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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### UNIVERSITY DEPARTMENTS
### B.E. COMPUTER SCIENCE AND ENGINEERING
### REGULATIONS – 2015
### CHOICE BASED CREDIT SYSTEM
### CURRICULA AND SYLLABUS I - VIII SEMESTERS

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### Employability Enhancement Courses (EEC)

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### Summary

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

OBJECTIVES:
- To 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 favourite 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
Listening – Listening and responding to instructions; Speaking – Telephone etiquette - Giving oral instructions/ Describing a process – Asking and answering questions; Reading – Reading and finding key information in a given text - Critical reading - Writing – Process description( non-technical); Grammar – Tense (simple past& past continuous) - Use of imperatives – Subject – verb agreement – Active and passive voice; Vocabulary – Compound words – Word formation – Word expansion (root words).

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 programmes/broadcast/ telecast/ podcast; Speaking – Giving impromptu talks, Making presentations on given topics- Discussion on the presentation; Reading –Extensive
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%

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 & Gillies Cunningham Face2Face (Pre-intermediate Student’s Book& Workbook) Cambridge University Press, New Delhi: 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 12
Representation of functions - New functions from old functions - Limit of a function - Limits at infinity - Continuity - Derivatives - Differentiation rules - Polar coordinate system - Differentiation in polar coordinates - Maxima and Minima of functions of one variable.

UNIT II FUNCTIONS OF SEVERAL VARIABLES 12

UNIT III INTEGRAL CALCULUS 12
Definite and Indefinite integrals - Substitution rule - Techniques of Integration - Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals.

UNIT IV MULTIPLE INTEGRALS 12

UNIT V DIFFERENTIAL EQUATIONS 12
Method of variation of parameters – Method of undetermined coefficients – Homogenous equation of Euler’s and Legendre’s type – System of simultaneous linear differential equations with constant coefficients.

TOTAL: 60 PERIODS

OUTCOMES:
- Understanding of the 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.
- Understanding the ideas of differential equations and facility in solving simple standard examples.

TEXTBOOKS:

REFERENCES:
OBJECTIVE:
• To introduce the basic physics concepts relevant to different branches of Engineering and Technology.

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
Single crystalline, polycrystalline and amorphous materials – Single crystals: unit cell, crystal systems, Bravais lattices, diffractions and planes in a crystal, Miller indices - interplanar distance for a cubic crystal - coordination number and packing factor for SC, BCC, FCC, HCP and diamond structures - structure and significance of NaCl, CsCl, ZnS and graphite - crystal imperfections: point defects, line defects – Burger vectors, dislocations and stacking faults – Growth of single crystals: Bridgman and Czochralski methods.

OUTCOMES:
• The students will acquire knowledge on the basics of physics related to properties of matter, optics, acoustics etc., and they will apply these fundamental principles to solve practical problems related to materials used for engineering applications.

TEXTBOOKS:
REFERENCES:

CY7151 ENGINEERING CHEMISTRY

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

UNIT I POLYMER CHEMISTRY
Introduction: Functionality-degree of polymerization. Classification of polymers- natural and synthetic, thermoplastic and thermosetting. Types and mechanism of polymerization: addition (free radical, cationic, anionic and living); condensation and copolymerization. Properties of polymers: Tg, tacticity, molecular weight-weight average, number average and polydispersity index. Techniques of polymerization: Bulk, emulsion, solution and suspension.

UNIT II SURFACE CHEMISTRY AND CATALYSIS

UNIT III PHOTOCHEMISTRY AND SPECTROSCOPY

UNIT IV CHEMICAL THERMODYNAMICS
Second law: Entropy-entropy change for an ideal gas, reversible and irreversible processes; entropy of phase transitions; Free energy and work function: Helmholtzand Gibbs free energy functions; Criteria of spontaneity; Gibbs-Helmholtz equation; Clausius Clapeyron equation; Maxwell relations-Van’t Hoff isotherm and isochore. Chemical potential; Gibbs-Duhem equation- variation of chemical potential with temperature and pressure.

UNIT V NANO CHEMISTRY

TOTAL: 45 PERIODS

OUTCOME:
• 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:

GE7151 COMPUTING TECHNIQUES (Common to all branches of Engineering and Technology) L T P C
3 0 0 3

OBJECTIVES:
• To learn programming using a structured programming language.
• To provide C programming exposure.
• To introduce foundational concepts of computer programming to students of different branches of Engineering and Technology.

UNIT I INTRODUCTION
Introduction to Computers – Computer Software – Computer Networks and Internet - Need for logical thinking – Problem formulation and development of simple programs - Pseudo code - Flow Chart and Algorithms.

UNIT II C PROGRAMMING BASICS

UNIT III ARRAYS AND STRINGS

UNIT IV POINTERS
Macros - Storage classes –Basic concepts of Pointers– Pointer arithmetic - Example Problems - Basic file operations

UNIT V FUNCTIONS AND USER DEFINED DATA TYPES

TOTAL : 45 PERIODS
OUTCOMES: 
At the end of the course, the student should 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

OBJECTIVE: 
To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics, properties of matter and 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

OUTCOMES: 
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.
(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-Phenanthroline/thiocyanate method).
10. Estimation of sodium and potassium present in water using flame photometer.
12. Pseudo first order kinetics-ester hydrolysis.
14. Determination of CMC.
15. Phase change in a solid.

TOTAL: 30 PERIODS

TEXTBOOKS

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
At the end of the course, the student should 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.

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS
30 Systems with C compiler

HS7251  TECHNICAL ENGLISH  L T P C
4  0  0  4

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  12
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  12

UNIT III  DESCRIBING VISUAL MATERIAL  12
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  12
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  12
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:
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:
1. Craig, Thaine. Cambridge Academic English: An integrated skills course for
   EAP(Student's Book) Level: Intermediate Cambridge University Press, New Delhi: 2012

REFERENCES:
2. Ibbotson, Mark. Cambridge English for Engineering. Cambridge University Press,
   Cambridge, New Delhi: 2008
3. Naterop, Jean B. and Rod Revell. Telephoning in English. Cambridge: Cambridge University
   2004
6. Hewings, Martin. Cambridge Academic English: An integrated skills course for

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

OBJECTIVES:
- To develop the use of matrix algebra techniques that is needed by engineers for
  practical applications.
- To 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
Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of
  eigenvalues and eigenvectors – Cayley-Hamilton theorem – Diagonalization of matrices –
  Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of
  quadratic forms.

UNIT II VECTOR CALCULUS
12
Gradient and directional derivative – Divergence and Curl – Irrotational and Solenoidal
  vector fields – Line integral over a plane curve – Surface integral - Area of a curved surface -
  Volume integral - Green’s, Gauss divergence and Stoke’s theorems – Verification and
  application in evaluating line, surface and volume integrals.
UNIT III ANALYTIC FUNCTION 12
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 12

UNIT V LAPLACE TRANSFORMS 12

TOTAL: 60 PERIODS

OUTCOMES:
Upon successful completion of the course, students should 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.

TEXTBOOKS:

REFERENCES:
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  14
Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.
Field study of common plants, insects, birds
Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II  ENVIRONMENTAL POLLUTION  8
Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.
Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III  NATURAL RESOURCES  10
Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.
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

TOTAL: 45 PERIODS

OUTCOMES:
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)
Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.
UNIT I  PLANE CURVES AND FREE HANDSKETCHING  14
Basic Geometrical constructions, Curves used in engineering practices- Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves. Visualization concepts and Free Hand sketching: Visualization principles – Representation of Three Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects

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
Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems.
Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method and vanishing point method.

COMPUTER AIDED DRAFTING (DEMONSTRATION ONLY)  3
Introduction to drafting packages and demonstration of their use.

L=45+T=30, TOTAL: 75 PERIODS

OUTCOMES:
On 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:

Publication of Bureau of Indian Standards:

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

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
Linearity and Superposition, Sources Transformation, Thevinin and Norton Equivalent Circuits, Maximum Power Transfer, Delta-Wye Conversion, Single Phase and 3 Phase Circuits-Power Factor-Power-Concept of Phasor Diagrams.

UNIT III SEMICONDUCTOR DEVICES

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

UNIT V OPERATION AMPLIFIER 12

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should 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:

PROGRAMMING AND DATA STRUCTURES I L T P C
3 0 0 3

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 - Bitfields - Files

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

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

UNIT IV NON LINEAR DATA STRUCTURES

UNIT V SORTING

TOTAL: 45 PERIODS

OUTCOMES:
- 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

TEXTBOOKS:

REFERENCES:
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, planing and making joints like T-Joint, Mortise and Tenon joint and Dovetail joint.

STUDY

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

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

GROUP – B (MECHANICAL AND ELECTRONICS)

3. MECHANICAL ENGINEERING PRACTICES
   15
   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

- 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

OUTCOMES:
Upon completion of the course, the students will be able to:
- Implement data structures using C
- Develop applications based on data structures

TOTAL: 60 PERIODS
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

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.

TEXTBOOKS:

REFERENCES:

TOTAL: 45 PERIODS

MA  ALGEBRA AND NUMBER THEORY

L T P C
(Branch specific course)

4 0 0 4

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
Groups: Definition - Properties - Homomorphism - Isomorphism - Cyclic groups - Cosets - Lagrange’s theorem. Rings : Definition - Sub rings - Integral domain - Field - Integer modulo n - Ring homomorphism.

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

TEXT BOOKS:

REFERENCES:

DIGITAL PRINCIPLES AND SYSTEM DESIGN

OBJECTIVES:
- To expose the students to perform binary arithmetic and conversion from one number system to another.
- To learn different Boolean simplification techniques.
- To learn the design and analysis of combinational and sequential circuits.
- To understand the design of registers and counters
- To discuss the basic concepts of PLDs
- To learn the design and analysis of asynchronous sequential circuits

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES

UNIT II COMBINATIONAL LOGIC

UNIT III SYNCHRONOUS SEQUENTIAL LOGIC

UNIT IV REGISTERS, COUNTERS, MEMORY AND PROGRAMMABLE LOGIC

UNIT V ASYNCHRONOUS SEQUENTIAL LOGIC

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Perform Simplification of Boolean Functions using Theorems and Karnaugh Maps
- Convert between digital codes using encoder/decoder
- Analyze combinational circuits and sequential circuits
- Write HDL code for combinational and sequential circuits
- Design shift registers/digital counters
- Implement Boolean functions using ROM, PLA and PAL
- Design asynchronous sequential circuits

TEXTBOOKS:

REFERENCES:
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

PROGRAMMING AND DATA STRUCTURES II

OBJECTIVES:
- To learn features of C++
- To learn generic data structures using templates
- To increase the student's intuitive understanding of search trees
- To learn advanced tree data structures
- To learn to represent data using graph data structure
- To implement graph algorithms using appropriate data structures
UNIT I  INTRODUCTION TO C++  9
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  9

UNIT III  PRIORITY QUEUES AND SEARCH TREES  9

UNIT IV  GRAPHS  9

UNIT V  HASHING AND SEARCHING  9

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

TEXTBOOKS:

REFERENCES:

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  BASIC PROCESSING UNIT  12

UNIT III  ADVANCED CONCEPTS IN ILP AND CURRENT TRENDS  12

UNIT IV  ARITHMETIC FOR COMPUTERS  12

UNIT V  MEMORY AND I/O  12

TOTAL : 60 PERIODS

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 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

MA  PROBABILITY AND QUEUEING THEORY (Branch specific course)  4 0 0 4

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  12
Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions - Functions of a random variable.

UNIT II  TWO - DIMENSIONAL RANDOM VARIABLES  12
Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).
UNIT III RANDOM PROCESSES

UNIT IV QUEUEING THEORY
Markovian queues – Birth and Death processes – Single and multiple server queueing models – Little’s formula - Queues with finite waiting rooms – Finite source models.

UNIT V NON-MARKOVIAN QUEUES AND QUEUEING NETWORKS
M/G/1 queue – Pollaczek Khinchin formula - M/D/1 and M/Er/1 as special cases – Series queues – Open and closed Jackson networks.

TOTAL : 60 PERIODS

TEXT BOOKS:

REFERENCES:

DESIGN AND ANALYSIS OF ALGORITHMS

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

UNIT I ANALYSING ALGORITHMS

UNIT II DIVIDE AND CONQUER & GREEDY DESIGN STRATEGIES

UNIT III DYNAMIC PROGRAMMING AND OTHER DESIGN STRATEGIES

UNIT I FLOW NETWORKS AND STRING MATCHING 12

UNIT V NP PROBLEMS 12

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

TEXTBOOKS:

REFERENCES:

DATABASE MANAGEMENT SYSTEMS L T P C
3 0 0 3

OBJECTIVES:
- To learn the fundamentals and issues in database systems
- To appreciate the design of databases using relational models
- To learn data definition and query languages
- To understand the importance of transaction management in databases
- To emphasize the need for sorting and indexing in databases
- To learn advanced representations of databases suited for real-time applications

UNIT I INTRODUCTION TO DATABASE SYSTEMS 9
Data - Database Applications - Evolution of Database - Need for Database Management – Data models - Database Architecture - Key Issues and Challenges in Database Systems

UNIT II ER AND RELATIONAL MODELS 9
**UNIT III DATA DEFINITION AND QUERYING**
- Basic DDL - Introduction to SQL - Data Constraints - Advanced SQL - Views - Triggers - Database Security –Embedded & Dynamic SQL

**UNIT IV TRANSACTIONS AND CONCURRENCY**

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

TOTAL: 45 PERIODS

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**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


TOTAL: 45PERIODS

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

TEXTBOOKS:

REFERENCES:
OBJECTIVES:
- To review the evolution of operating systems
- To learn about processes, process communication, process synchronization, deadlock and recovery
- To gain understanding of memory and storage management techniques.
- To understand the I/O Subsystem.
- To design an operating system.

UNIT I  OPERATING SYSTEMS OVERVIEW

UNIT II  PROCESS MANAGEMENT

UNIT III  MEMORY MANAGEMENT

UNIT IV  STORAGE MANAGEMENT

UNIT V  CASE STUDY

TOTAL: 45 PERIODS
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

UNIT II PLANNING

UNIT III ORGANISING

UNIT IV DIRECTING

OUTCOMES:
Upon completion of the course, the students will be able to:
- Recognize the need of synchronization methods to allow multiprocessing
- Apply different techniques for inter-process communication
- Analyze different scheduling algorithms
- Utilize system memory and mass storage effectively
- Analyze the existing systems in terms of the core principles and develop new system.

TEXTBOOKS:

REFERENCES:
UNIT V  CONTROLLING

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management

TEXTBOOKS:

REFERENCES:

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

CASE STUDIES SCENARIOS:
1. The following information are maintained by a book dealer:
   AUTHOR (author – id : number, name: string, city: string, country: string)
   PUBLISHER (publisher – id: number, name: string, city: string, country: string)
   CATEGORY (category – id: number, description: string)
   ORDER – DETAILS (order – no: number, book – id: number, quantity: number)

2. The following information regarding the Boats, Sailors and their reservation for boats are maintained by a Sailor-info system:
   SAILORS (sid: number, sname: string, rating: number, age: real-number);
   BOATS (bid: number, bname: string, color: string);
   RESERVES (sid: number, bid: number, day: date).

3. Consider the following database of student enrollments for courses and books adopted for each course.
   STUDENT (regno: string, name: string, major: string, bdate: date)
4. Consider the Insurance database given below.

PERSON (driver – id: string, name: string, address: string)
CAR (Regno: string, model: string, year: number)
ACCIDENT (report – number: number, date: date, location: string)
OWNS ( driver – id : string, Regno: string)
PARTICIPTATED (driver – id: string, Regno: string, report – number: number, damage amount: number)

5. Consider the following database for a banking enterprise.

BRANCH (branch – name: string, branch – city: string, assets: real number)
ACCOUNT (accco : number, branch – name: string, balance: real number)
DEPOSITOR (customer – name: string, accco: number)
LOAN (loan – number: number, branch – name: string, amount: real number)
BORROWER (customer – name: string, loan – number: number)

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
      i. Update command and its various forms
      ii. Delete command and its various forms
      iii. Select command and its various forms
      iv. Union, Intersect and Except
   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
      i. COUNT ([DISTINCT] A): The number of (unique) values in the A column.
      ii. SUM ([DISTINCT] A): The sum of all (unique) values in the A column.
      iii. AVG ([DISTINCT] A): The average of all (unique) values in the A column.
      iv. MAX (A): The maximum value in the A column.
      v. MIN (A): The minimum value in the A column.
   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.

OPERATING SYSTEMS LABORATORY

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.

COMPUTER NETWORKS

OBJECTIVES:
• To understand the division of network functionality into layers.
• To familiarize the functions and protocols of each layer of TCP/IP protocol suite.
• To understand the flow of information from one node to another node in the network.
• To understand the components required to build different types of network.
• To learn concepts related to network addressing.

UNIT I   INTRODUCTION / APPLICATION LAYER  8
Application Performance – Performance Metrics

UNIT II   TRANSPORT LAYER  9
End to End Protocols – Connectionless Transport – User Datagram Protocol (UDP) – Reliable
Data Transfer – Connection Oriented Transport - Transmission Control Protocol (TCP) - Flow
Control – Congestion Control – Transport Layer Alternatives (RPC) – Transport for Real Time
Application

UNIT III   NETWORK LAYER  10
Subnet Mask(VLSM) – Classless Inter Domain Routing (CIDR) – Private Addressing –
Network Address Translation – BOOTP/DHCP-ICMP – Routing Principles – Distance Vector
Routing(RIP) – Link State Routing (OSPF) – Path Vector Routing (BGP) – Router Internals –
IPV6 – Quality of Service (QoS)

UNIT IV   DATA LINK LAYER  9
Link Layer – Framing – Addressing – Error Detection/Correction – Multiple Access Protocols –
Address Resolution Protocol (ARP) – Ethernet Basics – CSMA/CD – Frame Format –
Switching – Types (datagram, virtual) – Hubs, Bridges, Switches – Virtual LAN (VLAN) –
Wireless LAN (802.11) – WAN Technologies – ATM – Frame Relay - MPLS

UNIT V   DATA COMMUNICATIONS  9
Transmission – Impairments – Bandwidth Limitations – Modulation – Frequency Spectrum –
(wireless) – Cable Pinouts – Crossover – Straight Through - Rollover

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.

TEXTBOOKS:

REFERENCES:
2014.
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
- Understand the process of OO design and its application to testing.

TEXTBOOKS:
2. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, Design Patterns: Elements of Reusable Object-Oriented Software, Addison Wesley, 1995, 37th reprint March 2009

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

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.

TEXTBOOKS:

REFERENCES:

DIGITAL SIGNAL PROCESSING

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:
At the end of this 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

TEXTBOOKS:

REFERENCES:

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

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.

TEXTBOOKS:

REFERENCES:

COMPUTER NETWORKS LABORATORY

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)
OUTCOMES:

- 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.

CASE TOOLS LABORATORY

OBJECTIVES:

- Learn the basics of OO analysis and design skills.
- Be exposed to the UML design diagrams.
- Learn to map design to code.
- Be familiar with the various testing techniques

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

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
COMPILER DESIGN

OBJECTIVES:
- Learn the various parsing techniques and different levels of translation
- Learn how to obtain specific object code from source language
- 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

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.

TEXTBOOKS:

REFERENCES:
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: 75 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

TEXTBOOKS:
WEB TECHNOLOGY

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

UNIT I  INTRODUCTION TO THE INTERNET

UNIT II  JAVA PROGRAMMING IN THE INTERNET

UNIT III  DOM, AJAX, JSON

UNIT IV  WEB FRAMEWORKS
Django Template System - Interacting with a Database (Modules) - Django Administration Site, Form Processing, Advanced Views and Urlconfs, Generic Views - Extending the Template Engine - Generating Non-HTML Content, Sessions, Users, Registration, Caching,

UNIT V WEB SERVICES

OUTCOMES:
Upon completion of the course, the students will be able to:
- Understand of and an appreciation for the wide variety of XML languages that are being used in many industries.
- Understand 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.

TEXTBOOKS:

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

PARALLEL AND DISTRIBUTED COMPUTING

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

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 9

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

UNIT V FAULT TOLERANT DESIGN 9

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

TEXTBOOKS:

REFERENCES:
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

WEB TECHNOLOGY LABORATORY

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: 45 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, Jena.
- Create applications using web services such as WSDL and SOAP
- Develop application using Dreamweaver/Flex/Silver Light etc.

EMPLOYABILITY SKILL
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 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.
- How badly things can go wrong and what you are up against when you write code?
- Apply number theory in public key encryption techniques.
- Design a secure operating system
- Discuss the various platform security models in a mobile environment.

TEXTBOOKS:

REFERENCES:
CLOUD COMPUTING TECHNIQUES

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 MapReduce – Hadoop Distributed File System- Hadoop I/O- Developing a MapReduce Application - MapReduce Types and Formats - MapReduce Features– Hadoop Cluster Setup – Administering Hadoop.

UNIT SECURITY IN THE CLOUD

TOTAL: 45 PERIODS
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

TEXTBOOKS:

REFERENCES:

WIRELESS NETWORKS

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:
- Understand and appreciate new technologies in wireless networks
- Demonstrate various protocols of wireless and cellular networks
- Discuss the features of different wireless networks

TEXTBOOKS:

REFERENCES:

SECURITY LABORATORY

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

LIST OF EXPERIMENTS:
1. Implement SQL injection attack and Buffer Overflow attack.
2. Implement Cross Site Scripting and Prevent XSS.
3. Implement Hacking windows - Windows login password.
4. Implement Hacking windows - Accessing restricted drives.
5. Implement the following cryptography algorithms
   - Simplified DES algorithm
   - RSA algorithm
6. Implement the Secure hash algorithm
7. 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
8. Installation of rootkits and study about the variety of options
9. 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.

COMPREHENSION AND TECHNICAL REPORT

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, Snaglt, MS Visio
6. Javadoc, ROBODoc or any other equivalent tools for source code documentation

CREATIVE AND INNOVATIVE PROJECT

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
- Understand the system implications

AD HOC AND SENSOR NETWORKS

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

UNIT II  ROUTING PROTOCOLS

UNIT III  TRANSPORT LAYER AND SECURITY ISSUES

UNIT IV  MAC AND ROUTING IN WIRELESS SENSOR NETWORKS

UNIT V  TRANSPORT, QoS AND SECURITY IN WIRELESS SENSOR NETWORKS
Network Security Protocols

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- To identify and understand 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.

TEXTBOOKS:

REFERENCES:

MOBILE COMMUNICATIONS

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

UNIT I INTRODUCTION

UNIT II WIRELESS LAN

UNIT III WIRELESS SYSTEMS

UNIT IV MOBILE NETWORK LAYER
UNIT V TRANSPORT LAYER AND APPLICATIONS


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

TEXTBOOKS:

REFERENCES:

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


UNIT II INTELLIGENT AND INTERNET DATABASES

Databases.

UNIT III TEMPORAL AND OBJECT DATABASES 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.
- Understand the state-of-the-art in advanced databases distributed systems.

TEXTBOOKS:

REFERENCES:

AGILE METHODOLOGIES

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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

UNIT II  AGILE PROCESSES

UNIT III  AGILITY AND KNOWLEDGE MANAGEMENT

UNIT IV  AGILITY AND REQUIREMENTS ENGINEERING

UNIT V  AGILITY AND QUALITY ASSURANCE

TOTAL: 45 PERIODS

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

- Understand 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.

TEXTBOOKS:
ARTIFICIAL INTELLIGENCE

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

UNIT I  INTRODUCTION

UNIT II  PROBLEM SOLVING METHODS

UNIT III  KNOWLEDGE REPRESENTATION

UNIT IV  SOFTWARE AGENTS

UNIT V  APPLICATIONS

TOTAL :45 PERIODS

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

TEXTBOOKS:

REFERENCES:

BIG DATA ANALYTICS  

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  9
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- MapReduce Programming Model

UNIT II  CLUSTERING AND CLASSIFICATION  9

UNIT III  ASSOCIATION AND RECOMMENDATION SYSTEM  9

UNIT IV  GRAPH MEMORY AND STREAM MEMORY  9
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

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

REFERENCES:

BIOINFORMATICS TECHNOLOGIES

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OBJECTIVES:
- To understand the basic concepts of molecular biology and genetics
- To learn the concepts of computer science that relate to problems in biological sciences
- To learn to use computer science algorithms for biomedical research
- To learn about modeling techniques for bioinformatics

UNIT I INTRODUCTION
Need for Bioinformatics technologies – Overview of Bioinformatics Technologies
- Structural Bioinformatics – Data Format and Processing – Secondary Resources and Applications – Role of Structural Bioinformatics - Biological Data Integration System.

UNIT II DATWAREHOUSING AND DATAMINING IN BIOINFORMATICS
Bioinformatics Data – Data Warehousing Architecture – Data Quality – Biomedical Data Analysis – DNA Data Analysis – Protein Data Analysis – Machine Learning – Neural Network Architecture And Applications in Bioinformatics.

UNIT III MODELING FOR BIOINFORMATICS

UNIT IV PATTERN MATCHING AND VISUALIZATION 9

UNIT V MICRO-ARRAY ANALYSIS 9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Develop models for biological data.
- Apply pattern matching techniques to bioinformatics data – protein data genomic data.
- Apply micro array technology for genomic expression study.

TEXTBOOKS:

REFERENCES:

CYBER FORENSICS

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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 9

UNIT II INVESTIGATIVE SMART PRACTICES 9
Forensics Investigative Smart Practices – Time and Forensics – Incident closure

UNIT III LAWS AND PRIVACY CONCERNS 9
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:

DATA WAREHOUSING AND DATA MINING

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

UNIT I INTRODUCTION TO DAT WareHOUSING
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
9
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
9
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
9
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.

TEXTBOOKS:

REFERENCES:
• 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

UNIT II  INDEX TUNING
Indexes – Clustering Indexes – Non Clustering Indexes – Composite Indexes – Comparison of Indexing and Hashing techniques – Hot Table – Storage structure optimization through index tuning.

UNIT III  DESIGN AND QUERY OPTIMIZATION

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

UNIT V  TROUBLESHOOTING

TOTAL: 45 PERIODS

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

TEXTBOOKS:

REFERENCES:
• To understand the techniques for processing images including the different file formats used
• To be exposed to different image enhancement techniques
• To learn about image segmentation and feature analysis
• To understand the role of multi resolution analysis in image processing
• To study various applications of image processing

UNIT I  FUNDAMENTALS OF IMAGE PROCESSING  9

UNIT II  IMAGE ENHANCEMENT  9
Spatial Domain - Gray Level Transformations - Histogram Processing - Spatial Filtering - Smoothing and Sharpening - Frequency domain: Filtering in Frequency Domain - DFT, FFT, DCT - Smoothing and Sharpening Filters - Homomorphic Filtering.

UNIT III  IMAGE SEGMENTATION AND FEATURE ANALYSIS  9
Detection of Discontinuities - Edge Operators - Edge Linking and Boundary Detection - Thresholding - Region based Segmentation - Morphological Watersheds - Motion Segmentation, Feature Analysis and Extraction

UNIT IV  MULTI RESOLUTION ANALYSIS AND COMPRESSION  9

UNIT V  APPLICATIONS OF IMAGE PROCESSING  9
Image Classification - Image Recognition - Image understanding - Video Motion Analysis - Image Fusion - Steganography - Digital Compositing - Mosaics - Color Image Processing

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
• Explain the various steps in image processing
• Compare and contrast different image enhancement techniques
• Critically analyze various image segmentation and feature analysis
• Apply Multi resolution analysis to image processing
• Design various applications using image processing

TEXT BOOKS:

REFERENCES:
OBJECTIVES
• To emphasise 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
Engineering as experimentation - engineers as responsible experimenters - codes of ethics – Importance of Industrial Standards - a balanced outlook on law – anticorruption- occupational crime -the challenger case study.

UNIT IV ENGINEER’S RIGHTS AND RESPONSIBILITIES ON SAFETY 12

UNIT V GLOBAL ISSUES 12
Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral leadership-Sample code of conduct.

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.

TOTAL : 45 PERIODS
TEXT BOOKS:

REFERENCES:

FOUNDATION SKILLS IN INTEGRATED PRODUCT DEVELOPMENT

OBJECTIVES:
- Understand the global trends and development methodologies of various types of products and services
- 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
- Understand requirement engineering and know how to collect, analyze and arrive at requirements for new product development and convert them into design specification
- Understand system modeling for system, sub-system and their interfaces and arrive at the optimum system specification and characteristics
- Develop documentation, test specifications and coordinate with various teams to validate and sustain up to the EoL (End of Life) support activities for engineering customers

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


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:


FREE AND OPEN SOURCE SOFTWARE

OBJECTIVES:

- To impart a firsthand knowledge on the FOSS philosophy and methodology
- To enable the students to install and use Linux distribution
- To train the students in Linux desktop usage and some commonly used programs
- To encourage students to apply OSS philosophy and migrate to FOSS in their own domains
- To develop application programs using FOSS

UNIT I HISTORY AND OVERVIEW OF GNU/LINUX AND FOSS
Definition of FOSS & GNU, History of GNU/Linux and the Free Software Movement, advantages of Free Software and GNU/Linux, FOSS Usage, Trends and Potential—Global and Indian.

UNIT II SYSTEM ADMINISTRATION 10
GNU/Linux OS Installation—Detect Hardware, Configure Disk Partitions & File Systems And Install A GNU/Linux Distribution; Basic Shell Commands -Logging in, Listing Files, Editing Files, Copying/Moving Files, Viewing File Contents, Changing File Modes and Permissions, Process Management; User and Group Management, File Ownership and Permissions, PAM Authentication; Introduction to Common System Configuration Files & Log Files; Configuring Networking, Basics of TCP/IP Networking And Routing, Connecting to the Internet (Through Dialup, DSL, Ethernet, Leased Line); Configuring Additional Hardware - Sound Cards, Displays & Display Cards, Network Cards, Modems, USB Drives, CD Writers; Understanding the OS Boot Up Process; Performing Everyday Tasks Using Gnu/Linux - Accessing the Internet, Playing Music, Editing Documents and Spreadsheets, Sending and Receiving Email, Copy Files from Disks and Over the Network, Playing Games, Writing Cds; X Window System Configuration and Utilities—Configure X Windows, Detect Display Devices; Installing Software From Source Code as well as Using Binary Packages.

UNIT III Server Setup and Configuration 10
Setting up Email Servers—Using Postfix (SMTP Services), Courier (IMAP & POP3 Services), Squirrel Mail (Web Mail Services); Setting up Web Servers—Using Apache (HTTP Services), Php (Server-Side Scripting), Perl (CGI Support); Setting up File Services—Using Samba (File and Authentication Services for Windows Networks), Using NFS (File Services For Gnu/Linux / Unix Networks); Setting up Proxy Services—Using Squid (Http / Ftp / Https Proxy Services); Setting up Printer Services—Using CUPS (Print Spooler), Foomatic (Printer Database); Setting up a Firewall—Using netfilter and iptables.

UNIT IV Programming Tools 12
Using the GNU Compiler Collection—GNU Compiler Tools; the C Preprocessor (Cpp), the C Compiler (Gcc) and the C++ Compiler (G++), Assembler (Gas); Understanding Build Systems—Constructing Make Files And Using Make, Using autoconf and autogen to Automatically Generate Make Files Tailored for Different Development Environments; Using Source Code Versioning and Management Tools—Using Cvs to Manage Source Code Revisions, Patch & Diff; Understanding the GNU Libc Libraries and Linker -Linking Against Object Archives (.A Libraries) and Dynamic Shared Object Libraries (.So Libraries), Generating Statically Linked Binaries and Libraries, Generating Dynamically Linked Libraries; Using the GNU Debugging Tools—gdb to Debug Programs, Graphical Debuggers like ddd, Memory Debugging / Profiling Libraries mpatrol and valgrind; Review of Common Programming Practices and Guidelines for GNU/Linux and FOSS; Introduction to Bash, sed&awk Scripting.

UNIT V Application Programming 10
Basics of the X Windows Server Architecture; Qt Programming; Gtk+ Programming; Programming; Programming GUI Applications with Localization Support

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Ability to work with FOSS and Developing Teams
- Ability to contribute to the further development of FOSS
- Ability to Integrate FOSS with other Applications

TEXTBOOKS:

REFERENCES:
5. GNU Autoconf, Automake and Libtool, Gary V. Vaughan, Ben Elliston, Tom Tromey and Ian Lance Taylor. URL: http://sources.redhat.com/autobook/
6. An Introduction to GCC, Brian Gough. URL: http://www.network-theory.co.uk/docs/gccintro

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  9
Developing 2D and 3D Interactive Games Using OpenGL, DirectX – Isometric and Tile Based Games, Puzzle Games, Single Player Games, Multi-Player Games. Case study: Mine craft.
TOTAL : 45 PERIODS

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

- Develop game programming skills and create interactive games.

TEXTBOOKS:

REFERENCES:

GPU ARCHITECTURE AND PROGRAMMING  L T P C
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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  9
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  9

UNIT III  PROGRAMMING ISSUES  9

UNIT IV  ALGORITHMS ON GPU  9
Parallel Patterns: Convolution, Prefix Sum, Sparse Matrix - Matrix Multiplication - Programming Heterogeneous Cluster - CUDA Dynamic Parallelism.

UNIT V  OTHER GPU PROGRAMMING MODELS  9
Introducing OpenGL, OpenACC, Thrust.
OUTCOMES:
Upon completion of the course, the students will be able to:
- Describe GPU Architecture
- Write programs using CUDA
- Implement algorithms in GPUs to get maximum occupancy and throughput
- Program in any heterogeneous programming model

TEXTBOOKS:

REFERENCES:

GRAPH THEORY

OBJECTIVES:
- To comprehend graphs as modeling and analysis tool
- To introduce various data structures with graph theory
- To learn fundamentals behind principle of counting and combinatorial.

UNIT I INTRODUCTION

UNIT II TREES, CONNECTIVITY & PLANARITY

UNIT III MATRICES, COLOURING AND DIRECTED GRAPH

UNIT IV PERMUTATIONS & COMBINATIONS

UNIT V GENERATING FUNCTIONS
Generating Functions - Partitions Of Integers - Exponential Generating Function - Summation

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- To write programs involving basic graph algorithms
- To write programs for graph coloring
- To differentiate the potential use of directed and undirected graphs
- To outline the concepts of permutations and combinations

TEXTBOOKS:

REFERENCES:

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
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
- Understand Fractal theory, color models, Animation.
- Do programming in OpenGL for drawing basic 3D scenes and add realism

TEXTBOOKS:

REFERENCES:

GREEN COMPUTING

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
Green IT Fundamentals: Business, IT, and the Environment – Benefits of a green data centre

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

TEXTBOOKS:

REFERENCES:

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

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:

INTERNET OF THINGS

OBJECTIVES:
- To understand the fundamentals of Internet of Things.
- To build a small low cost embedded system using Arduino / Raspberry Pi or equivalent boards.
- To apply the concept of Internet of Things in the real world scenario

UNIT I FUNDAMENTALS of IoT
Introduction – Characteristics-Physical Design - Protocols – Logical Design – Enabling technologies – IoT Levels – Six Levels of IoT - Domain Specific IoTs – IoTvs M2M.

UNIT II IoT DESIGN METHODOLOGY
IoT Systems Management – IoT Design Methodology – Specifications Integration and Application Development.

UNIT III BUILDING IoT with Raspberry Pi
Physical Device – Raspberry Pi Interfaces – Programming – APIs / Packages – Web Services

UNIT IV BUILDING IoT with Galileo/Arduino

98
UNIT V    CASE STUDIES and ADVANCED TOPICS

Various Real Time Applications of IoT - Connecting IoT to Cloud – Cloud Storage for IoT – Data Analytics for IoT – Software & Management Tools for IoT

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Design a portable IoT using Arduino/ equivalent boards and relevant protocols.
- Develop web services to access/control IoT devices.
- Deploy an IoT application and connect to the cloud.
- Analyze applications of IoT in real time scenario

TEXT BOOKS:

REFERENCES:

KNOWLEDGE MANAGEMENT

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OBJECTIVES:
- To learn about Knowledge Engineering Methodology
- To understand organizational context and identify knowledge bottlenecks
- To know about Knowledge Model Construction
- To understand the techniques of Knowledge Management and Implementation

UNIT I        INTRODUCTION

The value of Knowledge – Knowledge Engineering Basics – The Task and Organizational Content – Knowledge Management – Knowledge Management Ontology.

UNIT II       KNOWLEDGE MODELS


UNIT III      TECHNIQUES OF KNOWLEDGE MANAGEMENT

Knowledge Elicitation Techniques – Modeling Communication Aspects – Knowledge Management and Organizational Learning.

UNIT IV       KNOWLEDGE SYSTEM IMPLEMENTATION

OUTCOMES:
Upon completion of the course, the students will be able to:
- Design Knowledge Systems
- Construct Common KADS Model
- Implement Knowledge Management by Elucidating Knowledge
- Develop an Application using Knowledge Management Tools

TEXTBOOKS:

REFERENCES:
2. http://www.epistemics.co.uk
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.

TEXTBOOKS:

REFERENCES:

MIDDLEWARE TECHNOLOGIES

OBJECTIVES:

- To provide sound knowledge in various middleware technologies
- To familiarize between various web service architectures and their standards

UNIT I  INTRODUCTION
General Middleware, Service Specific Middleware, Client/Server Building blocks – Peer-to-

UNIT II EJB and CORBA
EJB Architecture - Overview of EJB Software Architecture, EJB Conversation, Building and Deploying EJBs, Roles, EJB Applications – Types of Enterprise Beans - Lifecycle of Beans - EJB clients - Developing an Application - Deployment. CORBA – Components - Architectural Features – Method Invocations - Static and Dynamic CORBA – Structure of CORBA IDL - Self-Describing Data Type - Interface Repository - Building an Application Using CORBA - CORBA Services - Object Location Services, Messaging Services - CORBA Component Model.

UNIT III .NET FRAMEWORK (FROM THE POINT OF VIEW .NET)

UNIT IV SOA and WEB SERVICES

UNIT V OTHER TYPES OF MIDDLEWARE
Other Types of Middleware, Real-Time Middleware, Embedded Systems Middleware, Mobile Middleware, Oracle Fusion Middleware.

OUTCOMES:
Upon completion of the course, the students will be able to:
- To implement programs in EJB
- To outline the functionalities of various types of middleware technologies
- To design web services

TEXTBOOKS:

REFERENCES:

MODELS OF COMPUTATIONS

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OBJECTIVES:
- To understand computation and computability concepts.
- To study different approaches to facilitate computing
- To learn the abstractions of computation and their implementations
UNIT I  TURING MACHINE MODEL  9
Turing Machine Logic, Proof, Computability.

UNIT II  QUANTUM COMPUTATION  9
Quantum Computing History, Postulates of Quantum Theory, Dirac Notation, the Quantum Circuit Model, Simple Quantum Protocols: Teleportation, Superdense Coding, Foundation Algorithms.

UNIT III  NATURE INSPIRED COMPUTING  9

UNIT IV  SOCIAL COMPUTING  9

UNIT V  EVOLUTIONARY COMPUTING  9

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Identify the terminology of the theory of computing
- Predict the major results in computability and complexity theory.
- Prepare the major models of computations

TEXTBOOKS:

REFERENCES:

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

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 – StoryBoarding, Metaphors – Card / Page, Icon, Timeline, Tools – Adobe Dream Weaver CC, Flash, Edge Animate CC, Camatasia Studio 8, Claro, E-Learning Authoring Tools – Articulate, Elucidat, 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

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
• A grasp on Basic elements of multimedia
• Understand 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

TEXTBOOKS:

REFERENCES:
4. www.Webstyleguide.com

NANO COMPUTING

OBJECTIVES:
• Learn nano computing challenges.
• Be familiar with the imperfections.
• Be exposed to reliability evaluation strategies.
• Learn nano scale quantum computing.
• Understand Molecular Computing and Optimal Computing.

UNIT I  NANOCOMPUTING-PROSPECTS AND CHALLENGES  9

UNIT II  NANOCOMPUTING WITH IMPERFECTIONS  9

UNIT III  RELIABILITY OF NANOCOMPUTING  9

UNIT IV  NANOSCALE QUANTUM COMPUTING  9

UNIT V  QCADESIGNER SOFTWARE AND QCA IMPLEMENTATION  9

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
• Discuss nano computing challenges.
• Handle the imperfections.
• Apply reliability evaluation strategies.
• Use nano scale quantum computing.
• Utilize Molecular Computing and Optimal Computing.

TEXTBOOKS:

REFERENCES:

OBJECTIVES:

NATURAL LANGUAGE PROCESSING  3 0 0 3
• 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**

**UNIT II**
**SPEECH**
Speech – Phonetics - Speech Synthesis - Automatic Speech Recognition - Speech Recognition: - Advanced Topics - Computational Phonology

**UNIT III**
**SYNTAX**

**UNIT IV**
**SEMANTICS AND PRAGMATICS**
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

**TEXTBOOKS:**

**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 HTML - Searching for Nodes - html - Generation - Serializing Objects - Pickle Files - Versions - Debugging - Serializing to JSON - HTTP Web Services - Features – httplib2

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to
- Understand the concepts of object oriented programming.
- Use generators and iterators
- Develop test cases and handle refactoring.
- Use objects to program over the web.

TEXTBOOKS:

REFERENCES:

OBJECTIVES:
- To be familiar with the automation and brief history of robot and applications.
- To discuss on various problem solving algorithms that should be integrated in robots.
- To give knowledge about Artificial intelligence, behavioral learning and their design.
To learn about various Sensors devices and their role in Robots.
To educate students about bringing Robots to Real life and justifications


OUTCOMES:
Upon completion of the course, the students will be able to:
- Understand the history, get equipped with the automation of robots and its applications.
- Familiarize and Identify different robotic problem solving techniques.
- Critically analyze the various robotic programming methods, artificial intelligence strategies and behavioral learning concepts with its design.
- Compare different sensory devices in various robotic applications
- Design a simple robot application in a real time scenario

TEXTBOOKS:


REFERENCES:


OBJECTIVES:
- To depict the overall architecture of semantic web and to illustrate the overview of design principles and technologies in semantic web
- To build and implement a small ontology that is semantically descriptive of your chosen problem domain, implement applications that can access, use and manipulate the ontology, represent data from a chosen problem in XML with appropriate semantic tags obtained or derived from the ontology
- To depict the semantic relationships among these data elements using Resource Description Framework (RDF)
- To design and implement a web services application that “discovers” the data and/or other web services via the semantic web (which includes the RDF, data elements in properly tagged XML, and the ontology), discover the capabilities and limitations of semantic web technology for different applications.

UNIT I INTRODUCTION

UNIT II KNOWLEDGE REPRESENTATION AND ONTOLOGIES

UNIT III STRUCTURING AND DESCRIBING WEB RESOURCES

UNIT IV WEB ONTOLOGY LANGUAGE

9


UNIT V SEMANTIC WEB TOOLS AND APPLICATIONS

9


TOTAL :45 PERIODS

OUTCOMES:

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

- Describe the architecture of semantic web and its technologies.
- Familiarize with different ontologies and their designing methods.
- Analyze semantic relationship among data using Resource Description Framework (RDF)
- Develop a web services application using semantic web tools and their services.
- Depict the capabilities and limitations of semantic web technology for different applications

TEXTBOOKS:


REFERENCES:


SERVICE ORIENTED ARCHITECTURE

L T P C

3 0 0 3
• To gain understanding of the basic principles of service orientation, service oriented analysis techniques, technology underlying the service design
• To learn the advanced concepts such as service composition, orchestration and Choreography, and various WS-* specification standards

UNIT I  FUNDAMENTALS OF SOA  9

UNIT II  SOA AND WEB SERVICES  9

UNIT III MULTICHA NNE LACCE S S A N D W E B S E R V I C E S C O M PO SI TIO N  9

UNIT IV  JAVA WEB SERVICES  9

UNIT V  WEB SERVICES SECURITY AND TRANSACTION  9

TOTAL :45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
• To outline the concepts of SOA
• To develop a web service in Java
• To implement web security

TEXTBOOKS:

REFERENCES:
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

UNIT V GENETIC ALGORITHM

TOTAL: 45 PERIODS

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

- Students awake the importance of tolerance of imprecision and uncertainty for design of robust and low-cost intelligent machines.
- Students 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.

- Students 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).

**TEXTBOOKS:**


**REFERENCES:**

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

**SOFTWARE AGENTS**

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**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**


**UNIT III**

**DISTRIBUTED MULTI-AGENTS**


**UNIT IV**

**SECURITY AND ANONYMITY IN AGENTS**

UNIT V APPLICATIONS


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:

SOFTWARE DEFINED NETWORKS

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
History of Software Defined Networking (SDN) – Modern Data Center – Traditional Switch Architecture – Why SDN – Evolution of SDN – How SDN Works – Centralized and Distributed Control and Date Planes

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:
- Understand and appreciate the evolution of software defined networks
- Understand the various components of SDN and their uses
- Understand the use of SDN in the current networking scenario
- Design and develop various applications of SDN

TEXTBOOKS:

REFERENCES:

SOFTWARE PROCESS MODELS

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OBJECTIVES:
- To learn the Software Engineering process models to make the project effectively
- To learn different types of process models
- To learn software development phases
- To know set of methods in project reviews and inspections
- To know work practices tools and techniques in developing software

UNIT I PROCESS AND BASIC PROCESS MODELS

UNIT II ADVANCED PROCESS MODELS 8

UNIT III ADVANCED PROCESS MODELS – II 12

UNIT IV PROCESS IMPROVEMENT MODELS – I 8

UNIT V PROCESS IMPROVEMENT MODELS – II 8
Six Sigma – CMMI.

TOTAL: 45 PERIODS

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

- Demonstrate the Software Process models for the Adaptive development of Software
- Knowing the process improvement for the product quality improvement.
- To categorizes and examines a number of methods for describing or modeling how software systems are developed.
- Knowing the software life cycle
- contemporary models of software development must account for software the interrelationships between software products and production processes, as well as for the roles played by tools, people and their workplaces

TEXTBOOKS:

REFERENCES:

SOFTWARE PROJECT MANAGEMENT L T P C
3 0 0 3

OBJECTIVES: title
- 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 II PROJECT EVALUATION 9

UNIT III ACTIVITY PLANNING 9

UNIT IV MONITORING AND CONTROL 9

UNIT V MANAGING PEOPLE AND ORGANIZING TEAMS 9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Students should have understood the roles of the project manager.
- Students should have understood the threats and opportunities in project management.
- Students should have Gained Expertise in size, effort and cost estimation techniques.
- Students should have understood the techniques available to keep the project’s aims and objectives, under control.
- Students should have understood the approaches of non-technical problems.
- Students should be able to appreciate the management issues like team structure, group dynamics.

TEXTBOOKS:

REFERENCES:
SOFTWARE QUALITY AND TESTING

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

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- To analyze software documentations using inspections and walkthrough
- To associate various software metrics to context
- To list the components of test plan
- To explain the principles behind SCM

TEXTBOOKS:

REFERENCES:

TCP/IP DESIGN AND IMPLEMENTATION

OBJECTIVES:
- To learn the basics of socket programming using TCP Sockets.
- To learn about Socket Options
- To learn to develop Macros for including Objects In MIB Structure
- To understand SNMPv1, v2 and v3 protocols & practical issues.

UNIT I  FUNDAMENTALS

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

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

UNIT IV  TCP I/O PROCESSING AND FSM

UNIT V  TCP TIMER AND FLOW CONTROL

OUTCOMES:
Upon completion of the course, the students will be able to:
- Understand the internals of the TCP/IP protocols
- Understand how TCP/IP is actually implemented
- Understand the interaction among the protocols in a protocol stack

TEXTBOOKS:

REFERENCES:
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
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

UNIT III
TQM TOOLS & TECHNIQUES I

UNIT IV
TQM TOOLS & TECHNIQUES II
UNIT V  QUALITY MANAGEMENT SYSTEM


OUTCOMES:

CO1: Ability to apply TQM concepts in a selected enterprise.
CO2: Ability to apply TQM principles in a selected enterprise.
CO3: Ability to apply the various tools and techniques of TQM.
CO4: Ability to apply QMS and EMS in any organization.

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TEXT BOOK:

REFERENCE BOOKS:

UNIX INTERNALS

OBJECTIVES:
- To provide knowledge about Unix operating system working principles, its file system and programming for interprocess communication
- To learn shell programming and filters
- To get an understanding on using various system calls

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

UNIT V MEMORY MANAGEMENT AND I/O

OUTCOMES:
Upon completion of the course, the students will be able to:
- To write UNIX programs using file system calls
- To write UNIX programs for process scheduling and page replacement
- To write UNIX programs on inter-process communication

TEXTBOOKS:

REFERENCES:

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
- Students will also understand the various abstraction mechanisms and to create interactive visual interfaces

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

UNIT II COMPUTER VISUALIZATION

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

UNIT V ABSTRACTION IN TIME AND INTERACTIVE SYSTEMS 9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Deploy legacy OSs on virtual machines
- Understand the intricacies of server, storage, network, desktop and application virtualizations
- Design new models for virtualization

TEXTBOOKS:

REFERENCES:

WEB DESIGN AND MANAGEMENT

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 PAGE DESIGN

UNIT III SCRIPTING LANGUAGES AND ANIMATION USING FLASH
Client side scripting : XHTML—DHTML—JavaScript—XML Server Side Scripting: Perl—PHP—ASP/JSP Designing a Simple Web Application—Introduction to MACROMEDIA FLASH, Importing Other File Formats to Flash—Saving and Exporting Flash Files, Frame by Frame Animation—Motion Tweening—Shape Tweening.

UNIT IV PRE-PRODUCTION MANAGEMENT

UNIT V PRODUCTION, MAINTENANCE AND EVALUATION
Design and Construction—Testing, Launch and Handover—Maintenance—Review and Evaluation—Case Study: Using the Skills and Concepts Learnt with the ADOBE IMAGE READY, DREAMWEAVER, FLASH, and Scripts, Students will Develop their Portfolio in the Form of Web Pages. These Pages have to be Uploaded in Free Public Domains.

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.

TEXTBOOKS:

REFERENCES:

DISASTER MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:
- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, 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  9
Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters –
Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social,
economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of
caste, class, gender, age, location, disability - Global trends in disasters: urban disasters,
pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of
Disasters.

UNIT II  APPROACHES TO DISASTER RISK REDUCTION (DRR)  9
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 stake-
holders- Institutional Processess 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  9
Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as
dams, embankments, 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  9
Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation,
Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and
Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes
and legislation – Role of GIS and Information Technology Components in Preparedness, Risk
Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

UNIT V  DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD
WORKS  9
Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and
Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge
Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man
Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and
field works related to disaster management.

OUTCOMES:
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

TOTAL: 45 PERIODS
TEXTBOOKS:

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

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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

UNIT V

TOTAL: 45 PERIODS

OUTCOMES:
- Engineering students will acquire the basic knowledge of human rights.

REFERENCES: