School of Engineering

B. Tech IT Cloud & Mobile based Application Development

(in association with IBM)

Programme Outcome of B.E / B.Tech Programme:

PO 1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2. Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant
to the professional engineering practice.

PO 7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes of B. Tech IT Cloud & Mobile based Application Development

To enable the student to emerge as:

PSO 1. An expert in Software design, Coding, Testing and Documentation.

PSO 2. Efficient programmer using high level languages such as C, C++, JAVA, .NET, PERL, PYTHON, etc.

PSO 3. Expert in mobile application development and Cloud Technology.

PSO 4. Specialist in the functions of various modules of different types of operating systems

PSO 5. System/Network Administrator with deep knowledge in Network design & analysis, Network security and Software defined networks


PSO 7. Data Scientist with deep knowledge in Data structure, Database and Data mining, Big Data analytics and Data Visualization.

PSO 8. Specialist in Virtualization techniques and Internet of Things.
## Members in Board of Studies (BOS)

### EXTERNAL MEMBERS

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<td>Dr. N. Bhalaji, Associate Professor, IT</td>
<td>Department of Information Technology SSN College of Engineering, Chennai.</td>
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<tr>
<td>2</td>
<td>Mr. Madhusudhana Rao R D, Regional Manager – Career Education</td>
<td>Software Group – India / South Asia IBM India Pvt Ltd.</td>
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<td>Mrs. K. Kalaivani, HOD / CSE</td>
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# B. Tech - IT (CLOUD & MOBILE BASED APPLICATION DEVELOPMENT) CURRICULUM

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## B. Tech - IT (CLOUD & MOBILE BASED APPLICATION DEVELOPMENT) CURRICULUM

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| Core       | 15ECS063| Information Retrieval                            | 3       | 1        | 0         | 3       |
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B. Tech - IT (CLOUD & MOBILE BASED APPLICATION DEVELOPMENT) CURRICULUM

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<td>15ECS122</td>
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<td>15ECS124</td>
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<td>15ECS125</td>
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<td>Essentials of Object Oriented Programming using Java</td>
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<td>Foundation Course in Enterprise Application Development using IBM Rational Tools</td>
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<td>15ECS130</td>
<td>Enterprise Mobile Application Development using IBM Worklight</td>
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<td>15ECS131</td>
<td>Development of IoT Based Applications</td>
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<td>15ECS132</td>
<td>Fundamentals of Enterprise Apps Development for Cloud Deployment</td>
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<tr>
<td>15ECS133</td>
<td>Cyber Forensics</td>
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List of Generic Elective Courses

15__151  Analog and Digital Communication  
15__152  Control Systems  
15__153  Digital Signal Processing  
15__154  High Speed Networks  
15__155  Robotics  
15__156  Embedded Systems  
15__157  Principles of Management & Professional Ethics  
15__158  Fundamentals of Nano science  
15__159  Intellectual Property Rights  
15__160  Indian Constitution and Society  
15__161  Engineering Economics  
15__162  Operation Research  
15__163  Total Quality Management  
15__164  Digital Principles and System Design

List of Skill Enhancement Elective Courses

15GPD251  Personality Development I  
15GPD252  Personality Development II  
15GPD253  Personality Development III  
15GPD254  Personality Development IV  
15NSS255  NSS - I  
15NSS256  NSS - II  
15NSS257  NSS - III  
15NSS258  NSS - IV  
15NSS259  NSS - V  
15NSS260  NSS – VI
Syllabus

Core Courses
Course Objective:

- To develop listening skills for academic and professional purposes.
- To acquire the ability to speak effectively in English in real life situations.
- To inculcate reading habit and to develop effective reading skills.
- To improve their active and passive vocabulary.
- To write letters and reports effectively in formal and business situations.

UNIT I  
INTRODUCTION TO BASIC GRAMMAR AND VOCABULARY  
9

UNIT II  
BASIC SKILL – LISTENING AND INTERPRETATION  
9

UNIT III  
BASIC SKILL-WRITING SKILL AND STRUCTURES  
9
Creative thinking and speaking, Tenses – Present Tense – simple present, present continuous, present perfect, present perfect continuous, Past Tense - simple past, past continuous, past perfect, past perfect continuous, Future Tense -simple future, future continuous, future perfect, future perfect continuous, Autobiographical writing, JAM session.

UNIT IV  
BASIC SKILL: READING SKILL AND WRITING SKILL  
9
Reading Skills- Skimming and Scanning, Comprehension Passage Paragraph Writing – Descriptive paragraph, Argumentative paragraph, Persuasive paragraph, Demonstrative paragraph, Compare and contrast, Conversations.

UNIT V  
BASIC SKILL: SPEAKING SKILL AND VOCABULARY  
9
Vocabulary, Prefixes and Suffixes, Cause and Effect relationship, Clauses and Phrases, Super-ordinates and Hyponyms, Expressing Causal Relation, Article, Prepositions, Preposition phrases, Speaking about the future plans, Reading comprehensions, Situational dialogues.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Improve the language proficiency of a technical under-graduate in English with emphasis on LSRW skills.
CO 2. Develop listening skills for academic and professional purposes.
CO 3. Acquire the ability to speak effectively in English in real life situations.
CO 4. Provide learning environment to practice listening, speaking, reading and writing skills.
CO 5. Assist the students to carry on the tasks and activities through guided instructions and materials.
CO 6. Inculcate reading habit and to develop effective reading skills.
CO 7. Improve their active and passive vocabulary.
CO 8. Effectively integrate English language learning with employability skills and training.
CO 9. Provide hands-on experience through case-studies, mini-projects, group and individual presentations.
CO 10. Write letters and reports effectively in formal and business situations.
CO 11. Expose the students to a variety of self-instructional modes of language learning.
CO 12. Develop learner autonomy.

TEXT BOOKS:

REFERENCE BOOKS:
**Course Objective:** To develop the skills in the areas of Matrices, Three dimensional Analytical Geometry, Differential calculus, Functions of several Variables and Multiple Integrals. To serve as a pre-requisite mathematics course for postgraduate courses, specialized studies and research.

**UNIT I MATRICES**


**UNIT II THREE DIMENSIONAL ANALYTICAL GEOMETRY**


**UNIT III DIFFERENTIAL CALCULUS**

Curvature in Cartesian co-ordinates – Centre and radius of curvature – Circle of curvature – Evolutes – Envelopes – Evolute as envelope of normals.

**UNIT IV FUNCTIONS OF SEVERAL VARIABLES**


**UNIT V MULTIPLE INTEGRALS**

Double integration – Cartesian and polar coordinates – Change of order of integration – Change of variables between Cartesian and polar coordinates – Triple integrals – Area as double integral

**TOTAL: 60h**

**Course Outcome:**

After successful completion of the Mathematics – I course, the student will be able to

CO 1. Able to solve the 1st order differential equations in different fields.
CO 2. Identify and solve a 2nd and higher order differential equations and perform simple applications in Engineering.
CO 3. Calculate grad, divergence, curl; a line, surface and volume integral.
CO 4. To find work done, area, and volume.
CO 5. Apply the vector integral theorems to evaluate multiple integrals. Find the maxima and minima of two variable functions under different constraints.
CO 6. Solve the single and multiple integrals and calculate the moment of inertia.
CO 7. Develop the skills in the areas of Matrices to calculate the three dimensional analytical geometry.
CO 8. Know about the Functions of several Variables and Multiple Integrals.
CO 9. Serve as a pre-requisite mathematics course for post graduate courses.

CO 10. Specialized for studies and research.

CO 11. Orthogonal transformation of a symmetric matrix to diagonal form.

TEXT BOOKS:

REFERENCE BOOKS:
Course Objective: To learn the basics of Ultrasonics, Lasers, Fibre optics and applications, Quantum physics and crystal physics etc., and to apply these fundamental principles to solve practical problems related to materials used for engineering applications.

UNIT I ULTRASONICS

UNIT II LASERS

UNIT III FIBRE OPTICS AND APPLICATIONS

UNIT IV QUANTUM PHYSICS

UNIT V CRYSTAL PHYSICS
Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – d spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – NaCl, ZnS, diamond and graphite structures – Polymorphism and allotropy – Crystal defects – point, line and surface defects – Burger vector.

TOTAL: 60 h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Apply the fundamental principles to solve practical problems related to materials used for engineering applications.

CO 2. Formulate general mechanics parameters and distinguish between central and non-central forces.

CO 3. Learn the basics of Ultrasonic.

CO 4. Understanding about the Fiber optics.

CO 5. Explain types of waves and interference of light

CO 6. Derive thermodynamic parameters and apply fundamental laws to solve thermodynamic problems

CO 7. Differentiate between the terms atomic number, atomic mass, isotopes etc and apply various rules such as rule, octet rules and Bohr’s energy levels.

CO 8. Know about various applications of Lasers.

CO 9. Basic information in Quantum physics and crystal physics etc,

CO 10. Categorize between various environmental pollutants, study harmful effects of pollutants, elaborate the concepts such as global warming, BOD, COD, ozone depletion and acid rain.

TEXT BOOKS:

REFERENCE BOOKS:
Course Objective:
- This course provides conceptual and foundational knowledge of the Fundamentals of technologies in the context of software and programming.
- The contents of this course will ensure a student’s interest in the subject is well founded and sows a seed for a conceptual understanding of History of Computing, including programming and the Open Source concepts.
- The course includes enough hands on exercises for the students to be glued on to it.

UNIT I INTRODUCTION TO OPEN SOURCE PARADIGM
12

UNIT II INTRODUCTION TO LINUX
12
What is Linux - Background of Linux - Why is Linux so popular - What can you do with Linux - Linux Distributions - Linux Technology Center - Future of Linux.

UNIT III INTRODUCTION TO EMERGING AREAS OF TECHNOLOGY
12

UNIT IV INDUSTRY USAGE OF COMPUTER PROGRAMMING
12
Industry Session on C Programming - Background of C, Getting Started with C, Constructs, Loops & Arrays, Functions, Pointers, User Defined Types, Binary I/O With Structures..

UNIT V FILE HANDLING
12

TOTAL: 60h

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

CO 1. Understand the need of Open Source Standards and its impact in industries
CO 2. Work in Linux platform
CO 3. Describe the advantages and limitations of Linux.
CO 5. Find the need for analytics and information security
CO 6. Understand the emerging areas of technology like cloud, data analytics and mobile app development
CO 7. Write programming code for various applications using C language
CO 8. Identify the industry usage of Computer Programming
CO 9. Implement various file operations in C

TEXT BOOK:
1. IBM Career Education IBM CE – Software Foundation and Programming 1, IBM Student Course Material,
Course Objective:

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

UNIT I  PLANE CURVES AND FREE HAND SKETCHING  12


UNIT II  PROJECTION OF POINTS, LINES AND PLANE SURFACES  12

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

UNIT III  PROJECTION OF SOLIDS  12

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

UNIT IV  SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES  12

Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – Obtaining true shape of section. Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinders and cones – Development of lateral surfaces of solids with cylindrical cutouts, perpendicular to the axis.

UNIT V  ISOMETRIC AND PERSPECTIVE PROJECTIONS  12


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.

Whenever the total number of candidates in a college exceeds 150, the University Examination in that college will be conducted in two sessions (FN and AN on the same day) for 50 percent of student (approx) at a time.

Total: 60h

Course Outcome:
At the end of this course, the Student will be able to

CO 1. Understand the theory of projection.
CO 2. Able to know and understand the conventions and the methods of engineering drawing.
CO 3. Improve their visualization skills so that they can apply these skills in developing new products.
CO 4. Able to prepare simple layout of factory buildings.
CO 5. Impart and inculcate proper understanding of the theory of projection.
CO 6. Improve the visualization skills.
CO 7. Enable the students with various concepts like dimensioning, conventions and standards related to working drawings in order to become professionally efficient.
CO 8. Impart the knowledge on understanding and drawing of simple residential/office buildings.
CO 9. Ability to produce engineered drawings will improve.
CO 10. Ability to convert sketches into engineered drawings will increase.

TEXT BOOK:

REFERENCES:
GROUP A – Mechanical And Civil Engineering Practices

MECHANICAL ENGINEERING PRACTICES

Course Objective:
- To study bench fitting drawings for making male and female fittings as per the given dimensions and tolerances.
- To study Arc welding drawings for making common weld joints as per the given dimensions.
- To study sheet metal development drawings for making common metal parts/components as per the given dimensions.

List of Experiments
1. To make square, hexagonal, V joint in bench fitting as per the given dimensions and Tolerances.
2. To make single V, butt, lap and T fillet joint by arc welding with the back hand and fore hand welding techniques as per the given dimensions.
3. To make simple Cubical blocks, Rectangular trays in sheet metal with the jigs as per the given dimensions.

CIVIL ENGINEERING PRACTICES

Course Objective:
1. To study wood working drawings for making common wooden joints as per the given dimensions.
2. To study pipe line drawings for making common water supply in the domestic, plant applications as per the given dimensions.

List of Experiments
1. To make simple T, cross lap, mortise- tenon joints by wooden blocks as per the given dimensions.
2. To make simple water line pipe connections in PVC pipes with single tap, double taps for same and different diameters with valves as per the given dimensions.

GROUP B – Electrical and Electronics Engineering Practices

ELECTRICAL ENGINEERING PRACTICES

Course Objective:
1. To read electrical drawings for making Residential and industrial wiring as per the given provisions.
2. To read electrical circuit drawings for measuring electrical quantities, energy for the given electrical circuit.

List Of Experiments:
1. To measure energy by using single phase energy meter.
2. To measure electrical quantities like voltage, current, power, power factor in RLC Circuit.
3. To make fluorescent lamp, stair case and residential wiring.
ELECTRONICS ENGINEERING PRACTICES

Course Objective:
1. To understand the colour coding of the Resistors.
2. To measure AC Signal parameters by the CRO.
3. To measure ripple factors of HWR, FWR.
4. To solder and de-solder the components in the PCB.

List of Experiments:
1. To measure Peak-peak, rms, period, frequency using CRO.
2. To solder components devices and circuits by using general purpose PCB.

SUGGESTED ACTIVITIES
1. To attempt application oriented mini projects with the skills obtained for all the practices.
2. To make picture charts for all the practices.

MANUALS

Total: 30h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Able to make various joints in the given object with the available work material.
CO 2. Able to know how much time a joint will take for the assessment of time.
CO 3. Familiar with different types of woods used and tools used in wood Working technology.
CO 4. Familiar with different types of tools used in sheet metal working.
CO 5. Developments of sheet metal jobs from GI sheets, knowledge of basic concepts of soldering.
CO 6. Familiar with different types of tools used in forging technology.
CO 7. Knowledge of different types of furnaces like coal fired, electrical furnaces etc.
CO 8. Familiar with different types of tools used in fitting technology.
CO 9. Provide exposure to the students with hands-on experience on various fields.
Course Objective: To learn the basic properties of various materials, to learn about the dispersive power of prism using Spectrometer, to determine the viscosity of liquid and to determine the wavelength of various sources.

List of Experiments:

1. Determination of Young’s modulus of the material – Non uniform bending.
2. Determination of Band Gap of a semiconductor material.
3. Determination of specific resistance of a given coil of wire – Carey Foster Bridge.
5. Spectrometer – Dispersive power of a prism.
6. Determination of Young’s modulus of the material – Uniform bending.
8. Ultrasonic Interferometer – Velocity of ultrasonic waves and compressibility of liquids.
11. Determine the wavelength of given source using the newton’s ring experiment
12. Find the thickness of the given thin wire using air wedge method

Total: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Ability to Design and Conduct experiments as well as to Analyze and Interpret Data.
CO 2. Ability to Identify, Formulate, and Solve Engineering Problems.
CO 3. Ability to use Techniques and Skills associated with Modern Engineering Tools such as Lasers and Fiber Optics.
CO 4. Provide Pre Requisite Hands on Experience for Engineering Laboratories.
CO 5. Study and understand the basic physics concepts and study the young’s modulus of the uniform and non uniform bending of the materials.
CO 6. Develop skills to impart practical knowledge in real time solution.
CO 7. Understand principle, concept, working and application of new technology and comparison of results with theoretical calculations.
CO 8. Design new instruments with practical knowledge.
CO 9. Gain knowledge of new concept in the solution of practical oriented problems and
CO 10. To understand more deep knowledge about the solution to theoretical problems.
CO 11. Understand measurement technology, usage of new instruments and real time applications in engineering studies.
REFERENCES:

Course Objective: To create Lab Programs in Word, Spreadsheet, Powerpoint, C Programs and HTML.

List of Experiments:

A) WORD PROCESSING
   1. Document creation, Text manipulation with Scientific notations.
   2. Table creation, Table formatting and Conversion.

B) SPREAD SHEET
   1. Chart - Line, XY, Bar and Pie.
   2. Formula - formula editor.
   4. Sorting and Import / Export features.

C) POWERPOINT
   1. Any presentation of minimum five slides.

D) SIMPLE C PROGRAMMING *
   1. Data types, Expression Evaluation, Condition Statements.
   2. Arrays.
   4. Functions and Pointers.
   5. File Operations.
   • For programming exercises Flow chart and pseudocode are essential

E) HTML PROGRAMMING*
   1. Create a webpage to embed an image in that page using HTML tags
   2. HTML program for Table creation.

Total: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Create and manipulate various operations in word document using MS-Office.
CO 2. Design and perform various operations in tables.
CO 4. Implement various editing and formatting operations in spread sheet.
CO 5. Create power point presentation slides.
CO 6. Develop programs using various control instructions and operator precedence in C Programming.
CO 7. Implement string manipulations, arrays and functions for various applications in C.
CO 8. Analyze the use of structures, unions and pointers in C.
CO 9. Handle various file operations in C.
CO 10. Design web pages using HTML Tags.
15GBE202 COMMUNICATION SKILLS 3003

Course objective:
1. To develop listening skills for academic and professional purposes.
2. To acquire the ability to speak effectively in English in real life situations.
3. To inculcate reading habit and to develop effective reading skills.
4. To improve their active and passive vocabulary.
5. To write letters and reports effectively in formal and business situations.

UNIT I TECHNICAL VOCABULARY 9

UNIT II BASIC SKILL: READING AND SPEAKING SKILLS 9

UNIT III BASIC SKILL: TECHNICAL WRITING SKILL 9
Letters – formal, informal, Cover Letter and CV, Synonyms and Antonyms, Indefinite Adjectives, Non-verbal communication, Interactive sessions. Role Plays, Critical reading, Listening and Note taking.

UNIT IV BASIC SKILL: LISTENING AND SPEAKING SKILLS 9

UNIT V TECHNICAL WRITING AND COMMUNICATION 9
Reports – Types, structure, data collection, content, form, Definitions, extended definition, Recommendations, Memos, Checklists. Group Discussions, Listening and comprehending the conversations.

TOTAL: 45h

Course Outcome:
At the end of this course, the Student will be able to

CO 1. Formulate and practice effective reading strategy to enhance technical communication.
CO 2. Get assess strengths in writing skills and set goals for future growth
CO 3. Practice and perceive the full repertoire of listening strategies by using authentic listening tasks.
CO 4. Create learning situations to develop speaking skills based on sound educational and communication theories.
CO 5. Discover an understanding of the process of oral communication and originate knowledgeable audience-centered speaking.
CO 6. Formulate a significant training ground for the development of student's abilities in public speaking.
CO 7. Create multiple opportunities for students to practice and share their reading skill development
CO 8. Improve critical thinking and analytical skills
CO 9. Develop a milestone for leadership and group participation through communication skills
CO 10. Speak in group discussion without any fear.

TEXT BOOKS:

REFERENCE BOOKS:
Course Objective:
- To acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- To learn 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 electric current.
- To understand 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  ORDINARY DIFFERENTIAL EQUATIONS  12
Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy’s and Legendre’s linear equations – Simultaneous first order linear equations with constant coefficients.

UNIT II  VECTOR CALCULUS  12
Gradient Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green’s theorem in a plane, Gauss divergence theorem and stoke’s theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelopipeds.

UNIT III  ANALYTIC FUNCTIONS  12
Functions of a complex variable – Analytic functions – Necessary conditions, Cauchy – Riemann equation and Sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping : w= z+c, cz, 1/z, and bilinear transformation.

UNIT IV  COMPLEX INTEGRATION  12

UNIT V  LAPLACE TRANSFORM  12

TOTAL : 60h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Evaluate double integral and triple integral to compute area, volume for two dimensional and three dimensional solid structure.

CO 2. Know the gradient, divergence and curl, related theorems useful for engineering applications.

CO 3. Test the analyticity and to construct the analytic function and transform complex functions from one plane to another plane graphically.

CO 4. Evaluate real and complex integrals over suitable closed paths or contours.

CO 5. Know the Applications of Laplace transform and its properties & to solve certain linear differential equations using Laplace transform technique

CO 6. Understand double and triple integrations and enable them to find area and volume using multiple integrals.

CO 7. Know the basics of vector calculus comprising gradient, divergence and curl and line, surface and volume integrals.

CO 8. Understand analytic functions of complex variables and conformal mappings.

CO 9. Know the basics of residues, complex integration and contour integration.

CO 10. Understand Laplace transform and use it to represent system dynamic models and evaluate their time responses.

TEXT BOOKS:

REFERENCE BOOKS:
Course Objective: To learn the basics of chemistry and application of water technology, principles of electrochemistry, nuclear chemistry, nano chemistry, engineering materials, polymer and composites, corrosion and storage devices etc., and to apply these fundamental principles to solve practical problems related to materials used for engineering applications.

UNIT I WATER TECHNOLOGY


UNIT II ELECTROCHEMISTRY, NUCLEAR CHEMISTRY AND NANO CHEMISTRY


UNIT III ENGINEERING MATERIALS


UNIT IV POLYMERS AND COMPOSITES


UNIT V CORROSION, CORROSION CONTROL AND STORAGE DEVICES

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Know about characteristics of water and estimation of hardness using EDTA Titration
CO 2. Determine alkalinity and its types of alkalinity using neutralisation reaction
CO 3. Explain different types of Nuclear reactions, stability of Nucleus and Nuclear forces
CO 4. Distinguish between Daniel cell, Voltaic cell, batteries etc.
CO 5. Define refractories, abrasives, lubricants and its classifications.
CO 7. Distinguish between Chemical and Electrochemical Corrosion and method of prevention
CO 8. Gain knowledge about different sources of energy and types of batteries
CO 9. Understand the method of synthesis and different types of Nano tubes and its application

TEXT BOOKS:

REFERENCE BOOKS:

15ECS021 SOFTWARE FOUNDATION AND PROGRAMMING 2 3 1 0 3

Course Objective:

- This course provides conceptual and practical knowledge of the Fundamentals of technologies in the context of building enterprise web based applications.
- The contents of this course will ensure that a student interest in the subject is well founded and sows a seed for a conceptual understanding of software and computing practices of current generation.
- This course provides knowledge on open source software PHP, XML, Eclipse.
- This course also provides the understanding on data analytics, and concepts of Hadoop.

UNIT I INTRODUCTION TO OPEN SOURCE PARADIGM 12

UNIT II INFORMATION MANAGEMENT : OVERVIEW 12
UNIT III  INTRODUCTION TO XML AND RELATED TECHNOLOGIES: OVERVIEW  12

UNIT IV  INTRODUCTION TO INTEGRATED DEVELOPMENT ENVIRONMENT – ECLIPSE  12

UNIT V  EMERGING TECHNOLOGIES  12

TOTAL : 60h

Course Outcome:
At the end of this course, the student will be able to
CO 1. Write simple code in open source paradigm like PHP, Ruby, Rails
CO 2. Understand the features and benefits of open source software
CO 3. Gain knowledge on IBM Information Management Software
CO 4. Understand XML and related technologies
CO 5. Discuss Issues in information exchange.
CO 6. Demonstrate XML schema
CO 7. Describe Eclipse Architecture, Terms and Concepts
CO 8. Identify and analyze Big Data applications
CO 9. Find the need of mobility and Cloud Based Applications Development.

TEXT BOOK:
1. IBM Career Education IBM CE – Software Foundation and Programming 2(with C++), IBM Student Course Material.
15ECS022 ELECTRIC CIRCUITS AND ELECTRONIC DEVICES  3 0 0 3

Course Objective:
- To understand the different types of electronic devices
- To design different types of electronic circuits such as amplifier, oscillators.
- To analyze different types of configurations and applications of transistor

UNIT I CIRCUIT ANALYSIS TECHNIQUES

UNIT II TRANSIENT RESONANCE IN RLC CIRCUITS

UNIT III SEMICONDUCTOR DIODES

UNIT IV TRANSISTORS
Principle of operation of PNP and NPN transistors – study of CE, CB and CC configurations and comparison of their characteristics – operation and characteristics of N-Channel and P-Channel JFET – drain current equation – MOSFET – operation and characteristics Enhancement and depletion types comparison of BJT with MOSFET.

UNIT V SPECIAL SEMICONDUCTOR DEVICES (Qualitative Treatment only)
Tunnel diodes – SCR characteristics and two transistor equivalent model – UJT – Diac and Triac – Photodiode, Phototransistor, Photoconductive and Photovoltaic cells – LED, LCD.

TOTAL: 45 h

Course Outcome:
At the end of this course, the student will be able to
CO 1. State Kirchhoff’s voltage and current law
CO 2. Describe the principle, limitations and applications of Network theorems
CO 3. Understand the transient resonance and power factor of RLC circuit
CO 4. Draw the phasor diagram for R, L and C Circuits
CO 5. Find the differences between intrinsic and extrinsic semiconductor diodes
CO 6. Understand the VI characteristics and applications of Zener diode
CO 7. Compare depletion and enhancement MOSFET
CO 8. Draw the symbol of n channel and p channel JFET
CO 9. Describe the characteristic of UJT and identify the negative resistance region
CO 10. Compare LED and LCD

TEXT BOOKS:

REFERENCE BOOKS:
Course Objective:

- To acquire practical skills in the determination of water quality parameters through volumetric analysis.
- To determine the molecular weight of a polymer by viscometry.

List Of Experiments:

1. Determination of the total, permanent and temporary hardness of the given water sample by EDTA method. A standard hard water and EDTA solutions are provided.
2. Determination of the type and amount of alkalinity present in the given water sample. A standard solution of sodium hydroxide of strength 0.1N is given.
3. Estimation of the amount of chloride present in the water sample by Argentometric analysis. A standard solution of strength 0.01N and sodium chloride solutions are provided.
4. Determination of degree of polymerization and molecular weight of given polymer solution by Ostwald viscometer method.
5. Estimation of copper in brass by EDTA method.
6. Determination of the amount of strong acid (HCl) present in 1 litre of the given mixture of acid solution by conductometric titration using standard NaOH of normality 0.2N.
7. Determination of the amount of weak acid (CH₃COOH) present in 1 litre of the given mixture of acid solution by conductometric titration using standard NaOH of normality 0.2N.
8. Determination of the amount of strong acid and weak acid (HCl and CH₃COOH) present in 1 litre of the given mixture of acid solution by conductometric titration using standard NaOH of normality 0.2N.
9. Determination of the amount of barium chloride present in 1 litre of the given solution by conductometric titration using standard solution of sodium sulphate of normality 0.2N.
10. Estimation of the amount of ferrous ion present in the whole of the given solution by potentiometric titration. A standard solution of potassium dichromate of strength 0.1N is provided.
11. Estimation of the amount of Ag⁺ ion present in the whole of the given solution by potentiometric titration. A standard solution of sodium chloride of strength 0.1N is provided.
12. Determination of the strength of the given hydrochloric acid by pH-metry with 0.2N sodium hydroxide solution.

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Estimate different types of hardness of water using complexometric titrations of given water sample
CO 2. Determine the amount of alkalinity of the given water sample using standard NaOH
CO 3. Find out the amount of chloride ion present in the given solution using argentometric method
CO 4. Calculate the molecular weight of unknown polymer solution using viscosity method
CO 5. Determine the amount of strong acid present in the given mixture of acid solution using conductometric titrations
CO 6. Estimate the amount of strong and weak acid present in the mixture solution using conductometric titrations
CO 7. Estimate the amount of barium chloride present in the given solutions using conductometric titrations
CO 8. Estimate the amount of ferrous ion present in the given solution using conductometric titrations

CO 9. Determine the strength of the given acid by using PH-metry titrations

REFERENCES:

Course Objective:
- To gain effective speaking and listening skills in communication.
- To develop the soft skills and interpersonal skills to excel in their job.
- To enhance the performance of students at Placement Interviews, Group Discussions and other recruitment exercises.

A. ENGLISH LANGUAGE LAB (18 Periods)
I. PC based session (Weightage 40%) 24 periods
1. LISTENING COMPREHENSION: (6)
   Listening and typing – Listening and sequencing of sentences – Filling in the blanks - Listening and answering questions.
2. READING COMPREHENSION: (6)
   Filling in the blanks - Close exercises – Vocabulary building - Reading and answering questions.
3. SPEAKING: (6)
   Phonetics: Intonation – Ear training - Correct Pronunciation – Sound recognition exercises – Common Errors in English. Conversations: Face to Face Conversation – Telephone conversation – Role play activities (Students take on roles and engage in conversation)

B. DISCUSSION OF AUDIO-VISUAL MATERIALS (6 PERIODS)
(Samples are available to learn and practice)
1. RESUME / REPORT PREPARATION / LETTER WRITING (1)
   Structuring the resume / report - Letter writing / Email Communication - Samples.
2. PRESENTATION SKILLS: (1)
   Elements of effective presentation – Structure of presentation – Presentation tools – Voice Modulation – Audience analysis - Body language – Video samples
3. SOFT SKILLS: (2)
   Time management – Articulateness – Assertiveness – Psychometrics – Innovation and Creativity - Stress Management & Poise - Video Samples
4. GROUP DISCUSSION: (1)
   Why is GD part of selection process ? - Structure of GD – Moderator – led and other GDs - Strategies in GD – Team work - Body Language - Mock GD –Video samples
5. INTERVIEW SKILLS: (1)
   Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews- Video samples.
   - Resume / Report Preparation / Letter writing: Students prepare their own resume and report. (2)
   - Presentation Skills: Students make presentations on given topics. (8)
   - Group Discussion: Students participate in group discussions. (6)
   - Interview Skills: Students participate in Mock Interviews (8)

II. Practice Session (Weightage – 60%) 24 periods
Course Outcome:
At the end of this course, the Student will be able to
CO 1. Improve the listening capability
CO 2. Enhance writing capability will be enhanced through practice.
CO 3. Improve the reading capability.
CO 4. Use strong vocabulary and fluently like foreigners.
CO 5. Prepare their own resume in professional way.
CO 6. Understand about Structure of presentation and the tools available in the power point presentation.
CO 7. Make presentations on given topics or their own topic of interest,
CO 8. Participate in group discussion without any hesitation.
CO 9. Attend mock interviews to remove the fear factors.

TEXT BOOKS:

REFERENCES:
Course Objective:

- To learn the object oriented way of solving problems.
- To practice the use of C++ classes and class libraries,
- To develop C++ programs using OOPS concepts for various applications

List of Experiments:

1. Create student details using class with constructor and destructor.
2. Program to calculate income tax using default arguments.
3. Program to implement payroll system using single inheritance.
4. Implementation of employee’s details using static data members.
5. Program to add two private data members using friend functions.
6. Program to create user defined manipulators.
7. Program to manipulate complex numbers using operator overloading and type conversions.
8. Overload the new and delete operators to provide custom dynamic allocation of memory.
9. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism and RTTI.
10. Program to develop a template for linked list class and its methods.
11. Design a stack class with necessary exception handling
12. Program for file handling using sequential access and random access.

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the basic concepts of Object Oriented programming and its advantages
CO 2. Use constructors and destructors
CO 3. Find solutions for problems using operator and function overloading
CO 4. Develop C++ code to change from one data type to other
CO 5. Implement dynamic memory allocation, inheritance and polymorphism
CO 6. Write code for exception handlers and pure virtual functions
CO 7. Understand and execute dynamic memory allocation
CO 8. Handle file operations and object serialization
CO 9. Write code to perform string manipulations
CO 10. Formulate new solutions for real time problems using object oriented programming concepts
Course Objective

At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity. The role of government and non – governmental organization in environmental management.

UNIT I  ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY  9

UNIT II  ENVIRONMENTAL POLLUTION  9
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 – Solid 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  9

UNIT IV  SOCIAL ISSUES AND THE ENVIRONMENT  9

UNIT V HUMAN POPULATION AND THE ENVIRONMENT


TOTAL: 45h

Course Outcome:
At the end of this course, the Student will be able to

CO 1. Understand the nature and facts about environment.
CO 2. Find and implement scientific, technological, economic solutions to environmental problems.
CO 3. Know about the interrelationship between living organisms and environment.
CO 4. Understand the integrated themes and biodiversity, natural resources, pollution control and waste management.
CO 5. Analyze the importance of environment by assessing its impact on the human world.
CO 6. Study the dynamic processes and understand the features of the earth's interior and surface.
CO 7. Know the role of an individual in Conservation of Natural Resources.
CO 8. Know about the various social issues.
CO 9. Understand the role of government in solving the environmental problems.
CO 10. Know about Population Growth and variation among Nations

TEXT BOOKS:

REFERENCES BOOKS:
Course Objective: To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems. To understand the mathematical principles on Fourier series and transforms, partial differential equations and Z transform would provide them the ability to formulate and solve some of the physical problems of engineering.

UNIT I      FOURIER SERIES

UNIT II    FOURIER TRANSFORMS

UNIT III   PARTIAL DIFFERENTIAL EQUATIONS
Formation of partial differential equations - singular integrals- Solutions of standard types of first order partial differential equations – Lagrange’s linear equation - Linear partial differential equations of second and higher order with constant coefficients of both homogeneous and non-homogeneous types.

UNIT IV   APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS
Classification PDE-Method of separation of variables - Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two-dimensional heat equation (excluding Insulated edges).

UNIT V    Z-TRANSFORMS AND DIFFERENCE EQUATIONS

TOTAL: 60h

Course Outcome:
At the end of this course, the Student will be able to

CO 1. Develop Fourier series for different types of functions.
CO 2. Define and determine Fourier transform of a system function.
CO 3. Perform Fourier series and analysis to analyze waveforms used in electronics engineering.
CO 4. Formulate numerical solution for algebraic, transcendental and simultaneous linear equations.
CO 5. Reduce equations to standard first order Partial Differential Equation (PDE) and solve the same.
CO 6. Derive and solve the wave, heat equation and boundary value problems using Partial Differential Equation (PDE)
CO 7. Understand the applications of Partial Differential Equations in engineering.
CO 8. Know the elementary properties of Z-Transform and solve difference equations using the same.

TEXT BOOKS:

REFERENCE BOOKS:
15ECS031  DATA STRUCTURES  3 1 0 3

Course Objective:
- To understand the basic concepts of data structures.
- To study the various abstract data types and their applications.
- To design and implement different types of searching and sorting algorithms.
- To analyze graphical representation and apply algorithms of path finding.

Unit I  Linear Structures  12

Unit II  Tree Structures  12

Unit III  Balanced Trees and Sorting  12

Unit IV  Hashing and Set  12

Unit V  Graphs  12

TOTAL: 60h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Acquire knowledge on different Abstract data types and their implementation
CO 2. Perform various operations such as insertion, deletion, searching, traversing on various data structures.
CO 3. Understand the functional routine of singly and doubly linked list
CO 4. Discuss, differentiate and implement various sorting and searching algorithms
CO 5. Be familiar with different types of Collision Resolution Techniques in hashing
CO 6. Understand the concept of union by size, union by height and path compression in smart union algorithm.
CO 7. Elaborate on direct file organization and the procedure to retrieve a record from a direct file using the key
CO 8. Perform various graph traversals
CO 10. Understand problems such as Euler circuits, Biconnectivity and exhibit various applications of data structures.

TEXT BOOKS:

REFERENCE BOOK:
Course Objective:

- To create and operate on various data structures like Stack, Queue and Linked List.
- To implement the Binary Tree concepts and various tree traversals.
- To implement various Sorting and Searching Techniques for various applications

List of Experiments:

1. Implementation of Linked List using Abstract Data Types (ADT).
2. Insert an element at any position using singly linked list.
3. Insert and delete an element at any position in doubly linked list.
4. Represent a polynomial as a linked list and write functions for polynomial addition.
5. Implement Stack ADT using Linked list with the basic operations as Create(), Is Empty(), Push(), Pop(), IsFull() with appropriate prototype to a functions.
6. Implement Queue ADT using Linked list with the basic functions of Create(), IsEmpty(), Insert(), Delete() and IsFull() with suitable prototype to a functions.
7. Implement stack and use it to convert infix to postfix expression
8. Insert and delete operation using binary search tree.
9. Write a program for Binary Search Tree to implement following operations:
   i. Insertion   ii. Deletion - Delete node with only child, Delete node with both children
10. Implement the application for ‘Evaluating Postfix Expressions’ using linked list implementations of Stack ADT.
11. Implementation of hash techniques using open addressing.
12. Implementation of Prim’s algorithm to find MST of an undirected graph.

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Gain skills to design and analyze simple linear and non linear data structures.
CO 2. Strengthen the ability to identify and apply the suitable data structure for the given real world problem
CO 3. Acquire knowledge in practical applications of linked list.
CO 4. Perform insertion, deletion and modification in singly and doubly linked list
CO 5. Write and execute code to perform manipulations in stack using arrays and linked list
CO 6. Demonstrate Queue in array for which all insertions and deletions are made at both end using various operations.
CO 7. Generate and manipulate Binary Search Tree
CO 8. Write program to avoid collision using open addressing hashing techniques
**Course Objective:**
- To introduce ALP concepts and features
- To write ALP for arithmetic and logical operations in 8086 and 8051
- To differentiate Serial and Parallel Interface
- To interface different I/Os with Microprocessors

**List of Experiments:**
1. Study of 8085 and 8086 Microprocessor
2. Programming with 8085 – 8-bit / 16-bit multiplication/division using repeated addition/subtraction
3. Programming with 8085-code conversion, decimal arithmetic, bit manipulations.
4. Programming with 8085-matrix multiplication, floating point operations
5. Programming with 8086 – String manipulation, search, find and replace, copy operations, sorting. (PC Required)
6. Using BIOS/DOS calls: Keyboard control, display, files manipulation. (PC Required)
7. Using BIOS/DOS calls: Disk operations. (PC Required)
8. Study of Microcontrollers
9. Interfacing with 8085/8086 – 8255, 8253
10. Interfacing with 8085/8086 – 8279, 8251
11. 8051 Microcontroller based experiments – Simple assembly language programs (cross assembler required).
12. 8051 Microcontroller based experiments – Simple control applications (cross assembler required).

**TOTAL:** 30h

**Course Outcome:**
At the end of this course, the Student will be able to
CO 1. Be familiar with the assembly level programming of 8085 and 8086 microprocessors
CO 2. Perform various arithmetic operations, searching and sorting using 8086 microprocessors
CO 3. Write assembly language programs for various code conversions like binary to decimal, hexa demical, BCD and vice versa.
CO 4. Understand and execute various string manipulation operations using 8086 microprocessor.
CO 5. Interface Microprocessor with various peripheral devices and program the same for various applications
CO 6. Analyze Serial and Parallel Communication between two microprocessor kits
CO 7. Write a program to interface a microprocessor and microcontroller
CO 8. Understand the basic programming concepts of 8051 Microcontroller and perform different arithmetic, logical and bit manipulation operations
CO 9. Install a communication link between 8051 Microcontroller kit and PC
Course Objective: The Probabilistic models are employed in countless applications in all areas of science and engineering. Queuing theory provides models for a number of situations that arise in real life. The course aims at providing necessary mathematical support and confidence to tackle real life problems.

UNIT I RANDOM VARIABLES 12
Discrete and continuous random variables – Moments - Moment generating functions and their properties. Binomial, Poisson, Geometric, Negative-binomial, Uniform, Exponential, Gamma and Weibull distributions .

UNIT II TWO DIMENSIONAL RANDOM VARIABLES 12
Joint distributions - Marginal and conditional distributions – Covariance - Correlation and regression - Transformation of random variables - Central limit theorem.

UNIT III MARKOV PROCESSES AND MARKOV CHAINS 12
Classification - Stationary process - Markov process - Markov chains - Transition probabilities - Limiting distributions- Poisson process.

UNIT IV QUEUEING THEORY 12
Markovian queues – Birth and Death Queuing models- Steady state results: Single and multiple server queuing models- Little’s Formula - queues with finite waiting rooms- Finite source models.

UNIT V NON-MARKOVIAN QUEUES AND QUEUE NETWORKS 12
M/G/1 queue- Pollaczek- Khintchine formula, series queues- open and closed networks.

TOTAL: 60h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the fundamental concepts in probability and queuing models and apply these techniques in networks, image processing etc.
CO 2. Acquire skills in analyzing queuing models.
CO 3. Characterize probability models using probability mass (density) functions & cumulative distribution functions.
CO 4. Understand the terminology & nomenclature appropriate queuing theory.
CO 5. Demonstrate the knowledge and understand the various queuing models.
CO 7. Gain fundamental knowledge of the probability concepts.
CO 8. Acquire skills in analyzing queuing models.
CO 9. Understand and characterize phenomenon, which evolve with respect to time in a probabilistic manner.
CO 10. Provide the required mathematical support in real life problems and develop probabilistic models which can be used in several areas of science and engineering.
TEXT BOOKS:
   (For units 1, 2 and 3).

REFERENCE BOOKS:
Course Objective: To help the learner to understand the concepts, techniques, security features, how data is stored in the system, Query Languages used and different types of Statements used in the Query Processing in Database Management Systems.

UNIT - I INTRODUCTION
Database system application-Purpose of database system-View of data-Database language-Relational database-Data storage and queuing-Transaction management-Database architecture-Database users and administrators-History of database system

UNIT- II INTRODUCTION TO SQL
SQL Data Definition and its types – Specifying Constraints in SQL – Basic Retrieval Queries in SQL – INSERT, UPDATE, DELETE Statements in SQL – Aggregate Functions in SQL – GROUPING : The GROUP BY and HAVING Clause – JOIN Expressions - VIEWS - TRANSACTIONS - SUBQUERIES

UNIT- III DATABASE DESIGN & PROGRAMMING TECHNIQUES

UNIT- IV TRANSACTION MANAGEMENT AND DATABASE SECURITY

UNIT- V DATA STORAGE AND QUERYING
Overview of Physical storage Media - Magnetic disks - RAID - Tertiary storage - File organization-Organization of records in files - B* - tree index files - B-tree Index files - Static Hashing - Dynamic Hashing - Overview of query processing-CASE STUDY-ORACLE

TOTAL: 60h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the fundamentals of database management system
CO 2. Acquire knowledge on Relational database, Data storage and queuing, Transaction management and Database architecture.
CO 3. Discuss the topic SQL Data Definition and its types.
CO 4. Write SQL queries using aggregate Functions such as Grouping, Join expressions, Views, Transactions and Subqueries.
CO 5. Analyze database design & programming techniques.
CO 6. Draw an Entity Relationship diagram for any application.
CO 7. Do transaction management and understand and implement database security.
CO 8. Understand the issues and challenges in Database security.
CO 9. Explain the effective ways of data storage and querying.
CO 10. Discuss and differentiate Static and Dynamic Hashing.

TEXT BOOKS:

REFERENCE BOOKS:
Course Objective: To understand the features of operating system and its role in managing various system resources. To learn the Structure and functions of OS, Process scheduling, Deadlocks, Device management, Memory management and File systems

UNIT I  PROCESSES AND THREADS  9

UNIT II  PROCESS SCHEDULING AND SYNCHRONIZATION  9

UNIT III  STORAGE MANAGEMENT  9

UNIT IV  FILE SYSTEMS  9

UNIT V  I/O SYSTEMS  9

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the concept of operating system structures, system calls, system programs, system structure and virtual machines

CO 2. Explain Interprocess communication, Communication in client-server systems and Threads

CO 3. Discuss the CPU Scheduling algorithms
CO 4. Acquire knowledge on Classic problems of synchronization, critical regions, Monitors and Deadlock  
CO 5. Be Familiar with the concept of Memory Management, Swapping, Contiguous memory allocation and Paging  
CO 6. Explain Page replacement, Allocation of frames and Thrashing in storage management  
CO 7. Know how to interface, mount and protect File-System Interface  
CO 8. Discuss Allocation methods, Free-space management and log-structured file systems  
CO 9. Gain knowledge on I/O Systems, I/O Hardware, Application I/O interface, kernel I/O subsystem and streams  
CO 10. Be well versed in Disk scheduling and RAID  

**TEXT BOOKS:**

**REFERENCE BOOKS:**
Course Objective: To understand the various database management system concepts by working on databases.

List of Experiments:

1. DDL and DML Commands.
2. Join Queries.
3. Views and Set operations.
4. Built in functions.
5. Nested Queries
6. Triggers.
7. Aggregate Functions.
8. Roles and Privileges.
9. Cursors.
10. PL/SQL programs
11. PL/SQL cursor programs
12. Front end tools – Mini Project

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to
CO 1. Understand the concept of DDL and DML Commands
CO 2. Write Join Queries, Views and Set operators.
CO 3. Use Built in functions to manipulate the database
CO 4. Write Nested Queries
CO 5. Develop programs using Triggers and Aggregate Functions.
CO 6. Be familiar with the Roles and Privileges.
CO 7. Handle Cursors.
CO 8. Write PL/SQL programs.
CO 9. Write and execute PL/SQL cursor programs
CO 10. Design and develop Mini Project.
Course Objective: To practice various system calls and concepts of process management, memory management techniques.

List of Experiments:

1. Study of Linux commands.
2. Writing programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir
3. Writing programs using the I/O system calls of UNIX operating system (open, read, write, etc)
4. Writing C programs to simulate UNIX commands like ls, grep, etc.
5. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions).
6. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)
7. Developing Application using Inter Process communication (using shared memory, pipes or message queues)
10. Implementation of some memory management schemes – I
11. Implementation of some memory management schemes – II
12. Implementation of any file allocation technique (Linked, Indexed or Contiguous)

Example for exercises 10 & 11:
Free space is maintained as a linked list of nodes with each node having the starting byte address and the ending byte address of a free block. Each memory request consists of the process-id and the amount of storage space required in bytes. Allocated memory space is again maintained as a linked list of nodes with each node having the process-id, starting byte address and the ending byte address of the allocated space. When a process finishes (taken as input) the appropriate node from the allocated list should be deleted and this free disk space should be added to the free space list. [Care should be taken to merge contiguous free blocks into one single block. This results in deleting more than one node from the free space list and changing the start and end address in the appropriate node]. For allocation use first fit, worst fit and best fit.

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to
CO 1. Understand the concept of Linux commands.
CO 2. Write programs using the system calls of UNIX operating system.
CO 3. Write programs using the I/O system calls.
CO 4. Display/print the Gantt chart for FCFS, SJF, Priority and Round robin.
CO 5. Develop Application using Inter Process communication.
CO 7. Handle Deadlock avoidance using Banker’s algorithm.
CO 8. Discuss memory management schemes – I.
CO 9. Know about memory management schemes – II.
CO 10. Demonstrate file allocation technique.
**Course Objective:** Providing value education to improve the students’ character - understanding of principled life and physical health - maintaining youthfulness - measures and methods in five aspects of life

**UNIT I  PHYSICAL HEALTH**


**UNIT II  LIFE FORCE**


**UNIT III: MENTAL HEALTH**

Mental Frequencies - Beta, Apha, Theta and Delta wave - Agna Meditation explanation - benefits. Shanthi Meditation explanation - Benefits Thuriya Meditation explanation - Benefits Benefits of Blessing - Self blessing (Auto suggestion) - Family blessing - Blessing the others - World blessing - Divine protection.

**UNIT IV  VALUES**


**UNIT V  MORALITY**


**Total: 30h**

**Course Outcome:**
At the end of this course, the Student will be able to
CO 1. Acquire knowledge about the interconnections between body, breathe, mind and emotions in the context of maintaining resilience and well-being

CO 2. Utilize skills developed through participation in manavalakalai (SKY) yoga to help maintain lifelong health and fitness

CO 3. Demonstrate foundational standing, sitting, balance postures with proper alignment.

CO 4. Maintain youthfulness through kalpa practice

CO 5. Explore relaxation techniques to observe thoughts and to manage emotions and stress.

CO 6. Apply the principles of yoga in a personal way outside of yoga practice

CO 7. Apply effective breathing techniques to their yoga practice

CO 8. Demonstrate an understanding of anatomy and physiology as it applies to the intention to integrate breath, posture and movement within the practice of yoga

CO 9. Identify asanas specific to their desired health benefits and create a yoga practice to use for an healthy mind

CO 10. Achieve a greater sense of awareness, wisdom, introspection and a deeper sense of relaxation through meditation.

REFERENCE BOOKS:

4. Rev.Dr.G.U.pope, 2016, Thirukkural, Giri Trading Agency,
7. Iyengar, B.K.S. 2008, Light on Yoga, Noida, UP India, Harber Collins Publishing India Ltd.,
Course Objective: To know the concepts of Mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.

UNIT I LOGIC AND PROOFS 12
Propositional Logic – Propositional equivalences-Predicates and quantifiers-Nested Quantifiers-Rules of inference-introduction to Proofs-Proof Methods and strategy

UNIT II COMBINATORICS 12
Mathematical inductions-Strong induction and well ordering-The basics of counting-The pigeonhole principle – Permutations and combinations-Recurrence relations-Solving Linear recurrence relations-generating functions-inclusion and exclusion and applications.

UNIT III GRAPHS 12
Graphs and graph models-Graph terminology and special types of graphs-Representing graphs and graph isomorphism -connectivity-Euler and Hamilton paths

UNIT IV ALGEBRAIC STRUCTURES 12
Algebraic systems-Semi groups and monoids-Groups-Subgroups and homomorphisms- Cosets and Lagrange’s theorem- Ring & Fields (Definitions and examples)

UNIT V LATTICES AND BOOLEAN ALGEBRA 12
Partial ordering-Posets-Lattices as Posets- Properties of lattices-Lattices as Algebraic systems –Sub lattices –direct product and Homomorphism-Some Special lattices-Boolean Algebra

TOTAL: 60h

Course Outcome:
At the end of this course, the Student will be able to

CO 1. Understand the notion of mathematical thinking, mathematical proofs, and algorithmic thinking, and be able to apply them in problem solving Proficiently construct logical arguments and rigorous proofs

CO 2. Solve problems using recurrence relations and recursion to analyze algorithms and programs such as finding Fibonacci numbers, the Ackerman function and Tower of Hanoi problems

CO 3. Calculate numbers of possible outcomes of elementary combinatorial processes such as permutations and combinations.

CO 4. Calculate probabilities and discrete distributions for simple combinatorial processes; calculate expectations.

CO 5. Understand the graphs and graph models

CO 6. Apply graph theory models of data structures and state machines to solve problems of connectivity and constraint satisfaction, for example, scheduling.
CO 7. Determine the domain and range of a discrete or non-discrete function, graph functions, identify one-to-one functions, perform the composition of functions, find and/or graph the inverse of a function, and apply the properties of functions to application problems.

CO 8. Be exposed to concepts and properties of algebraic structures such as semi groups, monoids and groups, rings and fields.

CO 9. Evaluate Boolean functions and simplify expression using the properties of Boolean algebra;

CO 10. Apply Boolean algebra to circuits and gating networks.

CO 11. Understand Basic concepts of sets, logic functions and graph theory

TEXT BOOKS:

   (For units 4 & 5, Sections 2-3.8 & 2-3.9, 3.1, 3.2 & 3.5, 4-1 & 4-2)

REFERENCE BOOKS:

Course Objective:

- To understand the concepts of data communications and to study the functions of different layers.
- To introduce IEEE standards employed in computer networking and to familiarize with different protocols and network components.
- To help the learner to design, calculate, and apply subnet masks and addresses to fulfill networking requirements.
- To analyze the features and operations of various application layer protocols such as HTTP, DNS, and SMTP.

UNIT I  PHYSICAL LAYER AND MEDIA


UNIT II  DATA LINK LAYER


UNIT III  NETWORK LAYER


UNIT IV  TRANSPORT LAYER


UNIT V  APPLICATION LAYER


TOTAL: 60h

Course Outcome:

At the end of this course, the Student will be able to
CO 1. Understand the concept of physical layer and transmission media.
CO 2. Illustrate the network standards of ISO / OSI model.
CO 3. Discuss Error Detection and Correction in data link layer
CO 4. Describe IEEE 802.4, Token Ring, FDDI and IEEE802.11.
CO 5. Understand the functionalities of Network layer.
CO 6. Be well versed in various Routing protocols and Subnetting.
CO 7. Analyze Duties of transport layer and qualities to improve Quality of Service
CO 8. Discuss Flow Control, Error Control and Congestion Control
CO 9. Acquire knowledge on Domain Name Space (DNS), protocols such as SMTP, POP, IMAP, FTP, HTTP and WWW
CO 10. Be familiar with the concept of Cryptography and network security.

TEXT BOOK:

REFERENCE BOOKS:
Course Objective:

- To provide an in-depth knowledge in software engineering paradigms, life cycles and Development processes.
- To impart a broad understanding of the discipline of software engineering and its application to the development and management of software systems.

UNIT I SOFTWARE PROCESS MODELS 9


UNIT II REQUIREMENTS ENGINEERING 9


UNIT III MODELLING 9


UNIT IV SOFTWARE DESIGN 9


UNIT V SOFTWARE MEASUREMENT 9


TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the fundamentals of software process models.

CO 3. Acquire knowledge on Software Engineering Practice and Deployment.
CO 4. Be well versed in Elements of the Analysis Model and Validating Requirements.
CO 5. Understand the Requirements Analysis.
CO 7. Analyze Design Engineering and Design process.
CO 8. Discuss testing and Art of debugging.
CO 9. Identify Process metrics for software measurement.
CO 10. Assess, configure and manage various software risks.

TEXT BOOKS:

REFERENCE BOOKS:

15ECS053 Computer Networks Laboratory 0 0 3 2

Course Objective: To help the learner to understand the underlying concepts of networked systems and to be able to develop networking programs using Java.

List of Experiments:

1. Programs using TCP Sockets (like date and time server & client, echo server & client, etc..)
2. Programs using UDP Sockets (like simple DNS)
3. Programs using Raw sockets (like packet capturing and filtering)
4. Programs using RPC
5. Simulation of sliding window protocols
6. Experiments using simulators (like OPNET)
7. Performance comparison of MAC protocols
8. Implementing Routing Protocols
9. Performance comparison of Routing protocols
10. Implementation of Logical and Physical Address
11. Simulation of ARP/RARP Protocol
12. Study of UDP and TCP performance

TOTAL: 30h
Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the concept of TCP Sockets & UDP Sockets.
CO 2. Learn Writing programs using Raw sockets and RPC.
CO 3. Discuss Simulation of sliding window protocols
CO 4. Display Experiments using simulators..
CO 5. Understand the working principle of MAC protocols
CO 6. Compare and contrast MAC protocols.
CO 8. Discuss Logical and Physical Address.
CO 9. Know about Simulation of ARP/RARP Protocol
Course Objective:
- To create Java programs that leverage the object-oriented features.
- To learn how to create Persistent objects using serialization.
- To create applications that handles user events.
- To create application that accesses database using JDBC

List of Experiments:
1. JavaDoc comments for documentation
2. java.util package.
3. Lisp-like list in Java.
4. Java interface for ADT Stack.
5. Template for linked-list class in Java
6. Polymorphism.
7. Object serialization
8. Event-driven programming paradigm
9. Multi threading
10. Multi-threaded echo server and a corresponding GUI client in Java
11. JDBC to connect to a back-end database.
12. Mini-Project

TOTAL: 30h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the JavaDoc comments and java.util package.
CO 3. Implement Java interface for ADT Stack.
CO 4. Do Experiments using simulators Template for linked-list class in Java
CO 5. Implement Polymorphism.
CO 6. Demonstrate Object serialization.
CO 8. Write code for Multi threading in Java
CO 9. Connect back end database using JDBC.
CO 10. Develop Mini-Project
Introduction to R Software

Course Objective

- R is free software that is capable of handling mathematical and statistical manipulations.
- R has its own programming language as well as built in functions to perform any specialized task.

Unit 1  Basic fundamentals  6
Basic fundamentals, installation and use of software, data editing, use of R as a calculator, functions and assignments.

Unit 2  Basic Operations  6
Use of R as a calculator, functions and matrix operations, missing data and logical operators. Conditional executions and loops, data management with sequences. Data management with repeats, sorting, ordering, and lists.

Unit 3  Vector Indexing and Strings  6
Vector indexing, factors, Data management with strings, display and formatting. Data management with display paste, split, find and replacement, manipulations with alphabets, evaluation of strings, data frames.

Unit 4  Frames  6
Data frames, import of external data in various file formats, statistical functions, compilation of data.

Unit 5  Graphical and Statistical Functions  6
Graphics and plots, statistical functions for central tendency, variation, skewness and kurtosis, handling of bivariate data through graphics, correlations, programming and illustration with examples.

Total: 30h

Course Outcome:
Upon completion of this course, student will accomplish the following:

CO 1. Install various packages and work effectively in the R environment

CO 2. Learn the basics of R programming including objects, classes, vectors, attributes etc.

CO 3. Become proficient in basic data formatting and manipulating functions

CO 4. Import external data in various file formats

CO 5. Write functions using various methods and loops

CO 6. Learn the handling of bivariate data through graphics

References:

1. Introduction to Statistics and Data Analysis - With Exercises, Solutions and Applications in R  By Christian Heumann, Michael Schomaker and Shalabh, Springer, 2016

Course Objective:

- To become familiar with the main uses of the Internet as the primary modern technology for online communication.
- To learn the basic features of web browsers such as Internet Explorer and Firefox.
- To understand the implications of Internet on society, primarily in the aspects of communication, commerce, crime, ethics, and privacy to create simple web pages using HTML, CSS and JavaScript.
- To understand the fundamentals of Web development and to design the static and dynamic web pages.

UNIT I   BASIC NETWORK AND WEB CONCEPTS  9

UNIT II   JAVA PROGRAMMING  9

UNIT III   SCRIPTING LANGUAGES  9

UNIT IV   DYNAMIC HTML  9

UNIT V   SERVER SIDE PROGRAMMING  9

TOTAL: 45 h

Course Outcome:
At the end of this course, the Student will be able to

CO 1. Understand basic network and web concepts.

CO 2. Acquire knowledge on MIME, CGI and PERL.

CO 3. Discuss Java basics, I/O streaming, socket programming and web page retrieval

CO 4. Understand protocol handlers, Content handlers and Applets.

CO 5. Be Familiar with the concept of scripting languages.

CO 6. Describe JavaScript Events and simple web applications.

CO 7. Illustrate DHTML technologies.

CO 8. Discuss event model, data binding and ActiveX control of Dynamic HTML

CO 9. Be well versed in Characteristics and architecture of JDBC

CO 10. Be Familiar with the simple web applications and multi-tier applications

TEXT BOOKS:


REFERENCE BOOKS:


Course Objective:
- To understand the system modeling and design based on requirements, converting design to code.
- To use various UML design diagrams and to apply the appropriate design patterns.
- To learn the basic Object oriented analysis and design skills through an elaborate case study.
- To apply the process of OOAD in software development.

UNIT I  INTRODUCTION  9

UNIT II  OBJECT ORIENTED METHODOLOGIES  9

UNIT III  OBJECT ORIENTED ANALYSIS  9

UNIT IV  OBJECT ORIENTED DESIGN  9

UNIT V  SOFTWARE QUALITY AND USABILITY  9

TOTAL:  45 h
Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the fundamentals of OOAD.
CO 3. Discuss object oriented design methodologies.
CO 5. Be Familiar with use cases in object oriented analysis
CO 6. Use Attributes and Methods in use case driven approach
CO 7. Design axioms in object oriented system development
CO 8. Discuss Object relational and Multi database systems.
CO 9. Understand the purpose of a view layer interface.
CO 10. Be Familiar with the test Cases, test Plan and Myer’s Debugging Principles

TEXT BOOKS:
2. Craig Larman,”Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and iterative

REFERENCE BOOKS:
Wiley & Sons, 2005.
Course Objective:

- To acquire knowledge in different phases and passes of Compiler, and specifying different types of tokens by lexical analyzer.
- To understand the use of Compiler tools like LEX, YACC, etc.
- To learn the different types of compiler tools that meets the requirements of the realistic constraints of compilers.

UNIT I  INTRODUCTION  12

UNIT II  INFORMATION RETRIEVAL  12

UNIT III  WEB SEARCH ENGINE – INTRODUCTION AND CRAWLING  12

UNIT IV  WEB SEARCH – LINK ANALYSIS AND SPECIALIZED SEARCH  12

UNIT V  DOCUMENT TEXT MINING  12
Information filtering; organization and relevance feedback – Text Mining - Text classification and clustering – Categorization algorithms: naive Bayes; decision trees; and nearest neighbor – Clustering algorithms: agglomerative clustering; k-means; expectation maximization (EM).

TOTAL:  60h

Course Outcome:

At the end of this course, the Student will be able to

CO 1.  Understand the basics, components and issues of information retrieval

CO 2.  Gain knowledge on open source search engine framework and the impact of web on IR

CO 3.  Determine Boolean and vector-space retrieval models.

CO 4.  Preprocess data and use various information retrieval techniques
CO 5. Describe the architecture of web search engine
CO 6. Implement index compression and use XML retrieval techniques
CO 7. Perform Link Analysis and specialized search
CO 8. Do Snippet generation, summarization and cross – lingual retrieval
CO 9. Accomplish Document text mining using various clustering algorithms

TEXT BOOKS:

REFERENCE BOOKS:
Course Objective: To learn the basic object oriented analysis and design skills through an elaborate case study UML design diagrams and to apply the appropriate design patterns

List of Experiments:
1. IEEE standard SRS document
2. Gantt chart.
3. Use Case model.
4. UML Activity diagram
5. UML Class diagram.
6. UML Sequence diagram.
7. UML Collaboration diagram
8. State Chart diagram.
9. UML package diagram.
11. Implementation in any application
12. Testing tools.

TOTAL: 30h

Course Outcome:
At the end of this course, the Student will be able to

CO 1. Understand IEEE standard SRS document and Gantt chart.
CO 2. Design Use Case model and UML Activity diagram
CO 3. Generate UML Class, sequence, collaboration, component, deployment and state chart diagram for any project development
CO 4. Be familiar with testing tools.
Course Objective:
- To create a window applications using Java components
- To learn the networking concepts like Sockets, Datagram packets etc.
- To create a fully functional website with MVC architecture.

List of Experiments:

1. Java components Text fields, buttons, Scrollbar, Choice, List and Check box
2. Various Layouts - Flow Layout, Border Layout, Grid layout, Grid bag layout and card layout
3. Applets
4. Uniform Resource Locator
5. Sockets
6. Datagram sockets and datagram packets.
7. HTML tags
8. Web page creation
9. Create a web page with all types of Cascading style sheets.
10. Client Side Scripts for Validating Web Form Controls using DHTML
11. Programs in Java using Servlets: To invoke servlets from HTML forms.
12. Three-tier applications using servlets, JSP and Databases.

TOTAL: 30h

Course Outcome:
At the end of this course, the Student will be able to

CO 1. Create java components like fields, buttons, Scrollbar, Choice, List and Check box
CO 2. Design various kinds of Layout
CO 3. Analyze and implement the concept of applets
CO 4. Generate the concept of Uniform Resource Locator
CO 5. Familiarize and implement the socket programming
CO 6. Build a web page using HTML tags
CO 7. Use cascading style sheet while creating web pages
CO 8. Construct Client Side Scripts for Validating Web Form Controls using DHTML
CO 9. Generate programs using Java servlets and invoke servlets using HTML forms
CO 10. Connect to the database and store data in database
Course Objective:
- To learn the basics of graphic systems and transformation techniques.
- To study the graphic designing methodologies like shading and adding texture to use in various applications.
- To understand the computer graphics techniques, focusing on 3D modeling, morphing, rendering.

UNIT I 2D PRIMITIVES

UNIT II 3D CONCEPTS

UNIT III GRAPHICS PROGRAMMING

UNIT IV RENDERING
Introduction to Shading models – Specular Reflection- Adding Color – Shading and the graphics pipeline- Flat Shading and Smooth shading – Removing Hidden Surfaces- The depth Buffer Approach- Adding texture to faces – pasting the Texture on to a flat surface- Rendering texture – Adding shadows of objects - Shadows as Texture - Drawing Shadows.

UNIT V FRACTALS

TOTAL: 45h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Be well versed in line, circle, ellipse drawing algorithms and their implementation.
CO 2. Explain the two dimensional geometric transformations like translation, rotation, scaling and other transformations.

CO 3. Understand the three dimensional concepts and object representations.

CO 4. Be Familiar with the various types of three dimensional representation and their implementation.

CO 5. Analyze different types of visible surface detection techniques and the methods used in each type.

CO 6. Describe the color models and animation Function.

CO 7. Understand the concept of graphics programming using OPENGL.

CO 8. Acquire knowledge on rendering such as specular reflection, shading, colouring etc.

CO 9. Implement the concept of Fractals, drawing Koch curves, snow flakes

CO 10. Be familiar with box, sphere and projection extents.

TEXT BOOKS:

REFERENCE BOOK:
Course Objective:

- To learn the principles of validation testing, defect testing, system and component testing
- To understand the strategies for generating system test cases
- To understand the essential characteristics of tool used for test automation

UNIT I
INTRODUCTION

UNIT II
TEST CASE DESIGN

UNIT III
LEVELS OF TESTING

UNIT IV
TEST MANAGEMENT

UNIT V
CONTROLLING AND MONITORING

TOTAL : 45 h
Course Outcome:
At the end of this course, the Student will be able to

CO 1. Create test strategies and plans, design test cases, prioritize and execute them
CO 2. Analyze requirements to determine appropriate testing strategies.
CO 3. Design and implement comprehensive test plans
CO 4. Instrument code appropriately for a chosen test technique
CO 5. Apply a wide variety of testing techniques in an effective and efficient manner
CO 6. Compute test coverage and yield according to a variety of criteria
CO 7. Identify the Types of errors and fault models
CO 8. Study the Methods of test generation from requirements
CO 9. Understand the limitations of various test tools
CO 10. Conduct reviews and inspections

TEXT BOOKS:

REFERENCES:
Course Objective: To assist the learner to understand the .NET Architecture, Object oriented concepts, to use ADO.NET for database connectivity and developing the ability to solve any type of problems by mapping with real world environment using ASP.NET and C#.

UNIT I INTRODUCTION TO C# 9

UNIT II OBJECT ORIENTED ASPECTS OF C# 9
Classes-Adding Variables – Adding Methods - Objects – Accessing class Members – Constructors – Abstract classes and Methods - Inheritance - Polymorphism – Interfaces - Operator Overloading - Delegates and Events - Errors and Exceptions.

UNIT III APPLICATION DEVELOPMENT ON .NET 9
Building Windows Forms Applications - Windows Forms Controls – Simple Windows Forms Application with controls and Events - ADO.NET Introduction - ADO.NET Architecture : Connected and Disconnected Architecture – Data Provider:Connection Object,Command Object, Data Reader - Executing a Command using ExecuteNonQuery,ExecuteScalar , ExecuteReader Datasets : DataTable , DataColumn , DataRow , DataConstraints , DataRelation , DataAdapters

UNIT IV WEB BASED APPLICATION DEVELOPMENT ON .NET 9
Programming Web Applications with Web Forms using ASP.NET - ASP.NET controls - Understand Data Binding and various Data Sources in ASP.NET - Understand the creation of Master Pages and themes - Configuration of web applications using IIS configurations - State management in ASP.NET- Programming Web Services.

UNIT V THE CLR AND THE .NET FRAMEWORK 9
Assemblies- Versioning- Attributes- Reflection- Viewing MetaData- Type Discovery- Reflecting on a Type- Marshaling- Remoting- Understanding Server Object Types- Specifying a Server with an Interface- Building a Server- Building the Client- Using SingleCall- Threads.

TOTAL : 45 h

Course Outcome:
At the end of this course, the Student will be able to

CO 1. Display proficiency in C# by building stand-alone applications in the .NET framework using C#.
CO 2. Understand object oriented features such as classes, inheritance, interfaces and polymorphism
CO 4. Build and analyze WEB based applications using ASP.NET
CO 5. Create distributed data-driven applications using the .NET Framework, C#, and ADO.NET
CO 6. Use the Visual Studio IDE to create and debug application and class library solutions and projects.
CO 7. Validate user input in a Windows Forms application
CO 8. To Manage IIS configuration and Services
CO 9. Add code to form and control event procedures in a Windows Forms application
CO 10. Understand the concept of assemblies and reflection

TEXT BOOKS:
3. Bill Hamilton, Matthew MacDonald, “ADO.NET in a Nutshell”, O'Reilly Media (Unit III)

REFERENCE BOOKS:
4. Thamarai Selvi, R. Murugesan, “A Textbook on C#”, Pearson Education,
5. ADO.NET in a Nutshell By Bill Hamilton, Matthew MacDonald Publisher: O'Reilly Media
6. Programming ASP.NET 3.5, 4th Edition By Jesse Liberty, Dan Maharry, Dan Hurwitz Publisher: O'Reilly Media
Course Objective:

- To understand and design the graphic concepts like compression, transformation and projections using various algorithms.
- To perform various editing operations using any animation software

List of Experiments:

1. Implement Bresenham’s algorithms for line, circle and ellipse drawing
2. Perform 2D Transformations such as translation, rotation, scaling, reflection and sharing.
3. Implement Cohen-Sutherland 2D clipping and window-viewport mapping
4. Perform 3D Transformations such as translation, rotation and scaling.
5. Visualize projections of 3D images.
6. Conversion of color models.
7. Implement text compression algorithm
8. Implement image compression algorithm
9. Perform animation using any Animation software
10. Perform basic operations on image using any image editing software
11. Draw three dimensional objects and Scenes using any Animation software
12. Generate Fractal images using any image editing software.

TOTAL: 30h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Be well versed in relationship between Bresenham's line, circle, ellipse drawing algorithms and their implementation.
CO 2. Implement two dimensional geometric transformations like Translation, Rotation, Scaling and other transformations.
CO 3. Develop the two dimensional clipping and window-viewport mapping.
CO 4. Implement the concept of three dimensional transformations and their implementation.
CO 5. Demonstrate the visualize projections of 3D images.
CO 6. Analyse and create the concept of color models.
CO 7. Build text compression and image compression algorithms.
CO 8. Draw three dimensional objects and Scenes using any Animation software.
Course Objective:
To familiarize with the operating system features and to develop applications in open source environment using PERL, PHP and Shell Scripts. To implement the basics of .Net framework using ASP.Net and ADO.Net

List of Experiments:

1. Kernel configuration, compilation and installation
2. Shell Scripting
3. Virtualization environment in kernels
4. Perl Scripting
5. Python Scripting
6. Php Scripting
7. Version Control System
8. .Net Console Application
9. .Net GUI Application
10. .Net Event Driven Application
11. ADO .Net Application
12. ASP .Net Application

TOTAL: 30h

Course Outcome:
At the end of this course, the Student will be able to

CO 1. Become expertise in programming open Source Language like Perl, Python, Php
CO 2. Design and expertise in creating Shell scripts
CO 3. Develop the skill in environmental setup.
CO 4. Create several programs which enhance the programming skills in Python
CO 5. Use scripts, HTML while Developing PHP
CO 6. Develop PERL scripts for calculation and reporting
CO 7. Build .NET console applications
CO 8. Establish connection to the database using ADO.NET with front end application
CO 9. Design and construct a front application in ASP.NET with different controls which interacts with the database.
Syllabus

Discipline Specific Elective Courses
Course Objective:

- Understand the concept of semantic web and related applications
- Learn knowledge representation using ontology.
- Understand human behaviour in social web and related communities.
- Learn visualization of social networks.

UNIT I  INTRODUCTION


UNIT II  MODELLING, AGGREGATING AND KNOWLEDGE REPRESENTATION


UNIT III  EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL NETWORKS


UNIT IV  PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES


TOTAL: 45h

Course Outcome:
At the end of this course, the Student will be able to

CO 1. Understand the Social Network architecture and applications
CO 2. Know the limitations of current web and the need for semantic web.
CO 3. Describe the key concepts and measures in network analysis
CO 5. Understand the modeling, aggregating and knowledge representation of ontology
CO 6. Discuss the Extracting evolution of Web Community from a Series of Web Archive.
CO 7. Demonstrate Relational characterization of dynamic social network communities
CO 8. Gain knowledge on privacy in online social networks
CO 9. Predict human behavior and enable new human experiences

TEXT BOOKS:

REFERENCES:
Course Objective:
- To Understand the different algorithm design techniques like greedy, divide and conquer, dynamic programming and backtracking.
- To learn and how to apply the various algorithmic design techniques in real time problems based on the time complexity.
- To learn various sorting and searching algorithms

UNIT I  BASIC CONCEPTS OF ALGORITHMS  9

UNIT II  ANALYSIS OF SORTING AND SEARCHING ALGORITHMS  9

UNIT III  ALGORITHM DESIGN METHODS  9

UNIT IV  ALGORITHMIC TECHNIQUES  9

UNIT V  GRAPH AND PROBLEM SOLVING TECHNIQUES  9
Graph Traversals:Breadth and Depth first search traversal – Connected Components – Spanning Trees – Biconnected components – Branch and Bound: General Methods (FIFO & LC) – 0/1 Knapsack problem: LC &FIFO brand and bound – Introduction toNP-HardandNP-Completeness.

TOTAL:  45h

Course Outcome:
At the end of this course, the Student will be able to
- CO 1. Understand the steps involved in design &analysis of algorithms.
- CO 2. Analyze the tradeoff between time and space complexity.
- CO 3. Learn the various asymptotic notations used in specifying the time complexity of an algorithm.
- CO 4. Understand the searching algorithm concepts.
- CO 5. Identify the algorithm design method in the form of algorithm.
CO 6. Analyze the concept of algorithm techniques.
CO 7. Implement the techniques of graph traversals.
CO 8. Identify the problem belonging to the class P, NP hard or NP complete.

TEXT BOOKS:

REFERENCE BOOKS:
Course Objective:

- To study the concepts and basic architecture of 8085, 8086, 8279, 8237, 8051 Pentium processor and Co-
  processor.
- To understand the importance of different peripheral devices and their interfacing to 8086.
- To know the design aspects of microprocessor and assembly language programs for various applications.

UNIT I  THE 8085 MICROPROCESSOR

Introduction to Microprocessor – Evolution – Microprocessor architecture – Application – Introduction to 8085 –
Architecture of 8085 Microprocessor - Pin diagram of 8085 Microprocessor – Addressing Modes – Instruction set –
Instruction and Data formats – Instruction Timing Diagram – Programming the 8085 – Code conversion.

UNIT II  8086 SOFTWARE ASPECTS

Intel 8086 microprocessor – Introduction – Architecture – Registers – Pin Description – Instruction set and
assembler directives – Addressing modes – Assembly language programming – Procedures – Macros – Interrupts
and interrupt service routines – Operations – BIOS function calls.

UNIT III  8086 SYSTEM DESIGN

8086 signals and timing – Minimum/Maximum mode of operation – Addressing memory and I/O – Multiprocessor
configurations – Coprocessor Configuration – Closely Coupled Configuration – Loosely Coupled Configuration –
Communication between CPU and IOP. – System design using 806.

UNIT IV  I/O INTERFACING

Memory Interfacing and I/O interfacing with 8085 – Parallel communication interface – Serial communication
interface – Asynchronous – Synchronous – Physical Standards – Timer – Keyboard and display controller(8279) –
Interrupt controller – Direct Memory Access and DMA controller(8237) – Programming and applications – stepper
Motor.

UNIT V  MICROCONTROLLERS

8051 Micro controller hardware- Architecture – I/O pins – ports and circuits- Memory organization – Special
function registers – Counters and Timers – Serial Data I/ O – Interrupts – 8051 instruction set – Addressing
modes- Operand types- Operand addressing – Assembly language programming – I/O port programming.

TOTAL:  45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the concepts of 8085 microprocessors and apply the fundamentals of assembly level
programming of 8085 microprocessors.

CO 2. Understand 8086 Microprocessor concepts, system configuration and memory organization.
CO 3. Be familiar with the concepts of 8086 Microprocessor architecture and its assembly level programming
CO 4. Interface Microprocessor with various peripheral devices and program the same for various applications.
CO 5. Classify and comprehend the working principle of I2C Standard, RS232C, RS485, and GPIB.
CO 6. Understand 8051 Microcontroller concepts, architecture and application of Microcontrollers
CO 7. Be familiar with external memory and interfacing the same to the 8051 Microcontroller
CO 8. Write assembly language programming of 8051 Microcontroller with various interfacing devices for diverse applications.

TEXT BOOKS:

REFERENCE BOOKS:

15ECS104 MULTICORE PROGRAMMING 3 0 0 3

Course Objective:
- To understand the principles of Multiprocessor and parallel programming.
- To develop exciting new applications that can take advantage of on-chip parallelism.
- To Build and debug Multicore –Ready applications.

UNIT I INTRODUCTION TO MULTIPROCESSORS AND SCALABILITY ISSUES

UNIT II PARALLEL PROGRAMMING

UNIT III OPENMP PROGRAMMING

UNIT IV  
**MPI PROGRAMMING**  
9

UNIT V  
**MULTITHREADED APPLICATION DEVELOPMENT**  
9

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the fundamentals of various multicore processor.
CO 2. Acquire knowledge on multi-core architecture techniques.
CO 3. Understand and Differentiate mapping threads and decomposition.
CO 4. Acquire knowledge on deadlock threading API.
CO 5. Analyze shared and disturbed memory concepts.
CO 7. Discuss error messages and error handling mechanisms in MPI programming
CO 8. Classify communication and topologies.
CO 9. Write algorithms and debug multi threaded techniques.
CO 10. Be well versed in multithreaded debugging using GDB.

TEXT BOOKS:
2. Michael J Quinn, Parallel programming in C with MPI and OpenMP, Tata Mc graw Hill, 2004.(3)(4)

REFERENCES:
Course Objective:
- To understand the relationship between system software and machine architecture.
- To know the design and implementation of assemblers, linkers and loaders.
- To understand the macroprocessors, system software tools and internal working of hardware and software interface of a typical system.

UNIT I INTRODUCTION
System software and machine architecture – The Simplified Instructional Computer (SIC) Machine architecture:
Memory- Registers- Data and instruction formats - addressing modes - instruction sets – Input / Output – SIC/XE

UNIT II ASSEMBLERS

UNIT III LOADERS AND LINKERS

UNIT IV MACRO PROCESSORS

UNIT V SYSTEM SOFTWARE TOOLS

TOTAL: 45h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Describe the machine architecture of SIC and SIC/XE.
CO 2. Different addressing modes and addressing set.
CO 3. Find the feature differences between machine dependent and independent assemblers.

CO 4. Gain knowledge on one pass assembler and multi pass assembler.

CO 5. Discuss machine dependent and independent loader features.

CO 6. Understand the basic loader functions and linkage editors

CO 7. Acquire knowledge on macro processor algorithm and data structures.

CO 8. Know various system software tools.

CO 9. Understand the basic concepts of data base management systems.

TEXT BOOK:

REFERENCE BOOKS:

15ECS106 COMPUTER ORGANIZATION AND ARCHITECTURE 3 0 0 3

Course Objective:
- To understand the architecture of computers and to analyze the performance using various addressing modes.
- To familiarize with hierarchical memory system including cache memories and virtual memory.
- To impart knowledge about different ways of communicating with I/O devices and standard I/O interfaces.

UNIT I BASIC STRUCTURE OF COMPUTERS

UNIT II BASIC PROCESSING UNIT
UNIT III  PIPELINING

UNIT IV  MEMORY SYSTEM

UNIT V  I/O ORGANIZATION

TOTAL:  45h

Course Outcome:
At the end of this course, the student will be able to
CO 1. Understand the Basic Structure of Computers.
CO 2. Draw the timing diagrams for Memory-Read, Memory-Write, I/O Read and I/O Write for Synchronous and Asynchronous buses.
CO 3. Understand the intricacies of representation and algorithm for addition, subtraction, division and multiplication of integer and floating point numbers.
CO 4. Clearly explain the differences between CISC and RISC processors.
CO 5. Understand the pipelining concepts used for speeding up the system.
CO 6. Gain Knowledge on the cache architecture and different cache mapping techniques.
CO 7. Explain the various types of Memories and Memory Management Techniques.
CO 8. Understand the concept of interrupt mechanism.

TEXT BOOK:

REFERENCE BOOKS:
Course Objective:
- To know about the basic knowledge representation, problem solving and learning methods,
- To design an intelligent agent that can solve ontological problems and to learn about the search strategies,
- To learn the applicability, strengths and weaknesses to solve particular engineering problems.

UNIT I  INTRODUCTION

UNIT II  PROBLEM SOLVING

UNIT III  KNOWLEDGE REPRESENTATION

UNIT IV LEARNING

UNIT V APPLICATIONS

Total: 45h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Identify problems that are amenable to solution by AI methods
CO 2. Apply appropriate AI methods to solve a given problems.
CO 3. Demonstrate different types of AI agent.
CO 4. Know various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms)
CO 5. Understand the fundamentals of knowledge representation (logic-based, frame based, semantic nets) inference and theorem proving.
CO 6. Learn how to build simple knowledge based systems.
CO 7. Recognize working knowledge of reasoning in the presence of incomplete and/or uncertain information
CO 8. Ability to apply knowledge representation, reasoning and machine learning techniques to real world problems.
CO 10. Design and carry out an empirical evaluation of different algorithms on problems formalization and state the conclusions that the evaluation supports.

TEXT BOOKS:

REFERENCE BOOKS:
Course Objective:
- To understand the principles and practices of object oriented programming in Java, including defining classes, invoking methods, packages and threading.
- To understand the concepts of designing the graphics programming using awt and java swing.
- To develop program using applets for potential inclusion in web page.

UNIT I  OBJECT-ORIENTED PROGRAMMING – FUNDAMENTALS  9

UNIT II  OBJECT-ORIENTED PROGRAMMING – INHERITANCE  9

UNIT III  EVENT-DRIVEN PROGRAMMING  9

UNIT IV  GENERIC PROGRAMMING  9

UNIT V  CONCURRENT PROGRAMMING  9

TOTAL:  45h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the fundamentals of object oriented programming.
CO 2. Define classes, methods and different types of constructors.
CO 3. Implement inheritance, polymorphism and encapsulation.
CO 4. Describe and write code in generic programming
CO 5. Create graphic applications using objects, events and adapter classes.

CO 6. Get knowledge on swing components, buttons and layout management.

CO 7. Handle exceptions at multiple situations.

CO 8. Discuss generic programming and its concepts.


CO 10. Acquire knowledge on different types of synchronization in concurrent programming

TEXT BOOKS:

REFERENCE BOOKS:
15ECS109  CRYPTOGRAPHY AND NETWORK SECURITY  3 0 0 3

Course Objective:

- To understand the fundamental principles, algorithms of cryptographic techniques and expose them to various scenarios of cyber crime with an introduction to cyber law along with a thrust on security on the internet.
- To develop an understanding of information assurance as practiced in computer operating systems, distributed systems, networks and representative applications.

UNIT I  INTRODUCTION  9

UNIT II  PUBLIC KEY CRYPTOGRAPHY  9

UNIT III  AUTHENTICATION AND HASH FUNCTION  9

UNIT IV  NETWORK SECURITY  9

UNIT V  SYSTEM LEVEL SECURITY  9

TOTAL:  45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand OSI security architecture and the design principles of Block cipher.
CO 2. Acquire knowledge on block cipher modes of operation
CO 3. Explain encryption techniques
CO 4. Describe key management in public key cryptography.
CO 5. Understand Hash Functions and Authentication Protocols.
CO 6. Familiarize with MD5 message Digest algorithm.
CO 8. Discuss Encapsulating Security Payload and Key Management.
CO 9. Gain knowledge on Intrusion detection and Distributed Denial of Service Attacks.
CO 10. Evaluate Firewall Design Principles and Internet standards and internet security

TEXT BOOKS:

REFERENCE BOOKS:
Course Objective:

- To construct finite state machines and the equivalent regular expressions.
- To understand and prove the equivalence of languages described by finite state machines and regular expressions. To construct and prove pushdown automata and the equivalent context free grammars.
- To construct Turing machines and Post machines for a variety of issues in the mathematical development of computer science theory, particularly finite representations for languages and machines.

UNIT I AUTOMATA

Introduction - Basic Mathematical Notation and techniques - Finite State systems - Basic Definitions - Introduction to formal proof - Additional forms of proof - Inductive proofs - Finite Automata (FA) - Deterministic Finite Automata (DFA) - Non-deterministic Finite Automata (NFA) - Finite Automata with Epsilon transitions - Equivalence of NFA and DFA - Equivalence of NDFA’s with and without €-moves.

UNIT II REGULAR EXPRESSIONS AND LANGUAGES

Introduction - Regular set - Regular Expression - FA and Regular Expressions: Equivalence of NFA and Regular Expression - Direct method for Conversion of Regular Expressions to Finite Automata - Conversion of Finite Automata to Regular Expressions - Applications of Regular Expression - Identity rules - Proving languages not to be regular - Closure properties of regular languages.

UNIT III CONTEXT-FREE GRAMMARS AND LANGUAGES


UNIT IV PROPERTIES OF CONTEXT-FREE LANGUAGES


UNIT V UNDECIDABILITY

A language that is not Recursively Enumerable (RE) - An undecidable problem that is RE - Undecidable problems about Turing Machine - Post’s Correspondence Problem - Intractable problems: The classes P and NP: The class of languages P - Kruskal’s Algorithm - The class of languages NP - Travelling Salesman’s Problem.

TOTAL: 45h
Course Outcome:
At the end of this course, the student will be able to
CO 1. Understand the Basic mathematical notations and techniques of automata and Finite Automata.
CO 2. Gain knowledge on Equivalence of NFA, DFA and closure properties of regular languages
CO 4. Familiarize with the Applications of Regular Expression.
CO 5. Describe Context free grammars and languages
CO 6. Find the equivalence of pushdown automata and context free grammar.
CO 7. Understand the Normal forms for CFG: Chomsky’s Normal form.
CO 8. Discuss Closure Properties of CFL.
CO 9. Analyze the Post’s Correspondence Problem and P, NP class problems

TEXT BOOKS:

REFERENCE BOOKS:
15ECS111  SOFT COMPUTING  3 0 0 3

Course Objective:
- To gain the Knowledge about Fuzzy logic and Knowledge engineering.
- To be familiar with design of various neural networks.
- To learn the fuzzy logic concepts and genetic programming.

UNIT I  FUZZY SET THEORY

UNIT II  OPTIMIZATION

UNIT III  ARTIFICIAL INTELLIGENCE

UNIT IV  NEURO FUZZY MODELING

UNIT V  APPLICATIONS OF COMPUTATIONAL INTELLIGENCE

Course Outcome:
At the end of this course, the Student will be able to

CO 1. Be well versed in fuzzy sets, soft computing and parameterization.
CO 2. Explain the rules of fuzzy interface systems and different fuzzy models.
CO 3. Understand various optimization methods and genetic algorithms.
CO 4. Implement the concept of generational cycle, annealing and simplex search.
CO 5. Learn knowledge representation and uncertainty in Artificial intelligence.
CO 6. Demonstrate the concept of heuristic search techniques and recursion patent.
CO 7. Analyze the neuro fuzzy inference systems and learning algorithms.
CO 8. Describe fuzzy spectrum, expert system and decision making.
CO 10. Exhibit the applications of computational intelligence.

TEXT BOOKS:

REFERENCES:
Course Objective:
- To understand the distributed System architecture and multiprocessor operating system.
- To gain knowledge on Distributed operating system concepts that includes architecture, Mutual exclusion algorithms, Deadlock detection algorithms and agreement protocols.
- To gain insight on to the distributed resource management components viz. the algorithms for implementation of distributed shared memory, recovery and commit protocols.

UNIT I  DISTRIBUTED OPERATING SYSTEM  

UNIT II  DISTRIBUTED DEADLOCK AND RESOURCE MANAGEMENT  

UNIT III  FAILURE RECOVERY AND FAULT TOLERANCE  

UNIT IV  CRYPTOGRAPHY AND SECURITY OPERATING SYSTEM  
Protection and security - preliminaries, the access matrix model and its implementations – safety in matrix model- advanced models of protection. Data security – cryptography: Model of cryptography, conventional cryptography-modern cryptography, Private key cryptography, Data encryption standard- Public key cryptography – Multiple encryption – Authentication in Distributed systems.

UNIT V  MULTIPROCESSOR AND DATABASE OPERATING SYSTEMS  


TOTAL: 45h

Course Outcome:
At the end of this course, the student will be able to
CO 1. Understand the different types of system architecture and design issues in distributed operating systems.
CO 2. Know the classification of mutual exclusion and associated algorithms.
CO 3. Determine deadlock handling strategies in distributed systems.
CO 4. Familiarize with the classification of agreement problems and its applications.
CO 5. Understand distributed resource management techniques.
CO 6. Analyze the algorithms for implementing distributed shared memory.
CO 7. Evaluate the performance of load distributing and load sharing algorithms.
CO 8. Handle failure recovery and fault tolerance in operating systems.
CO 9. Examine safety in matrix model and advanced models of protection.
CO 10. Implement data security using cryptography techniques and to discuss the requirements and architecture of microprocessor and database operating system.

TEXT BOOK:

REFERENCES:
1. Andrew S.Tanenbaum, "Modern operating system", PHI, 2014
3. Andrew S.Tanenbaum, "Distributed operating system", Pearson education, 2013
Course Objective:

- To understand the kernel, I/O & files, process control, scheduling and memory management policies in unix.
- To understand the file organization and management.
- To know the various system calls and to have knowledge of process architecture, process control & scheduling and memory management.

UNIT I  
OVERVIEW

General Overview of the System: History -- System structure -- User perspective -- Operating system services -- Assumptions about hardware. Introduction to the Kernel: Architecture of the UNIX operating system -- Introduction to system concepts. The Buffer Cache: Buffer headers -- Structure of the buffer pool -- Scenarios for retrieval of a buffer -- Reading and writing disk blocks -- Advantages and disadvantages of the buffer cache.

UNIT II  
FILE SUBSYSTEM

Internal representation of files: Inodes -- Access Inodes -- Releasing Inodes -- Algorithm -- Structure of a regular file -- Allocation of contiguous file and fragmentation of free space -- Directories -- Conversion of a path name to an Inode -- Algorithm -- Super block -- Inode assignment to a new file -- Algorithm -- Allocation of disk blocks -- Algorithm.

UNIT III  
SYSTEM CALLS FOR THE FILE SYSTEM

File System Calls: Open -- Algorithm for opening a file -- Read -- Write -- Algorithm for reading and writing a file -- File and record locking -- Adjusting the position of file I/O -- Lseek -- Close -- File creation -- Creation of special files -- Changing directory, root, owner, mode -- stat and fstat -- Pipes -- Dup -- Mounting and unmounting file systems -- link -- unlink.

UNIT IV  
PROCESSES


UNIT V  
MEMORY MANAGEMENT AND I/O


TOTAL: 45 h

Course Outcome:

At the end of this course, the student will be able to
CO 1. Understand the architecture of UNIX operating system.
CO 2. Know the concepts, merits and demerits of buffer cache.
CO 3. Analyze the representation of file inodes and allocation of contiguous files.
CO 4. Write an algorithm for assignment and inode to a new file and allocation of disk blocks.
CO 5. Represent various system calls for file subsystem.
CO 6. Identify process states, transition and process control mechanism.
CO 7. Learn about the different Process states and also to learn the memory organization.
CO 10. Create algorithms for I/O Subsystem and device drivers.

**TEXT BOOK:**


**REFERENCE BOOKS:**

Course Objective: To gain knowledge about how to create a User Interface, how to use different type of controls, Menu usage and its different types and components, different methodologies used to implement it and how to use multimedia, prototypes and analyzing different types of testing

UNIT I   INTRODUCTION


UNIT II   HUMAN COMPUTER INTERACTION


UNIT III   WINDOWS


UNIT IV   MULTIMEDIA


UNIT V   WINDOWS LAYOUT– TEST


TOTAL: 45 h

Course Outcome:

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

CO 1. Understand the concept of Human Computer Interface and Direct Manipulation Graphical System.
CO 2. Acquire knowledge on Web User Interface and Popularity.
CO 3. Discuss User Interface Design Process, Obstacles and Usability.
CO 5. Understand Window Characteristics, Presentation Styles, Organizations and Operations.
CO 6. Use Operate Control, Text Entry Controls, Selection Control, Combination Control, Custom Control and Presentation Control in interface design.
CO 8. Describe International Consideration and Accessibility of multimedia
CO 9. Identify Prototypes and Kinds Of Tests in windows layout
CO 10. Gain knowledge on the concept of Visualization and Hypermedia.

TEXT BOOKS:

REFERENCES:
Course Objective:

- To learn the concepts of Distributed system with examples like resource sharing.
- To understand the different types of communication process like client-server communication, group communication and distributed objects.
- To understand the Distributed File System, Distributed debugging and Distributed Memory,

UNIT I DISTRIBUTED SYSTEM AND COMMUNICATION


UNIT II DISTRIBUTED OBJECTS

Introduction:Distributed object middleware,component based middleware-Distributed Objects and Remote Invocation-Communication between distributed objects-Remote procedure calls-Events and notifications-Case study: Java RMI. Operating System Support-Introduction-OS layer-Protection-Processes and threads-Communication and invocation OS architecture.

UNIT III DISTRIBUTED FILE SYSTEM

Introduction:Distributed File Systems,characteristics of file system,Distributed file system requirements- File service architecture-Case Study:Sun Network File System-Enhancements and further developments. Name Services-Introduction-Name Services and the Domain Name System-Directory Services-Case Study: Global Name Service.

UNIT IV INTRODUCTION TO CLOCK EVENTS


UNIT V DISTRIBUTED SHARED MEMORY

Distributed Shared Memory-Introduction-Design and implementation issues-Sequential consistency and Ivy case study Release consistency and Munin case study-Other consistency models-CORBA CaseStudy: Introduction, CORBA RMI,CORBA services,CORBA Architecture,CORBA remote object references,CORBA client and server examples.

Total: 45h

Course Outcome:

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

CO 1. Understand the concept of distributed systems and communication.
CO 2. Gain insights on External data representation and marshalling, Client-server communication and Group communication.

CO 3. Describe Distributed object middleware and component based middleware.

CO 4. Acquire knowledge on Remote procedure calls, Events and notification of distributed objects.

CO 5. Analyze Distributed File Systems and Distributed file system requirements.

CO 6. Understand the Name Services, Domain Name System and Directory Services.

CO 7. Describe Clocks, events and process states.

CO 8. Explain Berkeley algorithm, Network time protocol, Logical time and logical clocks, Global states and Distributed debugging.

CO 9. Gain insights on Distributed Shared Memory Design and implementation issues.

CO 10. Understand the concept of RMI, services, Architecture and remote object references of CORBA.

TEXT BOOK:

REFERENCES:
15ECS116  GRID COMPUTING  3 0 0 3

Course Objective:

- To understand the concept of parallel and distributed computing, the anatomy and physiology of grid and grid security and to analyze how resources are managed.
- To know the application of grid computing and to understand the technology and tool kits to facilitate the grid computing.

UNIT I  CONCEPTS AND ARCHITECTURE  9

UNIT II  GRID MONITORING  9

UNIT III  GRID SECURITY AND RESOURCE MANAGEMENT  9

UNIT IV  DATA MANAGEMENT AND GRID PORTALS  9

UNIT V  GRID MIDDLEWARE  9
Introduction: Middlewares definition, purpose, grid layered architecture - Case Studies: Recent version of Globus Toolkit: Architecture model, programming model, Implementation, high level service and GLite: Architecture, Components and Features.

Total: 45h

Course Outcome:

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

CO 1. Understand the key concepts of parallel, distributed, grid and cluster computing.
CO 2. Know about the different web services in grid computing.
CO 3. Acquire knowledge on grid monitoring architecture and other monitoring systems.
CO 4. Know network weather service and net logger.
CO 5. Implement the grid security, scheduling and resource management.
CO 6. Evaluate different scheduling paradigms particularly grid scheduling with QoS.
CO 7. Explain data management of structured data and architectural approaches.
CO 8. Identify first and second generation grid portals and to implement the technology and tool kits for facilitating grid computing.
CO 9. Examine the importance and applications of Grid middleware.
CO 10. Analyze the architectural model, programming model, components and features of grid middleware.

TEXT BOOK:

REFERENCES:
Course Objective:
- To understand the concept of cloud and utility computing.
- To understand the various issues in cloud computing.
- To familiarize with the types of virtualization and the lead players in cloud.

UNIT I  INTRODUCTION, PRINCIPLES AND ARCHITECTURE  9

UNIT II  VIRTUALIZATION  9

UNIT III  CLOUD INFRASTRUCTURE  9

UNIT IV  CLOUD PROGRAMMING AND SOFTWARE ENVIRONMENT  11

UNIT V  CLOUD PLATFORMS AND APPLICATION  9

TOTAL: 45 h
Course Outcome:
At the end of this course, the student will be able to

CO 1. Understand the key technologies, strengths limitations and the possible applications for state-of-the-art cloud computing.

CO 2. Clearly understand the broad perceptive of cloud architecture model.

CO 3. Gain a basic knowledge of virtualization and its types.

CO 4. Design and develop highly scalable cloud-based applications by creating and configuring virtual machines on the cloud and building private cloud.

CO 5. Know the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.

CO 6. Compare, contrast, and evaluate the key trade-offs between multiple approaches to cloud system design, and identify appropriate design choices when solving real-world cloud computing problems.

CO 7. Explore some important cloud computing driven commercial systems such as: Google Apps, Microsoft Azure and Amazon Web Services and other businesses cloud applications.

CO 8. Develop and deploy cloud application using popular cloud platforms.

CO 9. Make recommendations on cloud computing solutions for an enterprise.

TEXT BOOKS:


REFERENCE BOOKS:

2. George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud” O’Reilly, 2009


Course Objective:
- To know about the Conceptual, theoretical, and applicable aspects of pervasive computing.
- To learn the applications of location and context-aware technologies, new types of user interfaces for pervasive computing.
- To understand the system architecture and infrastructure for pervasive computing.

UNIT I MOBILE NETWORKS

UNIT II WIRELESS NETWORKS

UNIT III ROUTING

UNIT IV TRANSPORT AND APPLICATION LAYERS

UNIT V PERVERSIVE COMPUTING

TOTAL : 45h

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

CO 1. Understand the Signal Propagation, Multiplexing and Modulation of mobile and pervasive computing
CO 2. Acquire knowledge on MAC, SDMA ,TDMA, FDMA and CDMA.
CO 3. Discuss the System and Protocol Architecture of IEEE 802.11.
CO 4. Understand the principles of Wireless networks like HIPERLAN and Bluetooth.
CO 5. Explain the advantages and limitations of Mobile AD HOC Networks and Routing Protocols.
CO 6. Understand DSDV, DSR and AODV Routing Techniques, Quality of service in Mobile Ad hoc Networks.
CO 8. Discuss the Procedure of Mobile IPv6, Route Optimization, Movement Detection and Dynamic Home Agent Address Discovery.
CO 9. Find the infrastructure security issues and applications of pervasive computing
CO 10. Be well versed in the concept of Pervasive Web Application architecture

TEXT BOOKS:

REFERENCES:
Course Objective:

- To introduce the concept of data warehousing with special emphasis on architecture and design.
- To introduce the concept of data mining with a detail coverage of basic tasks, metrics, issues, and implication.
- To learn the core topics like classification, clustering and association rules.

UNIT I DATA WAREHOUSING

Data warehousing Components: Data Warehouse Database, Sourcing, Acquisition, Cleanup and Transformation Tool, Data Warehouse Administration and Management, Information Delivery System – Building a Data warehouse — Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools – Metadata.

UNIT II BUSINESS ANALYSIS


UNIT III DATA MINING


UNIT IV ASSOCIATION RULE MINING AND CLASSIFICATION

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Backpropagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods - Prediction

UNIT V CLUSTERING, APPLICATIONS AND TRENDS IN DATA MINING

Cluster Analysis - Types of Data – Categorization of Major Clustering Methods - Kmeans– Partitioning Methods – Hierarchical Methods - Density-Based Methods – Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data- Constraint – Based Cluster Analysis – Outlier Analysis – Data Mining Applications.- Case Study.

TOTAL: 45 h
Course Outcome:
At the end of this course, the student will be able to

CO 1. Understand the purpose and need of data warehouse and data mining.

CO 2. Gain knowledge on data warehouse components, building a data warehouse, mapping the Data Warehouse to a Multiprocessor Architecture and metadata.

CO 3. Understand the concept of OLAP and data cube technology.

CO 4. Know about the Cognos Impromptu and Online Analytical Processing (OLAP).

CO 5. Understand the Categories of OLAP Tools.

CO 6. Explain the functionalities and classification of data mining systems.

CO 7. Identify the issues and understand the integration of a data mining system with a datawarehouse.

CO 8. Classify the association rule mining methods in DWDM.

CO 9. Understand various Kinds of Association Rules, Decision Tree Induction, Bayesian Classification, Support Vector Machines and Other Classification Methods of data mining.

CO 10. Understand Cluster Analysis, Outlier Analysis and Data Mining Applications.

TEXT BOOKS:


REFERENCES:


Course objective:

- To learn and understand the principles, concepts and various techniques for the processing & analysing of images.
- To have a clear understanding of the concepts and skills necessary to define and carry out some image processing tasks.

UNIT-I   FUNDAMENTALS OF IMAGE PROCESSING  9

UNIT-II   IMAGE ENHANCEMENT  9

UNIT-III   IMAGE RESTORATION AND SEGMENTATION  9
Restoration: Noise models – Restoration in the presence of Noise Only (Spatial filtering) - Periodic noise reduction by frequency Domain filtering - Image reconstruction from Projections.
Segmentation: Fundamentals - Point, Line and Edge detection – Thresholding - Region Based segmentation –Use of Motion in Segmentation.

UNIT-IV   MULTI RESOLUTION PROCESSING AND IMAGE COMPRESSION  9

UNIT-V   MORPHOLOGICAL IMAGE PROCESSING  9
Morphological Image Processing: Erosion and Dilation, Opening and Closing, The Hit-or-Miss Transformation, Some basic morphological algorithms - Image Representation and Description: Boundary Descriptors, Regional Descriptors – Object Recognition: Patterns and Pattern Classes, Recognition based on Decision Theoretic Methods.

TOTAL: 45 h
Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the fundamentals of digital image processing
CO 2. Describe visual perception, sensing, sampling and quantization of image
CO 3. Understand and examine the different types of resolutions, interpolations and color models
CO 4. Generate and find the histogram of an image.
CO 5. Denoise an image by the use of various filters according to the application
CO 6. Describe restorations of noise models and image reconstruction.
CO 7. Do image analysis by the process of segmentation and thresholding.
CO 8. Understand and implement various lossy and lossless image compression techniques.
CO 9. Perform morphological transformation of an image by various methods

TEXT BOOK:

REFERENCE BOOKS:
Course Objective:
To facilitate the understanding of Quality Management principles and process.

UNIT I   E-BUSINESS APPLICATION DESIGN  9


UNIT II   E-BUSINESS ENTERPRISE COMPONENT SPECIFICATION  9

e-business enterprise components : system context models - high-level operation specs - state charts for system models - event charts: horizontal and vertical expansion - elaborating models - relating the levels of detail - building a system spec - Enterprise component design - Design patterns : Two-way Link – Observer - Recursive Composite - State Delegation - Interface Decoupling – Domain coupling.

UNIT III  COMPONENT TECHNOLOGY & J2EE PLATFORM  9

Pluggable code and connector protocols - component kits, Beans, and building tools - component architecture - common models - common couplings - wrapping existing assets - product Vs component building - frameworks: generic models - generalization of two example static models - collaborations: generic designs for interactions - roles - synthesis of collaborations - J2EE platform.

UNIT IV   J2EE DISTRIBUTED SERVICES  9

J2EE distributed services - J2EE containers – Design with Session Beans : client sessions - benefits of stateless Session Beans - business logic encapsulation - modelling user interaction - command beans - a high performance alternative - data access objects - value objects - façade to Entity Beans.

UNIT V   DESIGN WITH ENTITY BEANS  9

Data and rules encapsulation - Enterprise Information Systems (EISs) - one row Entity Beans (single table mapping) - joins, views, and database issues - updating the model in MVC architecture - persisting transactions - Web and enterprise technology collaborations - Distributed application design - e-business application templates.

TOTAL: 45h

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

- Understand the architecture of client / server and n-tier Server technology
• Design various models for e-business application
• Acquire knowledge on e-business enterprise components specification
• Discuss and compare product and component building
• Explain interface decoupling and domain coupling in e-business enterprise component specification
• Be familiar with distributed services and containers of J2EE
• Design with session beans and entity beans in J2EE
• Be well versed in enterprise information system, distributed application design and e-business application templates

TEXT BOOK:

REFERENCES:
Course Objective:

- To learn the principles of network and the current wiring standards.
- To understand the basic design issues in both local and wide area networks, and the basics of the most common protocols.

UNIT I  
INTRODUCTION  
9

UNIT II  
TCP  
9

UNIT III  
IP IMPLEMENTATION  
9

UNIT IV  
TCP IMPLEMENTATION I  
9

UNIT V  
TCP IMPLEMENTATION II  
9

TOTAL : 45 h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand and build the internetworking architecture with supernetting and subnetting access
CO 2. Develop and use various addressing techniques of TCP
CO 3. Establish connection and termination using TCP
CO 4. Set time out timer and retransmission with selective acknowledgement.
CO 5. Understand and Develop various routing algorithms.
CO 6. Discuss error processing and multi cast processing in IP implementation
CO 7. Evaluate input and output processing during TCP implementation.
CO 8. Acquire knowledge on congestion control and attacks involving TCP Congestion control.
CO 9. Build timer, events and messages using TCP.
CO 10. Analyze TCP/IP Diagnostic tools and utilities.

TEXT BOOKS:

REFERENCES:
Course Objective:
- To understand the basic knowledge of software management principles.
- To familiarize in choosing an appropriate project development methodology and identifying project risks, monitoring and tracking project deadlines.
- To develop the capability to work in a team environment and be aware of different modes of communications.

UNIT I  INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT

UNIT II  PROJECT EVALUATION

UNIT III  ACTIVITY PLANNING

UNIT IV  MONITORING AND CONTROL

UNIT V  MANAGING PEOPLE AND ORGANIZING TEAMS

TOTAL: 45 h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Analyze project management principles.
CO 2. Understand what is project management and activities covered by software project management
CO 3. Evaluate project and provide technical assessment of a projects.
CO 4. Assess risk and Analyze cost benefit using different evaluation techniques.
CO 5. Design project schedule using different sequencing and scheduling activities.
CO 6. Be familiar with activity planning by identifying, analyzing and managing the nature of risk.
CO 7. Monitor and control software project management by visualizing the progress, monitoring cost, analysing earned value, prioritizing monitoring, etc
CO 8. Discuss different types of contract, stages in contract placement and contract management.
CO 9. Understand the organizational behaviour and structure by various job characteristics model.

TEXT BOOK:

REFERENCES:
Course Objective:

- To understand the quality management processes and to distinguish between various activities of quality assurance, quality planning and quality control.
- To know the importance of standards in the quality management process and their impact on the final product.
- To understand the SQA processes from planning till execution.

UNIT I  
FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE  
9

UNIT II  
MANAGING SOFTWARE QUALITY  
9

UNIT III  
SOFTWARE QUALITY ASSURANCE METRICS  
9

UNIT IV  
SOFTWARE QUALITY PROGRAM  
9

UNIT V  
SOFTWARE QUALITY ASSURANCE STANDARDIZATION  
9

TOTAL : 45 h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the roles and responsibilities of SQA (software quality assurance) people
CO 2. Discuss the plan, roles, activities and baselines of software configuration management
CO 3. Manage software organization and software quality measurement criteria.
CO 4. Prevent defects by tracking and enhancing the software quality
CO 5. Design principles of total quality management and analyze the approach of TQM implementation.
CO 6. Analyze the scope and tasks of software quality program.
CO 7. Discuss software quality assurance planning.
CO 9. Understand the role of SQA in software development maturity models.

TEXT BOOKS:

REFERENCES:
Course Objective:
- To understand the basics of Information Security and to know the legal, ethical and professional issues in Information Security.
- To know the aspects of risk management and to become aware of various standards and the technological aspects of Information Security.

UNIT I  INTRODUCTION  9

UNIT II  SECURITY INVESTIGATION  9
Need for Security- Business Needs: protecting the functionality of an organization, enabling the safe operation of an application, protecting the data that organization collects and use, safeguarding technology assets in organization-Threats-Attacks- Legal, Ethical and Professional Issues: Law and ethics in Information security, relevant U.S Laws, International laws and legal bodies, ethics and information security, codes of ethics and professional organization.

UNIT III  SECURITY ANALYSIS  9
Risk Management: Introduction- Risk Identification: plan and organize the process, asset identification and inventory, classifying and prioritizing information assets, information assets valuation, identifying and prioritizing threats, vulnerability identification and Assessing Risk, Assessing and Controlling Risk

UNIT IV  LOGICAL DESIGN  9

UNIT V  PHYSICAL DESIGN  9

Total: 45h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the basics of information security.
CO 2. Analyze the types of threats in information security and the associated attacks
CO 3. Demonstrate the system development life cycle in information security.
CO 4. Protect the functionality of an organization and enable the state operation of application.
CO 5. Understand international laws and analyze codes and ethics of professional organization.
CO 6. Acquire knowledge on risk identification plan and the process organization.
CO 7. Assess and control risks in security analysis.
CO 8. Design and implement various security models in information security
CO 9. Discuss different tools for physical design and analysis in enhancing information security.

TEXT BOOK:

REFERENCES:
Course Objective:
- To understand the nature of e-Commerce and recognize the business impact and potential of e-Commerce.
- To learn the technologies required to make e-Commerce viable.
- To know about the current drivers and inhibitors facing the business world in adopting and using e-Commerce.
- To get the awareness of the economic consequences of e-Commerce.

UNIT I INTRODUCTION 9

UNIT II INFRASTRUCTURE FOR E COMMERCE 9

UNIT III WEB BASED TOOLS FOR E COMMERCE 9

UNIT IV SECURITY 9

UNIT V INTELLIGENT AGENTS 9

TOTAL : 45 h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Design and implement various business models of E-Commerce
CO 2. Explain policy and regulatory issues in E-commerce.
CO 3. Understand the basic networking concepts.
CO 4. Design and implement the web client server architecture.
CO 5. Acquire knowledge on web server concepts and its performance evaluation.
CO 6. Be familiar with web-based tools for e-commerce.
CO 7. Enhance the security features and its protocols.
CO 8. Understand the intelligent agents and security threats

TEXT BOOKS:

REFERENCES:
15ECS127  Essentials of Object Oriented Programming using Java  3 0 0 3

Course Objective:
- To equip students with the required object oriented programming skills required to build highly reusable and robust software systems
- To acquire skills required to develop applications in Java

UNIT I  INTRODUCTION TO JAVA  9
Introduction to Java and Eclipse, Object-Oriented Programming, Introduction to SDLC, Introduction to UML, Java Basics (The basic building blocks of Java, variables and primitive types, Objects and Messages, String & String Buffer, Wrapper classes, Building Classes

UNIT II  INHERITANCE AND EXCEPTIONS  9
Debugging, Inheritance and Refactoring, Interfaces, Collections, Serialization and Streams, Exceptions and Exception Handling, Utility Classes, Threads and Synchronization

UNIT III  WEB COMPONENTS  9
Java Beans, Web Component Introduction, Java Servlets, Java Servlets API, Java Server Pages, JSP Specification and Syntax, Page Designer

UNIT IV  DEBUGGING WEB APPLICATIONS  9
Debugging Web Applications, Web Archive Deployment Descriptor, Http: Session Management, Cookie API, Management of Application Data, URL Rewriting.

UNIT V  SERVER SIDE APPLICATIONS  9

TOTAL: 45h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Explain the concepts in object oriented programming paradigm
CO 2. Acquire knowledge on Serialization, Exceptions and Exception handling
CO 3. Understand and work on Java web components
CO 4. Understand how Java achieves platform portability
CO 5. Write well-documented and elegant programs in Java
CO 6. Use the object oriented technique to address the real time problems
CO 7. Develop excellent debugging skills
CO 8. Aware of the best practices for server side application

TEXT BOOK:
IBM Course Material
Course Objective:
- To analyze, design, develop and deploy web applications using Java
- To learn web components such as servlets and custom tags

UNIT I  J2EE WEB COMPONENTS  9
J2EE Web Component Introduction, Servlet Overview, Supporting Perspectives for Developing J2EE Applications, Simple Registration Servlet, J2EE Container Services Overview, Servlet API (Part I), Library Case Study Flow, Building the Library Database, Parameter Servlet.

UNIT II  JAVA SERVER PAGES  9
Java Server Pages Overview, Java Server Pages Specifications and Syntax, Page Designer in Application Developer, Web Application Debugging, Servlet API (Part II), Web Archive Deployment Descriptor, Calling JSP Pages from a Servlet.

UNIT III  SESSION MANAGEMENT  9
Session State Storage Issues, Cookie API, Http Session: Management of Application Data, URL Rewriting, Session Management, Best Practices for Session Management.

UNIT IV  JAVA SERVER PAGES WITH JAVA BEANS  9
JavaBeans and the Model-View-Controller Pattern, Create a JavaBean, Java Server Pages with Java Beans, Combining Servlets, JSP Pages, and JavaBeans, JSP Expression Language, Using JSP Expression Language, JSP Custom Tags, JSP Tag Files, Servlet Filtering.

UNIT V  SERVLE LISTENERS  9

TOTAL: 45h

Course Outcome:
At the end of this course, the Student will be able to
- CO 1. Understand the fundamentals of J2EE web components
- CO 2. Acquire knowledge on session state storage issues and best practices for session management
- CO 3. Be familiar with the supporting perspectives for developing J2EE applications
- CO 4. Develop Java Server Pages with Java Beans
- CO 5. Understand how to combine servlets and configure a JSP to use tags
- CO 6. Install an Application in Web Sphere Application Server V6.1
- CO 7. Be aware of the server-side application development and web application security

TEXT BOOK:
IBM Course Material
Course Objective:
- To provide students with the fundamentals and essentials of cloud computing
- To understand the cloud computing services and tools in their life scenarios
- To learn IBM cloud computing architecture

UNIT I  INTRODUCTION TO CLOUD COMPUTING  9

UNIT II  SECURITY AND SERVICE MANAGEMENT  9
Security in cloud computing, IBM cloud computing architecture, Introduction to Service Management.

UNIT III  VIRTUALIZATION AND CLOUD MANAGEMENT  9

UNIT IV  CLOUD PERFORMANCE AND ISSUES  9
Customer Project Experiences & How to implement Cloud services, Considerations for Building Cloud services, Cloud Performance Considerations, Cloud Resiliency,

UNIT V  HYBRID CLOUDS  9
Cloud Service Metering, Accounting and Billing, Aspects of Hybrid Clouds, Disruptive Network Trends

TOTAL: 45h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the overview and service delivery models of cloud computing
CO 2. Acquire knowledge on IBM cloud computing architecture
CO 3. Understand the security features and service management in cloud computing
CO 4. Explain the considerations for building cloud services and cloud performance
CO 5. Be familiar with the underlying principles of cloud virtualization, cloud storage and data management
CO 6. Compare and analyze different cloud computing solutions
CO 7. Explain the aspects of hybrid clouds and disruptive network trends
CO 8. Develop and deploy cloud application for an enterprise

TEXT BOOK:
1. IBM Course Material
15ECS130  Enterprise Mobile application development using IBM Worklight  3 0 0 3

Course Objective:
- To learn the basics of IBM Worklight studio
- To develop, deploy and publish applications for mobile platforms using IBM Worklight mobile development platform

UNIT I  INTRODUCTION TO IBM WORKLIGHT  9
Mobile overview, Introduction to IBM Worklight, Overview of Worklight Studio, Developing and testing the user interface.

UNIT II  IBM WORKLIGHT CLIENT-SIDE DEVELOPMENT  9
IBM Worklight client-side development: Core APIs, IBM Worklight client-side development: Local storage APIs, Working with UI frameworks.

UNIT III  WORKLIGHT APIs  9
Worklight integration adapters, Native page and web page integration, Using Worklight native APIs.

UNIT IV  SECURITY IN MOBILE APPLICATION DEVELOPMENT  9
Security, Location services, Push notification.

UNIT V  APPLICATION TO DEVELOPMENT  9
Migrating an application from development to production, Team development, IBM Worklight Application Center.

TOTAL: 45h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the fundamentals of IBM Worklight studio
CO 2. Develop and test the user interface
CO 3. Acquire knowledge on IBM Worklight client-side development and API
CO 4. Use Worklight native APIs
CO 5. Understand the issues and handle security in mobile application development
CO 6. Develop and publish applications for mobile platforms
CO 7. Migrate an application from development to production.

TEXT BOOK:
IBM Course Material
Course Objective:

- To understand the core concept, role and scope of smart sensors in IOT
- To learn the fundamentals of Raspberry Pi and communication protocols between various IOT components

UNIT I  INTERNET OF THINGS - AN INTRODUCTION  9

UNIT II  ON TREK WITH JAVASCRIPT  9
On Trek with JavaScript - JS and testing waters, Node.js, installation on a Raspberry Pi

UNIT III  PROTOCOLS  9
Protocols - communication protocol between various IOT components – MQ Telemetry Transport, Node-RED – wiring various devices and APIs.

UNIT IV  IOT IN ACTION  9
IoT in Action – Developing IOT Applications on IBM Bluemix.

UNIT V  IOT - WHAT'S BREWING  9
IoT - What's Brewing, Case studies – Real Life examples.

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the role of sensors and actuators in Internet of Things
CO 2. Acquire knowledge on Raspberry Pi, Arduino and Edison
CO 3. Be familiar with JavaScript and testing waters
CO 4. Understand the working of different communication protocols between various IOT components
CO 5. Elaborate on wiring various devices and APIs
CO 6. Develop IOT applications on IBM Bluemix
CO 7. Understand the need of IOT in different sectors

TEXT BOOK:
IBM Course Material
15ECS132 Fundamentals of Enterprise Apps Development for Cloud Deployment

Course Objective:
- To learn the fundamentals of cloud computing
- To understand the application development using DevOps Service on Bluemix
- To learn the Bluemix services in mobility and Bigdata.

UNIT I INTRODUCTION TO BLUEMIX
Cloud computing overview, Consumption View – IaaS (Soft Layer), PaaS (IBM Bluemix), Blue Mix Architecture, Blue Mix Overview and Dashboard Setup and installations - Eclipse and CF plugins, Case Study 1: Building an Application from a Boilerplate in the Bluemix UI, Case Study 2: Deploying a Java web app that uses the PostGreSQL service with the IBM Bluemix Eclipse tools, Case Study 3: Building and Deploying the Java version with the IBM Bluemix Eclipse tools.

UNIT II DEVELOPMENT OF APPS USING BLUEMIX SERVICES
Registering Services in BluemixTM, Deploying a Node.js app that uses the MySQL service with command line tools, Build a Twitter Influencer Application in Bluemix, Building and Deploying the Node.js version with the IBM Bluemix Eclipse tools, Deploying the Python version with command line tools.

UNIT III DEVELOPMENT OF APPS USING DEV OPS SERVICES ON BLUE MIX
Overview of Dev Ops, Overview Bluemix DevOps Services, Part 1: Importing and deploying the application from DevOps, Part 2: (Optional) Updating the application, JEE Cloud Trader Benchmark Application on Bluemix that use performance analysis capabilities.

UNIT IV BLUEMIX SERVICES IN MOBILITY & BIG DATA
Overview of Services in the areas of Mobile Apps Development & Big Data

UNIT V DATA MANAGEMENT SERVICES
Building an Application with Mobile Backend as a Service (MBaaS) on Bluemix platform, Data Management service - Build an BI application using Map Reduce Service to perform analytics for Big Data Sets.

TOTAL: 45h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the Blue Mix Architecture and to exploit the Installation and setup procedures.
CO 2. Acquire knowledge on Building, Deploying a web application using PostGreSQL and IBM Bluemix.
CO 3. Be familiar with Bluemix DevOps Services
CO 4. Explore the different techniques in Mobile Apps Development & Big Data.
CO 5. Build an Application with Mobile Backend as a Service (MBaaS) on Bluemix platform.
CO 6. Build an BI application using Map Reduce Service.
CO 7. Perform analytics for Big Data Sets

TEXT BOOK:
IBM Course Material
Course Objective:
- To learn the security issues in transport and network layer
- To understand the fundamentals of firewalls and computer forensics
- To understand the process of analyzing and understanding the forensic data

UNIT I  NETWORK LAYER SECURITY & TRANSPORT LAYER SECURITY

UNIT II  E-MAIL SECURITY & FIREWALLS

UNIT III  INTRODUCTION TO COMPUTER FORENSICS

UNIT IV  EVIDENCE COLLECTION AND FORENSICS TOOLS

UNIT V  ANALYSIS AND VALIDATION
Validating Forensics Data – Data Hiding Techniques – Performing Remote Acquisition – Network Forensics – Email Investigations – Cell Phone and Mobile Devices Forensics

TOTAL: 45h

Course Outcome:
At the end of this course, the student will be able to
- CO 1. Gain in depth knowledge in the field of Computer forensics.
- CO 2. Be familiar and get skilled in Windows operating System.
- CO 4. Understand the importance and need for smart practices in computer investigation.
- CO 5. Know the ethical standards of the profession and apply those standards to all aspects of the study and practice of digital forensics.
- CO 6. Evaluate the effectiveness of available digital forensics tools and use them in a way that optimizes the efficiency and quality of digital forensics investigations.
- CO 7. Describe web and mobile device forensics.
TEXT BOOKS:

REFERENCES:

Syllabus

Generic Elective Courses
Course Objective:
- To understand the data and pulse communication techniques and to get familiarize with source and error control coding.
- To gain knowledge on multi-user radio communication.
- To learn analog and digital modulation techniques, communication receiver and transmitter design, line coding techniques, noise analysis, and multiplexing techniques.

UNIT I  FUNDAMENTALS OF ANALOG COMMUNICATION  9
Principles of amplitude modulation, AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation, AM Voltage distribution, AM power distribution, Angle modulation - FM and PM waveforms, phase deviation and modulation index, frequency deviation and percent modulation, Frequency analysis of angle modulated waves. Bandwidth requirements for Angle modulated waves.

UNIT II  DIGITAL COMMUNICATION  9
Introduction, Shannon limit for information capacity, digital amplitude modulation, frequency shift keying, FSK bit rate and baud, FSK transmitter, BW consideration of FSK, FSK receiver, phase shift keying – binary phase shift keying – carrier recovery – squaring loop, Costas loop, DPSK.

UNIT III  DIGITAL TRANSMISSION  9

UNIT IV  DATA COMMUNICATIONS  9
Introduction, History of Data communications, Standards Organizations for data communication, data communication circuits, data communication codes, Error control, Error Detection, Error correction, Data communication Hardware, serial and parallel interfaces, data modems, Asynchronous modem, Synchronous modem, low-speed modem, medium and high speed modem, modem control.

UNIT V  SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES  9
Introduction, Pseudo-noise sequence, DS spread spectrum with coherent binary PSK, processing gain, FH spread spectrum, multiple access techniques – wireless communication, TDMA and CDMA in wireless communication systems

TOTAL: 45h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Elaborate and explain about frequency spectrum, bandwidth, modulation index and power distribution of AM waves.
CO 2. Give the expression for frequency spectrum and Bandwidth
CO 3. Explain the principle of Angle modulation. Derive phase deviation, modulation index and frequency deviation.

CO 4. Derive the spectrum and bandwidth of FSK modulated waves.

CO 5. Explain the principle of FSK and DPSK with a neat diagram.

CO 6. Find the modulation index and bandwidth requirements in Analog communication

CO 7. Understand the modulation techniques in Digital communication

CO 8. Acquire knowledge on the principles of transmitter and receiver in Digital communication

CO 9. Be familiar with the concept of sampling, quantization and pulse code modulation

CO 10. Explain error correction and detection techniques in data communication

CO 11. Discuss spread spectrum and multiple access techniques.

TEXT BOOKS:


REFERENCE BOOKS:

Course Objective:

- To understand the methods of representation of systems and to desire their transfer function models.
- To provide adequate knowledge in the time response of systems and steady state error analysis.
- To accord basic knowledge in obtaining the open loop and closed-loop frequency responses of systems.
- To understand the concept of stability of control system and methods of stability analysis.
- To study the three ways of designing compensation for a control system.

UNIT I  SYSTEMS AND THEIR REPRESENTATION  9


UNIT II  TIME RESPONSE  9


UNIT III  FREQUENCY RESPONSE  9

Frequency response – Bode plot – Polar plot – Determination of closed loop response from open loop response – Correlation between frequency domain and time domain specifications.

UNIT IV  STABILITY OF CONTROL SYSTEM  9


UNIT V  COMPENSATOR DESIGN  9

Performance criteria – Lag, lead and lag-lead networks – Compensator design using bode plots.

TOTAL: 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Understand the method of representation of systems and its transfer function.

CO 2. Analyze the basic elements in control systems and function of open and closed systems and electrical and mechanical systems and its transfer function.

CO 3. Determine the time response of first and second order system, error coefficients and error series and steady state error.

CO 4. Plot the frequency response in bode and polar plot.

CO 5. Determine the closed loop response from open loop response and correlations between frequency domain and time domain representations.
CO 6. Find out the characteristics equation and locations of roots in S plane for stability and Routh Hurwitz criterions.

CO 7. Determine the pole, zero addition, gain margin and phase margin and nyquist stability criterions

CO 8. Understand the performance of Lag, lead and lag-lead networks.

TEXT BOOKS:

REFERENCE BOOKS:
1. Ogata, K. ‘Modern Control Engineering’, 5th edition, PHI, New Delhi, 2010
Course Objective:

- To understand the design linear discrete-time systems and filters and to analyze their behavior.
- To learn how to represent continuous-time signals and linear systems in discrete time, so that such signals can be recovered in continuous time when necessary.
- To compute approximations to Fourier transforms of continuous-time signals with finite discrete time methods.

UNIT I SIGNALS AND SYSTEMS
Basic elements of DSP – converting to analog to digital -concepts of frequency in Analog and Digital Signals – sampling theorem – Discrete – time signals, systems – Analysis of discrete time LTI systems – Z transform – Convolution (linear and circular) – Correlation

UNIT II FREQUENCY TRANSFORMATIONS

UNIT III IIR FILTER DESIGN
Structures of IIR –IIR filter issues- Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (HPF, BPF, BRF) filter design using frequency translation.

UNIT IV FIR FILTER DESIGN
Structures of FIR –FIR filter design specification -FIR filter in transposed structure- FIR filter design by optimization- Linear phase FIR filter – Filter design using windowing techniques Frequency sampling techniques – Finite word length effects in digital Filters.

UNIT V APPLICATIONS

TOTAL: 45 h

Course Outcome:
At the end of this course, the Student will be able to

CO 1. Understand the basic concepts of signals and systems.
CO 2. Be familiar with the different frequency transformation techniques.
CO 3. Learn the different algorithms and properties of DFT and FFT.
CO 4. Design and analyze the IIR filters.
CO 5. Design the digital FIR filter at the end of the course.
CO 6. Demonstrate the applications if FFT to digital signal processing at the end of the course.
CO 7. Understand the different algorithms related to adaptive filter.
CO 8. Create any filters using MATLAB by the end of the course

TEXT BOOKS:

REFERENCES:
Course Objective:

- To understand the basis of ATM and Frame relay concepts.
- To learn the various types of LAN’s and to know about their applications and techniques involved to support real-time traffic and congestion control in ATM.
- To understand the basis of ISA queuing discipline.

UNIT I     HIGH SPEED NETWORKS


UNIT II    CONGESTION AND TRAFFIC MANAGEMENT


UNIT III  TCP AND ATM CONGESTION CONTROL


UNIT IV    INTEGRATED AND DIFFERENTIATED SERVICES


UNIT V     PROTOCOLS FOR QOS SUPPORT


TOTAL: 45 h

Course Outcome:
At the end of this course, the Student will be able to

CO 1. Understand Asynchronous transfer modes, its architecture, logical connection, cell and service categories.
CO 2. Be familiar with High Speed LANs such as Fast Ethernet, Gigabit Ethernet and its applications.
CO 3. Perform queuing analysis for congestion control and traffic management.
CO 5. Familiar with the flow control, congestion control and performance of TCP over ATM.
CO 6. Understand the requirements, attributes, management framework and control of ABR and GFR traffic management.

CO 7. Be familiar with the architecture, approach. Components, services and queuing discipline of integrated services.

CO 8. Be familiar with multiprotocol label switching and stacking operations

TEXT BOOK:

REFERENCES:
Course Objective:
- To study microcontroller operations for robotics and the different interfaces to implement in a microcontroller.
- To learn how Microchip PIC micro PIC16F627 can be erased and reprogrammed.
- To learn how different sensors, outputs, and peripherals can be wired to a microcontroller to work cooperatively and create a high-level control program.
- To design robots in a real time environment.

UNIT I  SCOPE OF ROBOTS AND INTELLIGENCE  9


UNIT II  SOFTWARE DEVELOPMENT  9

Source files, object files, libraries, linkers and hex files – Assemblers – Interpreters – Compilers - Simulators and Emulators - Integrated development environments.

UNIT III  THE MICROCHIP PIC micro (R) MICROCONTROLLER  9

Different PIC micro MCU devices and features - Application development tools - Basic circuit requirements - The PIC16F627 - EL cheapo PIC micro programmer circuit.

UNIT IV  THE MICROCONTROLLER CONNECTIONS  9


UNIT V  BRINGING ROBOTS TO LIFE  9

Real time operating system (RTOS) – Example application running in an RTOS – State machines – Randomly moving a robot application with IR remote control - Behavioral programming - Neural networks and Artificial intelligence.

Total: 45h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the scope, definition and need for industrial robots
CO 2. Learn and plan robot tasks using artificial intelligence
CO 3. Acquire knowledge on assemblers, interpreters, compilers and simulators of software development
CO 4. Understand various PIC microcontrollers and their features
CO 5. Explain application development tools in PIC controllers
CO 6. Understand the basics of Robot C programming
CO 7. Use different IR, ultrasonic, light and sound sensors in robots
CO 8. Apply neural networks and artificial intelligence to activate robots and function like a human being

TEXT BOOK:

REFERENCES:
Course Objective:

- To introduce the difference between embedded systems and general purpose systems.
- To learn how to optimize hardware designs of custom single-purpose processors.
- To study the different approaches in optimizing general-purpose processors and to introduce different peripheral interfaces to embedded systems.
- To understand the design tradeoffs made by different models of embedded systems.

UNIT I  EMBEDDED COMPUTING  9

UNIT II  MEMORY AND INPUT / OUTPUT MANAGEMENT  9

UNIT III  PROCESSES AND OPERATING SYSTEMS  9
Multiple tasks and processes – Context switching – Scheduling policies – Inter process communication-IPC unicast and multicast-message passing- Cooperating Processes –purpose of IPC-inter process methods-inter process mechanisms – Performance issues.

UNIT IV  EMBEDDED SOFTWARE  9

UNIT V  EMBEDDED SYSTEM DEVELOPMENT  9
Design issues and techniques – Control System Modeling and Design- embedded system development experience- Exemplary embedded system- Embedded system development methodology-Electronic Design and Analysis -Case studies – Complete design of example embedded systems.

TOTAL: 45 h

Course Outcome:
At the end of this course, the Student will be able to

CO 1. Understand the design process and challenges involved in embedded system
CO 2. Classify the architecture and memory organization of the microcontroller
CO 3. Identify the source of interrupt and handle it
CO 4. Understand the different input and output memory devices and their interfacing
CO 5. Identify the purpose of inter process, its methods, mechanisms and performance issues
CO 6. Acquire knowledge on embedded software development tools using emulators and debuggers
CO 7. Model and design control systems with different techniques
CO 8. Understand and analyze the development methodology of embedded system

TEXT BOOKS:

REFERENCES:
Course Objective:

- To have a clear understanding of the managerial functions like planning, organizing, staffing, leading and controlling.
- To study the evolution of management
- To study the functions and principles of management
- To learn the application of the principles in an organization
- To learn the engineering ethics and human values

UNIT I

OVERVIEW OF MANAGEMENT


UNIT II

PLANNING & ORGANIZING


UNIT III

DIRECTING & CONTROLLING


UNIT IV

ENGINEERING ETHICS & HUMAN VALUES


UNIT V

SAFETY RESPONSIBILITIES AND RIGHTS

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the management roles, skills and evolution of the management in global scenario.
CO 2. Know the functions and principles of management
CO 3. Understand the planning, organizing, directing and controlling system of the management.
CO 4. Identify and analyze the ethical issue in the subject matter under investigation.
CO 5. Understand the own ethical values and the social context problems.
CO 6. Identify the ethical concerns in research and intellectual contexts including academic integrity.
CO 7. Know the importance of yoga and meditation for professional excellence and stress management

TEXT BOOKS:

REFERENCE BOOKS:
FUNDAMENTALS OF NANO SCIENCE

Course Objective:

- To learn the basic concepts of nano science and nanotechnology and their applications in various fields of Science and Engineering.
- To understand the scope of nano materials potential use in products manufactured by various industries.

UNIT I INTRODUCTION

Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering-Classifications of nanostructured materials- nano particles- quantum dots,nanowires-ultra-thinfilms-multilayered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties. Introduction to properties and motivation for study (qualitative only).

UNIT II PREPARATION METHODS

Bottom-up Synthesis-Top-down Approach: Precipitation, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE.

UNIT III PATTERNING AND LITHOGRAPHY FOR NANOSCALE DEVICES

Introduction to optical/UV electron beam and X-ray Lithography systems and processes-transmission of mask fature-lithography electron range-steps in the mask fabrication-steps in photo lithography- Wet etching, dry (Plasma /reactive ion) etching, Etch resists-dip pen lithography

UNIT IV PREPARATION ENVIRONMENTS

Clean rooms: specifications and design, air and water purity, requirements for particular processes, Vibration free environments: Services and facilities required. Working practices, sample cleaning, Chemical purification, chemical and biological contamination, Safety issues, flammable and toxic hazards, biohazards.

UNIT V CHARECTERISATION TECHNIQUES


TOTAL: 45 h

Course Outcome:

At the end of this course, the Student will be able to

CO1: Acquire knowledge on nanotechnology principles and industrial Applications.
CO2: Understand the Nano-scale paradigm in terms of properties at the Nano-scale dimensions.
CO3: Explain the concept of materials science, chemistry, physics, biology and engineering.
CO4: Assess the current nanotechnology solutions in design, engineering and manufacturing.
CO5: Determine patterning and lithography for Nano-scale devices.
CO6: Describe UV electron beam and x-ray lithography system process
CO7: Understand the technology issues that may impede the adoption of nanotechnology.
CO8: Identify career paths and skills for career changes towards Nanotechnology.
CO9: Illustrate the latest characterization techniques.
CO10: Describe the surface analysis techniques such as AFM, SPM, STM, SNOM, ESCA, SIMS.

TEXT BOOKS:

REFERENCE:
Course Objective:
- To know how to protect the rights of the university, its innovators, inventors, research sponsors and the public.
- To learn how to eliminate the infringement, improper exploitation and abuse of the university's intellectual assets.

UNIT I INTRODUCTION
Introduction – Invention and Creativity – Intellectual Property (IP) – Importance – Need for IPR - Protection of IPR - IPR in India – Genesis and Development IPR in abroad - some important examples of IPR – Basic types of property (i). Movable Property - Immovable Property and - Intellectual Property- Competing Rationales for Protection of Intellectual Property Rights

UNIT II APPLICATIONS OF IP
IP – Patents- Procedure for Opposition- Revocation of Patents - Ownership and Maintenance of Patents - Assignment and licensing of Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark registration – Definitions – Industrial Designs and Integrated circuits – Protection of Geographical Indications at national and International levels – Application Procedures -

UNIT III IP ESSENTIALS

UNIT IV GLOBAL PERSPECTIVE

UNIT V TRENDS IN IP
Case Studies on – Patents (Basumati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade Marks – Industrial design and Integrated circuits – Geographic indications– Protection against unfair competition- India’s IP regime – Development- Legislation- International Searching Authority and International Preliminary Examining Authority- IPR on Internet.

TOTAL: 45 h
**Course Outcome:**
At the end of this course, the Student will be able to

CO 1. Understand the Importance and Need for IPR
CO 2. Assess different types of intellectual property rights
CO 3. Explain the concept of patent, Ownership and Maintenance of Patents
CO 4. Discuss TRIPS Agreement, Copyright and Related Rights
CO 5. Create Layout-Designs (Topographies) of Integrated Circuits and implement.
CO 6. Differentiate between Indian Position Vs WTO in global perspective
CO 7. Define the principles of Global Value of Digital Piracy
CO 8. Acquire knowledge about Industrial design and Integrated circuits
CO 9. Illustrate International Searching Authority and International Preliminary Examining Authority

**TEXT BOOK:**

**REFERENCES:**
Course Objective:

- To understand various legal principles, and to get familiarize with the concept of judicial activism.
- To know the public interest litigation that is often used in environmental cases.
- To understand how courts influence environmental decision making in India.

UNIT I INTRODUCTION


UNIT II UNION GOVERNMENT


UNIT III STATE GOVERNMENT


UNIT IV FEDERAL SYSTEM


UNIT V SOCIOLOGY

Society : Nature, Meaning and definition; Indian Social Structure; Caste, Religion, Language in India; Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections- Women’s Movement in India before and after Independence- personal troubles and public and social problems.

Total: 45h

Course Outcome:

At the end of this course, the Student will be able to

CO 1. Discuss Philosophical foundations of the Indian Constitution
CO 2. Provide Knowledge on Fundamental Rights and Fundamental Duties
CO 3. Understand the Structures of the Union Government and Functions
CO 4. Determine the Government Response to Changing Political Scenario
CO 5. Demonstrate the Structure and Functions of state Government
CO 6. Explain the principles of Welfare State and Development.
CO 7. Understand the concept of Indian Federal System
CO 8. Assess the working of the Parliamentary System in India
CO 9. Identify the Constitutional Remedies for citizens
CO 10. Discuss Women’s Movement in India before and after Independence

TEXT BOOKS:

REFERENCES:
1. Sharma, Brij Kishore, "Introduction to the Constitution of India;", Prentice Hall of India, New Delhi. 2015
Course Objective:

To enable students to understand the fundamental economic concepts applicable to engineering and to learn the techniques of incorporating inflation factor in economic decision making.

UNIT I  INTRODUCTION TO ECONOMICS  8

UNIT II  VALUE ENGINEERING  10
Make or buy decision, Value engineering – Function, aims, Value engineering procedure. Interest formulae and their applications – Time value of money, Single payment compound amount factor, Single payment present worth factor, Equal payment series sinking fund factor, Equal payment series payment Present worth factor- equal payment series capital recovery factor – Uniform gradient series annual equivalent factor, Effective interest rate, Examples in all the methods.

UNIT III  CASH FLOW  9
Methods of comparison of alternatives – present worth method (Revenue dominated cash flow diagram), Future worth method (Revenue dominated cash flow diagram, cost dominated cash flow diagram), Annual equivalent method (Revenue dominated cash flow diagram, cost dominated cash flow diagram), rate of return method, Examples in all the methods.

UNIT IV  REPLACEMENT AND MAINTENANCE ANALYSIS  9
Replacement and Maintenance analysis – Types of maintenance, types of replacement problem, determination of economic life of an asset, Replacement of an asset with a new asset – capital recovery with return and concept of challenger and defender, Simple probabilistic model for items which fail completely.

UNIT V  DEPRECIATION  9

TOTAL: 45h

Course Outcome:

At the end of this course, the Student will be able to
CO 1. Understand the basics of Engineering Economics
CO 2. Acquire knowledge on Value Engineering procedure
CO 3. Familiarize with different categories of Equal payment series.
CO 4. Analyze the various categories of Cash Flow Diagram
CO 5. Explain the principles of Replacement and Maintenance analysis
CO 6. Differentiate multiple methods of depreciation
CO 7. Evaluate Simple probabilistic model for items which fail completely

TEXT BOOK:

REFERENCES:
Course Objective:
To provide knowledge and training in using optimization techniques under limited resources for the engineering and business problems.

UNIT I  LINEAR MODELS
The phase of an operation research study - Linear programming - Graphical method - Simplex algorithm - Duality formulation - Sensitivity analysis.

UNIT II  TRANSPORTATION MODELS AND NETWORK MODELS

UNIT III  INVENTORY MODELS
Inventory models - Economic order quantity models - Quantity discount models - Stochastic inventory models - Multi product models - Inventory control models in practice.

UNIT IV  QUEUEING MODELS
Queueing models - Queueing systems and structures - Notation parameter - Single server and multi server models - Poisson input - Exponential service - Constant rate service - Infinite population - Simulation.

UNIT V  DECISION MODELS

TOTAL: 45h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the fundamentals of Linear model
CO 2. Solve the real time problems using optimization techniques
CO 3. Acquire knowledge on transportation assignment, network and sequencing models.
CO 4. Solve various problems such as Inventory models, Queuing model and Decision model.
CO 5. Understand the working principle of dynamic programming

TEXT BOOK:
REFERENCES:
Course Objective:
To facilitate the understanding of Quality Management principles and process.

UNIT I  INTRODUCTION  9

UNIT II  TQM PRINCIPLES  9
Leadership – Strategic quality planning, Quality Councils – Employee involvement – Motivation, Empowerment, Team and Teamwork, Quality circles Recognition and Reward, Performance appraisal – Continuous process improvement – PDCA cycle, 5S, Kaizen – Supplier partnership – Partnering, Supplier selection, Supplier Rating.

UNIT III  TQM TOOLS AND TECHNIQUES I  9

UNIT IV  TQM TOOLS AND TECHNIQUES II  9

UNIT V  QUALITY SYSTEMS  9

TOTAL: 45h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the basics of Total Quality Management System.
CO 2. Be Familiar with Customer focus, orientation, satisfaction, complaints and retention
CO 3. Acquire knowledge on Employee involvement, Motivation and Empowerment
CO 5. Analyze Bench marking process and its different stages
CO 6. Utilize Total Quality Management Tools and Techniques
CO 7. Understand the need for ISO9000 and its principles
TEXT BOOK:

REFERENCES:
Course Objective:
- To understand different methods used for the simplification of Boolean functions.
- To design and implement Combinational circuits, synchronous sequential circuits and asynchronous sequential circuits.
- To study the fundamentals of VHDL / Verilog HDL

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES

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

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

UNIT IV SYNCHRONOUS SEQUENTIAL LOGIC
Sequential circuits – Flip flops – Analysis and design procedures - State reduction and state assignment - Shift registers – Counters – HDL for Sequential Circuits.

UNIT V ASYNCHRONOUS SEQUENTIAL LOGIC
Analysis and design of asynchronous sequential circuits - Reduction of state and flow tables – Race-free state assignment – Hazards- ASM Chart.

TOTAL: 45 h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Understand the various number systems and perform arithmetic operations in them
CO 2. Analyze Boolean expression using K-Map and tabulation techniques
CO 3. Understand different methods used for simplification of Boolean functions
CO 4. Use Boolean simplification technique to design a combinational hardware circuit
CO 5. Design and analyze combinational circuits
CO 6. Implement synchronous and asynchronous sequential circuits
CO 7. Reduce state tables and assign states
CO 8. Write programs in HDL for combinational and sequential circuits
TEXT BOOK:

REFERENCE BOOKS:
Syllabus

Skill Enhancement Elective Courses
UNIT I  SOFT SKILLS I
Introduction to Personality Development – Meaning-Features of personality-Dimensions of Personality-Determinants of Personality-Features and Traits- Components of self concept-Barriers-Self analysis

UNIT II  SOFT SKILLS II
Importance of Soft Skills – First impression-Work Place requirements-Discipline-Cleanliness-Hygiene-general Appearance--Building Confidence—Concept of Thinking and Usage-Value of Time-Focus & Commitment.

UNIT III  SOFT SKILLS IN ACTION
Grooming – Attire – Understanding others- – Stability & Maturity Development – Strength s – Weakness – Opportunities-threats -Merits of SWOT Analysis-Components-how to convert weakness into strengths-Goal settings

UNIT IV  SELF AWARENESS AND SELF ESTEEM
Definitions-Components of self awareness-Developing Self awareness-Self esteem-meaning-Steps to improve self esteem

UNIT V  SELF MOTIVATION

Total: 30 h

Course Outcome:
At the end of this course, the Student will be able to

CO 1. Develop interpersonal skills and be an effective goal oriented team player.
CO 2. Develop professionals with idealistic, practical and moral values.
CO 3. Develop communication and problem solving skills.
CO 4. Re-engineer attitude and understand its influence on behavior.
CO 5. Enhance the holistic development and improve their employability skills.
CO 6. Emerge from a process of reflection on the essential contents of a course.
CO 7. Focus on the application and integration of acquired knowledge and skills.

REFERENCES
1. Personality Development And Soft Skills---Barun K Mitra, Oxford Publication
2. Seven habits of Highy Effective people – Stephen R. covey
3. Emotion, motivation and Self regulation - Nathan C. Hall , McGill University, Canada, Thomas Goetz, University of Konstanz, Germany
UNIT I Soft Skills III
Basic Etiquette – Email etiquette – Business etiquette – Telephone etiquette – Meeting etiquette – Adjustment of Role & Leadership – Team Management & Development

UNIT II QUANTITATIVE APTITUDE I
Percentage – Profit Loss -Discount – Ratio Proportion – Time & Work – Time, Speed &Distance. Problems relating to ages- Permutation & Combination -Probability

UNIT III QUANTITATIVE APTITUDE II
Mensuration Clocks and Calendars - Boats-Simple Interest – Compound Interest- Fractions and Decimals – Square roots – Functions.

UNIT IV ANALYTICAL PROBLEMS

UNIT V LOGICAL PROBLEMS

TOTAL: 30h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Develop the confidence & skills to interact with the business environment and at networking events & client functions in a manner that enhances the Company Brand.
CO 2. Engage with clients & colleagues in a polished and professional manner, ensuring positive first & last impressions.
CO 3. Master effective email structures to achieve clarity and successful communication.
CO 4. Recognize a variety of leadership theories
CO 5. Demonstrate the ability to use theories in the practice of leadership.
CO 6. Display the critical thinking skills and abilities to lead others toward common goals.
CO 7. Demonstrate an understanding of group dynamics and effective teamwork.
CO 8. Think reflectively and to convey thoughts and feelings.
CO 9. Communicate effectively in a range of group sizes and across multiple media types.
Establish and maintain trust in others to complete projects and tasks.

REFERENCE BOOKS
1. Personality Enrichment – K R Dhanalakshmi And N S Raghunathan, Margham Publications
2. Personality Development – Dr V M Selvaraj Bhavani Publications
3. Quantitative Aptitude – R. S Aggarwal
4. Logical and Analytical Reasoning (English) 30th Edition – A.K Gupta
UNIT I VERBAL APPTITUDE I

UNIT II VERBAL APPTITUDE II
Singular/plural-present tense/past tense—genders - Prepositions-conjunctions-Choice of words—simple sentences—compound sentences- summarising phrases—Synonyms—Antonyms— Analogies—Similar Words

UNIT III SOFT SKILLS IV
Attitude—Meaning - Features of attitude-Formation-Personality Factors-Types of attitude-change in attitude-Developing Positive attitude.

UNIT IV TIME MANAGEMENT
Definition –Meaning-Importance, Value of time as an important resource- comparison of Time and Money-Circle of influence and circle of control—Definition of URGENT and IMPORTANT—Time Wasters and how to reduce—Procrastination—meaning and impact- 4 Quadrants.

UNIT V TEAM BUILDING
Meaning—Aspects of team building—Process of team building—Types of Teams-Team ethics and Understanding-Team trust and commitment

TOTAL: 30h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Collect and analyze data for the purpose of resolving an issue(s) directly related to organizational behavior.
CO 2. Undertake complete and submit a project using appropriate planning, methodological, evaluative and presentation techniques.
CO 3. Develop a range of core (or transferable) skills, including: communication - orally and in writing problem – solving learning to learn (use of resources) and team-working.
CO 4. Understand the benefits of positive thinking and how negative thinking weakens and disempowers.
CO 5. Create a mission statement to identify their long term goals.
CO 6. Design believable positive affirmations to support them through troubled times.
CO 7. Identify characteristics of successful people.
Identify why some people seem to be more positive.

REFERENCE BOOKS
4. Personality Development --Dr V M Selvaraj, Bhavani Publications
UNIT I Soft SKILLS V 6
Assertiveness—Meaning—Importance of assertiveness—Characteristics of assertive communication—Merits—forms of assertion—Causes of misunderstanding

UNIT II Communication Skills 6
Meaning—Elements of communication—Functions of communication—Principles of communication—Formal and Informal communication—Barriers in Communication—Characteristics of good communication—Feedback—communication systems.

UNIT III Presentation Skills I 6
Meaning—Importance of Presentation—Concept of 5 w’s and one H—understanding the audience—Types of presentations—How to make effective presentation

UNIT IV Presentation Skills II 6
Use of slide, PPT’s.and visuals—Rules for slide presentation—precautions —seminars and conferences—Steps to eliminate Stage fear.

UNIT V Change Management 6

TOTAL: 30h

Course Outcome:
At the end of this course, the Student will be able to
CO 1. Create effective presentations and determine primary and secondary objectives.
CO 2. Build a presentation, develops an introduction, capture the audience attention, organize the body of the presentation, use transitions, and conclude the presentation.
CO 3. Use a presentation process, prepare before speaking in a presentation, deliver a presentation, and use nonverbal communication aids.
CO 4. Handle the questions effectively, approach the question-and-answer session, responsibilities during a session, and handle challenging questions.
CO 5. Persuade a presentation, understand the goals of persuasion, organize a persuasive presentation, and use the methods of persuasion.
CO 6. Incorporate, understand and create the types of visual aids
CO 7. understand the difference between leadership and management.
CO 8. Empower, motivate and inspire others.
CO 9. Gain insight into your patterns, beliefs and rules.
CO 10. Understand good leadership behaviors.
REFERENCE BOOKS:

2. Who Moved My Cheese by Spencer Johnson published by Vermilion first edition
Unit-01 Introduction and basic concepts of NSS

Unit-02 NSS Programs and activities
Concept of regular activities- special camping-day camps-Basis of adoption of village/slums, Methodology of conducting survey-Financial pattern of the scheme- other youth program/schemes of GOI- Coordination with different agencies- Maintenance of the dairy

Unit-03 Understanding youth
Youth: Definition, profile of youth, categories – youth: Issues, challenges and opportunities - Youth as an agent of social change.

Unit-04 Community Mobilization
Mapping of community stakeholders-Designing the message in the context of the problem and the culture of the community-Identifying methods of mobilization-Youth adult partnership

Unit-05 Volunteerism and Shramdan
Indian Tradition of volunteerism-Needs & Importance of volunteerism- Motivation and constraints of volunteerism-Shramdan as a part of volunteerism.

TOTAL: 30h
Unit-01 Importance and Role of youth leadership
Meaning and types of leadership-Qualities of good leaders; traits of leadership- Importance and role of youth leadership

Unit-02 Life competencies
Definition and importance of life competencies-Communication- Inter personal- Problem solving and decision-making

Unit-03 Social harmony and National Integration
Indian history and culture-Role of youth in peace-building and conflict resolution- Role of youth in Nation building

Unit-04 Youth development programmes in India
National youth policy-Youth development programmes at the National level,state level and voluntary sector-Youth focused and youth-led organization

Conducting surveys on special theme and preparing a report thereof.

TOTAL: 30h
Unit-01 Citizenship
Basic features of constitution of India-Fundamental Rights and duties- Human rights- Consumer awareness and the legal rights of consumer- RTI

Unit-02 Family and society
Concept of family-community(PRIs and community-based organization) and society-Growing up in the family-dynamics and impact-Human values-Gender justice

Unit-03 Health, Hygiene & sanitation
Health Education Definition, needs and scope-Food and nutrition- Safe drinking water- water born diseases and sanitation(Swachh Bharath Abhiyan)-National Health Programme- Reproductive health

Unit-04 Youth health
Healthy Lifestyles-HIV AIDS, Drugs and substance abuse- Home nursing- First aid .

Unit-05 Youth and Yoga
Yoga: History, philosophy and concept-Myths and misconceptions about yoga- Different yoga traditions and their impact-Yoga as a preventive,promotive and curative method- Yoga as a tool for healthy lifestyle

Preparation of research project report.

TOTAL: 30h
Unit-01 Environment issues 7
Environment: conservation, enrichment and sustainability-Climate change- Waste management- Natural resource management(Rainwater harvesting, energy conservation, wasteland development, soil conservations and afforestation)

Unit-02 Disaster management 7
Introduction to Disaster management-classification of disasters-Role of youth in disaster management

Unit-03 Project Cycle Management 8
Project planning-Project implementation- Project monitoring- Project evaluation-Impact Assessment

Unit-04 Documentation and reporting 8
Collection and analysis of data- Preparation of Documentation/Reports- Dissemination of documents/Reports
Workshops/seminars on personality development and improvement of communication skills.

TOTAL: 30h
Unit-01 Vocational skill development 15
This unit will aim to enhance the employment potential of the NSS volunteers- alternately to help them to set up small business enterprises. For this purpose, a list of 12-15 vocational skills will be drawn up ,based on local conditions and opportunities - Each volunteer will have the option to select two skill-areas out of this list-one such skill in each semester-The education institution (or the university)will make arrangements for developing these skills in collaboration with established agencies that possess the necessary expertise in the related vocational skills.

Unit-02 Entrepreneurship Development 8
Definitions & meaning- Qualities of good Entrepreneur- Steps/ways in opening an enterprise- Role of financial and support service Institutions.

Unit-03: Youth and crime 7
Sociological and Psychological Factors influencing youth crime- Peer monitoring in preventing crimes Awareness about Anti-Ragging -Cyber Crime and its prevention- Juvenile justice

TOTAL: 30h
Unit-01 Vocational skill development 15
This unit will aim to enhance the employment potential of the NSS volunteers- alternately to help them to set up small business enterprises. For this purpose, a list of 12-15 vocational skills will be drawn up ,based on local conditions and opportunities-Each volunteer will have the option to select two skill-areas out of this list-one such skill in each semester-The education institution (or the university)will make arrangements for developing these skills in collaboration with established agencies that possess the necessary expertise in the related vocational skills.

Unit-02 Civil/Self defense 5
Civil defense services-aims and objectives of civil defense - Needs for Self defense training

Unit-03 Resource Mobilisation 3
Writing a project proposal- Establishment of SFUs

Unit-04 Additional life skills 7
Positive thinking- Self confidence and self esteem- Setting life goals and working to achieve them-Management of stress including time management.

TOTAL: 30h