways and discuss its effect on similarity
- Calculations and on search
- To design and implement an innovative feature in a search engine

TEXTBOOKS:

REFERENCES:

CS7013 INFORMATION VISUALIZATION TECHNIQUES

OBJECTIVES:
- To understand basic visualization and interaction techniques in the information visualization fields, as well as basic approaches to visually exploring large databases
- To understand the various abstraction mechanisms and 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


TOTAL: 45 PERIODS

OUTCOMES:

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

- Deploy legacy OSs on virtual machines
- Point the intricacies of server, storage, network, desktop and application virtualizations
- Design new models for virtualization

TEXT BOOKS:


REFERENCE:


CS7014 MICROPROCESSORS AND INTERFACING

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

UNIT I THE 8086 MICROPROCESSOR


UNIT II 8086 SYSTEM DESIGN

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


UNIT IV 80286, 80386 AND 80486 MICROPROCESSORS


UNIT V ADVANCED MICROPROCESSORS

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
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:

CS7015 MOBILE COMMUNICATIONS L T P C 3 0 0 3

OBJECTIVES:
- To study the details of lower layers of mobile architectures
- To learn to develop applications for various mobile OS

UNIT I INTRODUCTION 9

UNIT II WIRELESS LAN 9

UNIT III WIRELESS SYSTEMS 9

UNIT IV MOBILE NETWORK LAYER 9
UNIT V  TRANSPORT LAYER AND APPLICATIONS  \[\text{9}\]

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- To explain the features of smart mobiles and other smart devices
- To develop applications for Android and iOS
- To explain protocols related to routing in mobile networks

TEXT BOOKS:

REFERENCES:

CS7016  NATURAL LANGUAGE PROCESSING  \[\text{L T P C}\]
\[3 \ 0 \ 0 \ 3]\n
OBJECTIVES:
- To learn the fundamentals of natural language processing
- To appreciate the use of CFG and PCFG in NLP
- To understand the role of semantics and pragmatics

UNIT I  INTRODUCTION  \[\text{9}\]

UNIT II  SPEECH  \[\text{9}\]
Speech – Phonetics - Speech Synthesis - Automatic Speech Recognition - Speech Recognition: - Advanced Topics - Computational Phonology

UNIT III  SYNTAX  \[\text{9}\]

UNIT IV  SEMANTICS AND PRAGMATICS  \[\text{9}\]
The Representation of Meaning - Computational Semantics - Lexical Semantics - Computational Lexical Semantics - Computational Discourse
UNIT V APPLICATIONS
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:
- To tag a given text with basic Language features
- To design an innovative application using NLP components
- To implement a rule based system to tackle morphology/syntax of a language
- To design a tag set to be used for statistical processing for real-time applications
- To compare and contrast use of different statistical approaches for different types of NLP applications.

TEXT BOOKS:

REFERENCES:

CS7017 PROGRAMMING PARADIGMS

OBJECTIVES
- To explore modern programming languages and the techniques used for programming
- To get an idea on evaluation of programming languages
- To analyze a given program from good programming practice perspective

UNIT I INTRODUCTION

UNIT II SEMANTICS

UNIT III FUNCTIONS
UNIT IV  PROGRAMMING TECHNIQUES  9
Imperative programming – C – ADA – Perl – Object Oriented Programming – Small Talk-
Java– Python – Functional Programming – Scheme – Haskell

UNIT V  MODERN PROGRAMMING TECHNIQUES  9
Logic Programming – Prolog – Event-Driven programming – Concurrent Programming –
Concepts – Synchronization Strategies – Language Level Mechanism - Interprocess
COMMUNICATION – Scripting LANGUAGES.

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:
1. Allen B. Tucker and Robert E. Noonan, “Programming Languages – Principles and

REFERENCES:
   2009.

CS7018  PROJECT MANAGEMENT  L T P C
3 0 0 3

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
Project Definition – Contract Management – Activities Covered by Software Project
Management, Plan, Methods and Methodologies- Ways of Categorizing Software Projects
Problem with Software Projects – Setting Objectives Stakeholders- Requirements
Specification, Management Control – Overview of Project Planning – Stepwise Project
Planning.

UNIT II  PROJECT EVALUATION  9
Programme Management, Managing the Allocation of Resources, Strategic Programme
Management, Creating a Programme, Aids to Programme Management, Benefits
Management-Evaluation of Individual Projects – Technical Assessment – Cost Benefit
Software Effort Estimation
UNIT III  ACTIVITY PLANNING

UNIT IV  MONITORING AND CONTROL

UNIT V  MANAGING PEOPLE AND ORGANIZING TEAMS

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.

UNIT I INTRODUCTION TO PYTHON

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

UNIT III CLASSES
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
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 WEB SERVICES
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
- Discuss the concepts of object oriented programming.
- Use generators and iterators
- Develop test cases and handle refactoring.
- Use objects to program over the web.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To understand how software agents reduce information overhead.
- To gain knowledge in design and architectural frameworks and methodology.
- To know distributed multi-agent concepts and its variety.
- 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

UNIT V 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:

CS7021 SOFTWARE DEFINED NETWORKS L T P C
3 0 0 3

OBJECTIVES:
- To learn about what software defined networks are
- To understand the separation of the data plane and the control plane
- To learn about the use of SDN in data centers
- To learn about different applications of SDN

UNIT I INTRODUCTION

UNIT II OPEN FLOW & SDN CONTROLLERS
Open Flow Specification – Drawbacks of Open SDN, SDN via APIs, SDN via Hypervisor-Based Overlays – SDN via Opening up the Device – SDN Controllers – General Concepts

UNIT III DATA CENTERS
Multitenant and Virtualized Multitenant Data Center – SDN Solutions for the Data Center Network – VLANs – EVPN – VxLAN – NVGRE

UNIT IV SDN PROGRAMMING
Programming SDNs: Northbound Application Programming Interface, Current Languages and Tools, Composition of SDNs – Network Functions Virtualization (NFV) and Software Defined Networks: Concepts, Implementation and Applications.

UNIT V SDN
Juniper SDN Framework – IETF SDN Framework – Open Daylight Controller – Floodlight Controller – Bandwidth Calendaring – Data Center Orchestration

TOTAL : 45 PERIODS

OUTCOMES:
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

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To understand the basics of software quality
- To learn various metrics of software quality
- To introduce concepts behind designing of test cases
- To learn the procedure of debugging a given software

UNIT I INTRODUCTION TO SOFTWARE QUALITY

UNIT II SOFTWARE QUALITY METRICS AND RELIABILITY

UNIT III TEST CASE DESIGN

UNIT IV TEST MANAGEMENT

UNIT V CONTROLLING AND MONITORING

OUTCOMES:
Upon completion of the course, the students will be able to:
- Analyze software documentations using inspections and walkthrough
- Associate various software metrics to context
- List the components of test plan
- Explain the principles behind SCM

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To make the students 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 DATAWAREHOUSING
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:
- To build a data warehouse for a real-world system
- To write programs for classification and clustering
- To evaluate various mining techniques on complex data objects
- To develop applications using Big Data Mining Tools.

TEXT BOOKS:
REFERENCES:

CS7072     GRAPH THEORY     L   T   P   C
               3   0   0   3

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.

UNIT I     INTRODUCTION

UNIT II     TREES, CONNECTIVITY & PLANARITY

UNIT III     MATRICES, COLOURING AND DIRECTED GRAPH

UNIT IV     PERMUTATIONS & COMBINATIONS

UNIT V     GENERATING FUNCTIONS

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
- Outline the concepts of permutations and combinations

TOTAL: 45 PERIODS
TEXT BOOKS:

REFERENCES:

CS7073 MULTIMEDIA TOOLS AND TECHNIQUES

OBJECTIVES:
- To comprehend the building blocks of multimedia, with emphasis on authoring, data compression, web and mobile applications of multimedia with an added exposure to some of the popular tools / software.

UNIT I BASIC ELEMENTS

UNIT II MULTIMEDIA ON THE WEB

UNIT III AUTHORING and TOOLS
Authoring – Story Boarding, Metaphors - Card / Page, Icon, Timeline, Tools – Adobe Dream Weaver CC, Flash, Edge Animate CC, Camatasia Studio 8, Claro, E-Learning Authoring Tools – Articulate, Elucidate, Hot Lava.

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

OUTCOMES:
Upon completion of the course, the students will be able to:
- A grasp on basic elements of multimedia
- Explain the importance of web based multimedia usage
- Use and apply authoring tools for web and e-learning
- Learn the theory behind data compression both lossless and lossy
- Implement applications
TEXT BOOK:

REFERENCES:
4. www.Webstyleguide.com

CS7074 SOFT COMPUTING L T P C
3 0 0 3

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

UNIT II NEURAL NETWORKS - II

UNIT III FUZZY LOGIC - I

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

UNIT V GENETIC ALGORITHM

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, rough sets, chaos, hybrid approaches (combinations of neural networks, fuzzy logic and genetic algorithms).

TEXT BOOKS:

REFERENCES:
1. Siman Haykin, “Neural Networks”, Prentice Hall of India, 1999

CS7075 WEB DESIGN AND MANAGEMENT L T P C
3 0 0 3

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

UNIT I SITE ORGANIZATION AND NAVIGATION

UNIT II ELEMENTS OF PAGDesig

UNIT III SCRIPTING LANGUAGES AND ANIMATION USING FLASHF
UNIT IV  PRE-PRODUCTION MANAGEMENT

UNIT V  PRODUCTION, MAINTENANCE AND EVALUATION

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.
- Determine templates for web pages and layout.
- Develop simple web applications using scripting languages.
- Determine the various issues of web project development.
- Address the core issues of web page maintenance and evaluation.

TEXT BOOKS:

REFERENCES:

GE7071  DISASTER MANAGEMENT

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
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.

TOTAL: 45 PERIODS

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  SUSTENANCE 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

OBJECTIVES:
- To sensitize the Engineering students to various aspects of Human Rights.

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
OUTCOME:
• Engineering students will acquire the basic knowledge of human rights

REFERENCES:

GE7351 ENGINEERING ETHICS AND HUMAN VALUES (Common to all branches) L T P C 3 0 0 3

OBJECTIVES
• 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.

UNIT I HUMAN VALUES 3

UNIT II ENGINEERING ETHICS 9

UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION 9

UNIT IV ENGINEER’S RIGHTS AND RESPONSIBILITIES ON SAFETY 12

UNIT V GLOBAL ISSUES 12

TOTAL: 45 PERIODS

OUTCOMES:
• Students will have the ability to perform with professionalism, understand their rights, legal, ethical issues and their responsibilities as it pertains to engineering profession with engaging in life-long learning with knowledge of contemporary issues.

TEXT BOOKS:
REFERENCES:

GE7652 TOTAL QUALITY MANAGEMENT

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

OBJECTIVES:
- To understand the need for quality, its evolution, basic concepts, contribution of quality gurus, TQM framework, Barriers and Benefits of TQM.
- To understand the TQM Principles.
- To learn and apply the various tools and techniques of TQM.
- To understand and apply QMS and EMS in any organization.

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
Leadership - The Deming Philosophy, Quality council, Quality statements and Strategic planning -- Customer satisfaction - Customer Perception of Quality, Feedback, Customer complaints, Service Quality, Kano Model and Customer Retention - Employee involvement - Motivation, Empowerment, Team and Teamwork, Recognition & Reward and Performance Appraisal - Continuous process improvement - Juran Trilogy, PDSA cycle, 5s and Kaizen - Supplier Partnership - Partnering, Supplier Selection, Supplier Rating and Relationship Development.

UNIT III TQM TOOLS AND TECHNIQUES I
9

UNIT IV TQM TOOLS AND TECHNIQUES II
9

UNIT V QUALITY MANAGEMENT SYSTEM
9

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Apply TQM concepts in a selected enterprise.
- Apply TQM principles in a selected enterprise.
- Apply the various tools and techniques of TQM.
- Apply QMS and EMS in any organization.

TEXT BOOK:

REFERENCES:

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 9

UNIT III MULTI RESOLUTION ANALYSIS AND COMPRESSION 9

UNIT IV IMAGE SEGMENTATION AND FEATURE EXTRACTION 9
UNIT V  IMAG E CLASSIFICATION AND APPLICATIONS OF IMAGE PROCESSING  9

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.

TEXT BOOKS:

REFERENCES:

IT7072  TCP/IP DESIGN AND IMPLEMENTATION  L  T  P  C
3  0  0  3

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.

UNIT I  FUNDAMENTALS  9

UNIT II  ARP AND IP  9
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  9
Routing Table - Routing Algorithms - Fragmentation and Reassembly - Error Processing (ICMP) - Multicast Processing (IGMP)

UNIT IV  TCP I/O PROCESSING AND FSM  9
UNIT V  TCP TIMER AND FLOW CONTROL


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:

IT7551  UNIX INTERNALS  L T P C

OBJECTIVES:
• To learn about the design of the UNIX operating system.
• To become familiar with the various data structures used.
• To learn the various low-level algorithms used in UNIX.

UNIT I  OVERVIEW

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
OUTCOMES:
On Completion of the course, the students should be able to:
  • To design and implement the subsystems of an operating system.
  • To explain the data structures of an open source operating system.
  • To modify and implement the data structures and algorithms of an open source operating system.

TEXT BOOK:

REFERENCES: