ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
B.TECH INFORMATION TECHNOLOGY
REGULATIONS – 2017
CHOICE BASED CREDIT SYSTEM

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

1. To ensure graduates will be proficient in utilizing the fundamental knowledge of basic sciences, mathematics and Information Technology for the applications relevant to various streams of Engineering and Technology.

2. To enrich graduates with the core competencies necessary for applying knowledge of computers and telecommunications equipment to store, retrieve, transmit, manipulate and analyze data in the context of business enterprise.

3. To enable graduates to think logically, pursue lifelong learning and will have the capacity to understand technical issues related to computing systems and to design optimal solutions.

4. To enable graduates to develop hardware and software systems by understanding the importance of social, business and environmental needs in the human context.

5. To enable graduates to gain employment in organizations and establish themselves as professionals by applying their technical skills to solve real world problems and meet the diversified needs of industry, academia and research.

PROGRAM OUTCOMES (POs)

ENGINEERING GRADUATES WILL BE ABLE TO:

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

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

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.

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.

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.

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.
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.

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

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

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.

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.

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 OBJECTIVES (PSOs)**

1. To create, select, and apply appropriate techniques, resources, modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

2. To manage complex IT projects with consideration of the human, financial, ethical and environmental factors and an understanding of risk management processes, and operational and policy implications.
### MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES
A broad relation between the programme objective and the outcomes is given in the following table.

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### MAPPING OF PROGRAM SPECIFIC OBJECTIVES WITH PROGRAMME OUTCOMES
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AFFILIATED INSTITUTIONS
B.TECH INFORMATION TECHNOLOGY
REGULATIONS – 2017
CHOICE BASED CREDIT SYSTEM
I - VIII SEMESTERS CURRICULA AND SYLLABI

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PROFESSIONAL ELECTIVES (PE)

SEMESTER VI

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*Professional Electives are grouped according to elective number as was done previously.*

### EMPLOYABILITY ENHANCEMENT COURSES (EEC)

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OBJECTIVES:
- To develop the basic reading and writing skills of first year engineering and technology students.
- To help learners develop their listening skills, which will, enable them listen to lectures and comprehend them by asking questions; seeking clarifications.
- To help learners develop their speaking skills and speak fluently in real contexts.
- To help learners develop vocabulary of a general kind by developing their reading skills.

UNIT I  SHARING INFORMATION RELATED TO ONESELF/FAMILY& FRIENDS  12

UNIT II  GENERAL READING AND FREE WRITING  12
Reading- comprehension-pre-reading-post reading- comprehension questions (multiple choice questions and/or short questions/ open-ended questions)- inductive reading- short narratives and descriptions from newspapers including dialogues and conversations (also used as short Listening texts)- register. Writing- paragraph writing- topic sentence- main ideas- free writing, short narrative descriptions using some suggested vocabulary and structures –Listening- telephonic conversations. Speaking – sharing information of a personal kind—greeting – taking leave- Language development – prepositions, conjunctions. Vocabulary development- guessing meanings of words in context.

UNIT III  GRAMMAR AND LANGUAGE DEVELOPMENT  12
Reading- short texts and longer passages (close reading) Writing- understanding text structure- use of reference words and discourse markers-coherence-jumbled sentences Listening – listening to longer texts and filling up the table- product description- narratives from different sources. Speaking- asking about routine actions and expressing opinions. Language development- degrees of comparison- pronouns- direct vs indirect questions. Vocabulary development – single word substitutes- adverbs.

UNIT IV  READING AND LANGUAGE DEVELOPMENT  12
Reading- comprehension-reading longer texts- reading different types of texts- magazines Writing- letter writing, informal or personal letters- e-mails-conventions of personal email- Listening- listening to dialogues or conversations and completing exercises based on them. Speaking- speaking about oneself- speaking about one’s friend. Language development- Tenses- simple present-simple past-present continuous and past continuous. Vocabulary development- synonyms-antonyms- phrasal verbs.
UNIT V EXTENDED WRITING

Reading- longer texts- close reading – Writing- brainstorming -writing short essays – developing an outline- identifying main and subordinate ideas- dialogue writing -Listening – listening to talks- conversations- Speaking – participating in conversations- short group conversations -Language development- modal verbs- present/ past perfect tense - Vocabulary development- collocations- fixed and semi-fixed expressions

TOTAL: 60 PERIODS

OUTCOMES:
At the end of the course, learners will be able to:
- Read articles of a general kind in magazines and newspapers.
- Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
- Comprehend conversations and short talks delivered in English
- Write short essays of a general kind and personal letters and emails in English.

TEXT BOOKS:

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

MA8151 ENGINEERING MATHEMATICS – I

OBJECTIVES:
The goal of this course is to achieve conceptual understanding and to retain the best traditions of traditional calculus. The syllabus is designed to provide the basic tools of calculus mainly for the purpose of modelling the engineering problems mathematically and obtaining solutions. This is a foundation course which mainly deals with topics such as single variable and multivariable calculus and plays an important role in the understanding of science, engineering, economics and computer science, among other disciplines.

UNIT I DIFFERENTIAL CALCULUS

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules - Maxima and Minima of functions of one variable.
UNIT II  FUNCTIONS OF SEVERAL VARIABLES  12

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

UNIT IV  MULTIPLE INTEGRALS  12

UNIT V  DIFFERENTIAL EQUATIONS  12

TOTAL: 60 PERIODS

OUTCOMES :
After completing this course, students should demonstrate competency in the following skills:
- Use both the limit definition and rules of differentiation to differentiate functions.
- Apply differentiation to solve maxima and minima problems.
- Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
- Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
- Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.
- Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
- Apply various techniques in solving differential equations.

TEXT BOOKS :
2. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 7th Edition, New Delhi, 2015. [For Units I & III - Sections 1.1, 2.2, 2.3, 2.5, 2.7(Tangents problems only), 2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1(Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem), 5.5, 7.1 - 7.4 and 7.8].

REFERENCES :
OBJECTIVES:

- To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering and Technology.

UNIT I PROPERTIES OF MATTER


UNIT II WAVES AND FIBER OPTICS


UNIT III THERMAL PHYSICS


UNIT IV QUANTUM PHYSICS


UNIT V CRYSTAL PHYSICS

Single crystalline, polycrystalline and amorphous materials – single crystals: unit cell, crystal systems, Bravais lattices, directions and planes in a crystal, Miller indices – inter-planar distances - coordination number and packing factor for SC, BCC, FCC, HCP and diamond structures - crystal imperfections: point defects, line defects – Burger vectors, stacking faults – role of imperfections in plastic deformation - growth of single crystals: solution and melt growth techniques.

TOTAL : 45 PERIODS

OUTCOMES:

Upon completion of this course,

- The students will gain knowledge on the basics of properties of matter and its applications,
- The Students Will Acquire Knowledge On The Concepts Of Waves And Optical Devices And Their Applications in fibre optics,
- The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,
- The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and
- The students will understand the basics of crystals, their structures and different crystal growth techniques.
TEXT BOOKS:

REFERENCES:

CY8151
ENGINEERING CHEMISTRY

OBJECTIVES:
- To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
- To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
- Preparation, properties and applications of engineering materials.
- Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
- Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.

UNIT I  WATER AND ITS TREATMENT

UNIT II  SURFACE CHEMISTRY AND CATALYSIS

UNIT III  ALLOYS AND PHASE RULE
UNIT IV  FUELS AND COMBUSTION

UNIT V  ENERGY SOURCES AND STORAGE DEVICES
Nuclear fission - controlled nuclear fission - nuclear fusion - differences between nuclear fission and fusion - nuclear chain reactions - nuclear energy - light water nuclear power plant - breeder reactor - solar energy conversion - solar cells - wind energy. Batteries, fuel cells and supercapacitors: Types of batteries – primary battery (dry cell) secondary battery (lead acid battery, lithium-ion-battery) fuel cells – H₂-O₂ fuel cell.

TOTAL: 45 PERIODS

OUTCOMES:
• The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.

TEXT BOOKS:

REFERENCES:

GE8151  PROBLEM SOLVING AND PYTHON PROGRAMMING

OBJECTIVES:
• To know the basics of algorithmic problem solving
• To read and write simple Python programs.
• To develop Python programs with conditionals and loops.
• To define Python functions and call them.
• To use Python data structures — lists, tuples, dictionaries.
• To do input/output with files in Python.
UNIT I  ALGORITHMIC PROBLEM SOLVING  
Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.

UNIT II  DATA, EXPRESSIONS, STATEMENTS  
Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

UNIT III  CONTROL FLOW, FUNCTIONS  
Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

UNIT IV  LISTS, TUPLES, DICTIONARIES  
Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: selection sort, insertion sort, mergesort, histogram.

UNIT V  FILES, MODULES, PACKAGES  
Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file.

OUTCOMES:
Upon completion of the course, students will be able to
- Develop algorithmic solutions to simple computational problems
- Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python Programs.

TOTAL : 45 PERIODS

TEXT BOOKS:
REFERENCES:

GE8152 ENGINEERING GRAPHICS L T P C
2 0 4 4

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

CONCEPTS AND CONVENTIONS (Not for Examination)
Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT I PLANE CURVES AND FREEHAND SKETCHING 7+12
Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves. Visualization concepts and Free Hand sketching: Visualization principles – Representation of Three Dimensional objects – Layout of views- Freehand sketching of multiple views from pictorial views of objects

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACE 6+12
Orthographic projection- principles-Principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT III PROJECTION OF SOLIDS 5+12
Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method.

UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES 5+12
Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones.

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UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS 6+12
Principles of isometric projection – isometric scale – Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones - combination of two solid objects in simple vertical positions - Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method.

TOTAL: 90 PERIODS

OUTCOMES:
On successful completion of this course, the student will be able to
- Familiarize with the fundamentals and standards of Engineering graphics
- Perform freehand sketching of basic geometrical constructions and multiple views of objects.
- Project orthographic projections of lines and plane surfaces.
- Draw projections and solids and development of surfaces.
- Visualize and to project isometric and perspective sections of simple solids.

TEXT BOOKS:

REFERENCES:

Publication of Bureau of Indian Standards:

Special points applicable to University Examinations on Engineering Graphics:
1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day
OBJECTIVES
- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python.

LIST OF PROGRAMS
1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton’s method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Linear search and Binary search
6. Selection sort, Insertion sort
7. Merge sort
8. First n prime numbers
9. Multiply matrices
10. Programs that take command line arguments (word count)
11. Find the most frequent words in a text read from a file
12. Simulate elliptical orbits in Pygame
13. Simulate bouncing ball using Pygame

PLATFORM NEEDED
Python 3 interpreter for Windows/Linux

OUTCOMES
Upon completion of the course, students will be able to
- Write, test, and debug simple Python programs.
- Implement Python programs with conditionals and loops.
- Develop Python programs step-wise by defining functions and calling them.
- Use Python lists, tuples, dictionaries for representing compound data.
- Read and write data from/to files in Python.

TOTAL : 60 PERIODS

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

LIST OF EXPERIMENTS: PHYSICS LABORATORY (Any 5 Experiments)
1. Determination of rigidity modulus – Torsion pendulum
2. Determination of Young’s modulus by non-uniform bending method
3. (a) Determination of wavelength, and particle size using Laser
   (b) Determination of acceptance angle in an optical fiber.
5. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer
6. Determination of wavelength of mercury spectrum – spectrometer grating
7. Determination of band gap of a semiconductor
8. Determination of thickness of a thin wire – Air wedge method

TOTAL: 30 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to
- Apply principles of elasticity, optics and thermal properties for engineering applications.

CHEMISTRY LABORATORY: (Any seven experiments to be conducted)

OBJECTIVES:
- To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.
- To acquaint the students with the determination of molecular weight of a polymer by viscometry.

1. Estimation of HCl using Na₂CO₃ as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler’s method.
4. Determination of chloride content of water sample by argentometric method.
5. Estimation of copper content of the given solution by iodometry.
6. Determination of strength of given hydrochloric acid using pH meter.
7. Determination of strength of acids in a mixture of acids using conductivity meter.
8. Estimation of iron content of the given solution using potentiometer.
9. Estimation of iron content of the water sample using spectrophotometer (1, 10-Phenanthroline / thiocyanate method).
10. Estimation of sodium and potassium present in water using flame photometer.
12. Pseudo first order kinetics-ester hydrolysis.
14. Determination of CMC.
15. Phase change in a solid.
16. Conductometric titration of strong acid vs strong base.

OUTCOMES:
- The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

TOTAL: 30 PERIODS

TEXTBOOKS:
OBJECTIVES:
The Course prepares second semester engineering and Technology students to:

- Develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.
- Foster their ability to write convincing job applications and effective reports.
- Develop their speaking skills to make technical presentations, participate in group discussions.
- Strengthen their listening skill which will help them comprehend lectures and talks in their areas of specialisation.

UNIT I
INTRODUCTION TECHNICAL ENGLISH

Language Development: subject verb agreement – compound words.

UNIT II
READING AND STUDY SKILLS

Language Development: impersonal passive voice, numerical adjectives.

UNIT III
TECHNICAL WRITING AND GRAMMAR

UNIT IV
REPORT WRITING

UNIT V
GROUP DISCUSSION AND JOB APPLICATIONS

TOTAL : 60 PERIODS
OUTCOMES:
At the end of the course learners will be able to:
- Read technical texts and write area-specific texts effortlessly.
- Listen and comprehend lectures and talks in their area of Specialization successfully.
- Speak appropriately and effectively in varied formal and informal contexts.
- Write reports and winning job applications.

TEXT BOOKS:

REFERENCES:

Students can be asked to read Tagore, Chetan Bhagat and for supplementary reading.

MA8251 ENGINEERING MATHEMATICS – II

OBJECTIVES:
This course is designed to cover topics such as Matrix Algebra, Vector Calculus, Complex Analysis and Laplace Transform. Matrix Algebra is one of the powerful tools to handle practical problems arising in the field of engineering. Vector calculus can be widely used for modelling the various laws of physics. The various methods of complex analysis and Laplace transforms can be used for efficiently solving the problems that occur in various branches of engineering disciplines.

UNIT I MATRICES

UNIT II VECTOR CALCULUS
Gradient and directional derivative – Divergence and curl - Vector identities – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface integral - Area of a curved surface - Volume integral - Green’s, Gauss divergence and Stoke’s theorems – Verification and application in evaluating line, surface and volume integrals.
UNIT III               ANALYTIC FUNCTIONS
Analytic functions – Necessary and sufficient conditions for analyticity in Cartesian and polar coordinates - Properties – Harmonic conjugates – Construction of analytic function - Conformal mapping – Mapping by functions $w = z + c, cz, \frac{1}{z}$ - Bilinear transformation.

UNIT IV            COMPLEX INTEGRATION

UNIT V             LAPLACE TRANSFORMS

TOTAL: 60 PERIODS

OUTCOMES:
After successfully completing the course, the student will have a good understanding of the following topics and their applications:

- Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
- Gradient, divergence and curl of a vector point function and related identities.
- Evaluation of line, surface and volume integrals using Gauss, Stokes and Green’s theorems and their verification.
- Analytic functions, conformal mapping and complex integration.
- Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

TEXT BOOKS:

REFERENCES:

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PHYSICS FOR INFORMATION SCIENCE (Common to CSE & IT)

OBJECTIVES:
- To understand the essential principles of Physics of semiconductor device and Electron transport properties. Become proficient in magnetic and optical properties of materials and Nano-electronic devices.

UNIT I ELETRICAL PROPERTIES OF MATERIALS
- Classical free electron theory
- Expression for electrical conductivity
- Thermal conductivity
- Wiedemann-Franz law
- Success and failures
- Electrons in metals
- Particle in a three dimensional box
- Degenerate states
- Fermi-Dirac statistics
- Density of energy states
- Electron in periodic potential
- Energy bands in solids
- Tight binding approximation
- Electron effective mass
- Concept of hole.

UNIT II SEMICONDUCTOR PHYSICS
- Intrinsic Semiconductors
- Energy band diagram
- Direct and indirect band gap semiconductors
- Carrier concentration in intrinsic semiconductors
- Extrinsic semiconductors
- Carrier concentration in N-type & P-type semiconductors
- Variation of carrier concentration with temperature
- Variation of Fermi level with temperature and impurity concentration
- Carrier transport in Semiconductor: random motion, drift, mobility and diffusion
- Hall effect and devices
- Ohmic contacts
- Schottky diode.

UNIT III MAGNETIC PROPERTIES OF MATERIALS
- Magnetic dipole moment
- Atomic magnetic moments
- Magnetic permeability and susceptibility
- Magnetic material classification
- Diamagnetism
- Paramagnetism
- Ferromagnetism
- Antiferromagnetism
- Ferrimagnetism
- Origin and exchange interaction
- Saturation magnetization and Curie temperature
- Domain Theory
- M versus H behaviour
- Hard and soft magnetic materials
- Examples and uses
- Magnetic principle in computer data storage
- Magnetic hard disc (GMR sensor).

UNIT IV OPTICAL PROPERTIES OF MATERIALS
- Classification of optical materials
- Carrier generation and recombination processes
- Absorption and scattering of light in metals, insulators and semiconductors
- Photo current in a P-N diode
- Solar cell
- LED
- Organic LED
- Laser diodes
- Optical data storage techniques.

UNIT V NANO DEVICES
- Electron density in bulk material
- Size dependence of Fermi energy
- Quantum confinement
- Quantum structures
- Density of states in quantum well, quantum wire and quantum dot structure
- Band gap of nanomaterials
- Tunneling: single electron phenomena and single electron transistor
- Quantum dot laser
- Conductivity of metallic nanowires
- Ballistic transport
- Quantum resistance and conductance
- Carbon nanotubes: Properties and applications.

OUTCOMES:
At the end of the course, the students will able to
- Gain knowledge on classical and quantum electron theories, and energy band structures,
- Acquire knowledge on basics of semiconductor physics and its applications in various devices,
- Get knowledge on magnetic properties of materials and their applications in data storage,
- Have the necessary understanding on the functioning of optical materials for optoelectronics,
- Understand the basics of quantum structures and their applications in carbon electronics.
TEXT BOOKS:

REFERENCES:

BE8255 BASIC ELECTRICAL, ELECTRONICS AND MEASUREMENT ENGINEERING

OBJECTIVES:
- To understand the fundamentals of electronic circuit constructions.
- To learn the fundamental laws, theorems of electrical circuits and also to analyse them
- To study the basic principles of electrical machines and their performance
- To study the different energy sources, protective devices and their field applications
- To understand the principles and operation of measuring instruments and transducers

UNIT I ELECTRICAL CIRCUITS ANALYSIS
Ohms Law, Kirchhoff’s Law-Instantaneous power- series and parallel circuit analysis with resistive, capacitive and inductive network - nodal analysis, mesh analysis- network theorems - Thevenins theorem, Norton theorem, maximum power transfer theorem and superposition theorem, three phase supply-Instantaneous, Reactive and apparent power-star delta conversion.

UNIT II ELECTRICAL MACHINES
DC and AC ROTATING MACHINES: Types, Construction, principle, Emf and torque equation, application Speed Control- Basics of Stepper Motor – Brushless DC motors- Transformers-Introduction- types and construction, working principle of Ideal transformer-Emf equation- All day efficiency calculation.

UNIT III UTILIZATION OF ELECTRICAL POWER

UNIT IV ELECTRONIC CIRCUITS

UNIT V ELECTRICAL MEASUREMENT
Characteristic of measurement-errors in measurement, torque in indicating instruments- moving coil and moving iron meters, Energy meter and watt meter. Transducers- classification-thermo electric, RTD, Strain gauge, LVDT, LDR and piezoelectric. Oscilloscope-CRO.

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the students will be able to:
- Discuss the essentials of electric circuits and analysis.
- Discuss the basic operation of electric machines and transformers.
- Introduction of renewable sources and common domestic loads.
- To understand the fundamentals of electronic circuit constructions.
- Introduction to measurement and metering for electric circuits.

TEXT BOOKS:

REFERENCES:

IT8201 INFORMATION TECHNOLOGY ESSENTIALS

OBJECTIVES:
- To introduce the concept of Internet, Networks and its working principles.
- To know scripting languages.
- To understand various applications related to Information Technology.

UNIT I WEB ESSENTIALS
Creating a Website - Working principle of a Website - Browser fundamentals - Authoring tools - Types of servers: Application Server - Web Server - Database Server

UNIT II SCRIPTING ESSENTIALS
Need for Scripting languages - Types of scripting languages - Client side scripting - Server side scripting - PHP - Working principle of PHP - PHP Variables - Constants - Operators – Flow Control and Looping - Arrays - Strings - Functions - File Handling - PHP and MySQL - PHP and HTML - Cookies - Simple PHP scripts

UNIT III NETWORKING ESSENTIALS
Fundamental computer network concepts - Types of computer networks - Network layers - TCP/IP model - Wireless Local Area Network - Ethernet - WiFi - Network Routing - Switching - Network components
UNIT IV        MOBILE COMMUNICATION ESSENTIALS  9

UNIT V        APPLICATION ESSENTIALS  9
Creation of simple interactive applications - Simple database applications - Multimedia applications - Design and development of information systems – Personal Information System – Information retrieval system – Social networking applications

TOTAL: 45 PERIODS

OUTCOMES:
On Completion of the course, the students should be able to:
- Design and deploy web-sites
- Design and deploy simple web-applications
- Create simple database applications
- Develop information system
- Describe the basics of networking and mobile communications

TEXT BOOKS:

REFERENCES:
3. it-ebooks.org

CS8251        PROGRAMMING IN C  L T P C
3 0 0 3

OBJECTIVES:
- To develop C Programs using basic programming constructs
- To develop C programs using arrays and strings
- To develop applications in C using functions, pointers and structures
- To do input/output and file handling in C

UNIT I        BASICS OF C PROGRAMMING  9
Introduction to programming paradigms - Structure of C program - C programming: Data Types – Storage classes - Constants – Enumeration Constants - Keywords – Operators: Precedence and Associativity – Expressions – Input/Output statements, Assignment statements – Decision making statements - Switch statement - Looping statements – Pre-processor directives - Compilation process

UNIT II        ARRAYS AND STRINGS  9
UNIT III  FUNCTIONS AND POINTERS

UNIT IV  STRUCTURES

UNIT V  FILE PROCESSING
Files – Types of file processing: Sequential access, Random access – Sequential access file - Example Program: Finding average of numbers stored in sequential access file - Random access file - Example Program: Transaction processing using random access files – Command line arguments

OUTCOMES:
Upon completion of the course, the students will be able to
• Develop simple applications in C using basic constructs
• Design and implement applications using arrays and strings
• Develop and implement applications in C using functions and pointers.
• Develop applications in C using structures.
• Design applications using sequential and random access file processing.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

GROUP A (CIVIL & MECHANICAL)

I CIVIL ENGINEERING PRACTICE

Buildings:
(a) Study of plumbing and carpentry components of residential and industrial buildings. Safety aspects.

Plumbing Works:
(a) Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.
(b) Study of pipe connections requirements for pumps and turbines.
(c) Preparation of plumbing line sketches for water supply and sewage works.
(d) Hands-on-exercise:
   Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.
(e) Demonstration of plumbing requirements of high-rise buildings.

Carpentry using Power Tools only:
(a) Study of the joints in roofs, doors, windows and furniture.
(b) Hands-on-exercise:
   Wood work, joints by sawing, planing and cutting.

II MECHANICAL ENGINEERING PRACTICE

Welding:
(a) Preparation of butt joints, lap joints and T-joints by Shielded metal arc welding.
(b) Gas welding practice

Basic Machining:
(a) Simple Turning and Taper turning
(b) Drilling Practice

Sheet Metal Work:
(a) Forming & Bending:
(b) Model making – Trays and funnels.
(c) Different type of joints.

Machine assembly practice:
(a) Study of centrifugal pump
(b) Study of air conditioner

Demonstration on:
(a) Smithy operations, upsetting, swaging, setting down and bending. Example – Exercise – Production of hexagonal headed bolt.
(b) Foundry operations like mould preparation for gear and step cone pulley.
(c) Fitting – Exercises – Preparation of square fitting and V-fitting models.
GROUP B (ELECTRICAL & ELECTRONICS)

III ELECTRICAL ENGINEERING PRACTICE
1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring.
3. Stair case wiring
5. Measurement of energy using single phase energy meter.

IV ELECTRONICS ENGINEERING PRACTICE
1. Study of Electronic components and equipments – Resistor, colour coding measurement of AC signal parameter (peak-peak, rms period, frequency) using CR.
2. Study of logic gates AND, OR, EX-OR and NOT.
4. Soldering practice – Components Devices and Circuits – Using general purpose PCB.
5. Measurement of ripple factor of HWR and FWR.

TOTAL: 60 PERIODS

OUTCOMES:
On successful completion of this course, the student will be able to
- Fabricate carpentry components and pipe connections including plumbing works.
- Use welding equipments to join the structures.
- Carry out the basic machining operations
- Make the models using sheet metal works
- Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings
- Carry out basic home electrical works and appliances
- Measure the electrical quantities
- Elaborate on the components, gates, soldering practices.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

CIVIL
1. Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings. 15 Sets.
2. Carpentry vice (fitted to work bench) 15 Nos.
4. Models of industrial trusses, door joints, furniture joints 5 each
5. Power Tools: (a) Rotary Hammer 2 Nos
   (b) Demolition Hammer 2 Nos
   (c) Circular Saw 2 Nos
   (d) Planer 2 Nos
   (e) Hand Drilling Machine 2 Nos
   (f) Jigsaw 2 Nos
MECHANICAL

1. Arc welding transformer with cables and holders 5 Nos.
2. Welding booth with exhaust facility 5 Nos.
3. Welding accessories like welding shield, chipping hammer, wire brush, etc. 5 Sets.
4. Oxygen and acetylene gas cylinders, blow pipe and other welding outfit 2 Nos.
5. Centre lathe 2 Nos.
6. Hearth furnace, anvil and smithy tools 2 Sets.
7. Moulding table, foundry tools 2 Sets.
9. Study-purpose items: centrifugal pump, air-conditioner One each.

ELECTRICAL

1. Assorted electrical components for house wiring 15 Sets
2. Electrical measuring instruments 10 Sets
3. Study purpose items: Iron box, fan and regulator, emergency lamp 1 each
4. Megger (250V/500V) 1 No.
5. Power Tools: (a) Range Finder 2 Nos. (b) Digital Live-wire detector 2 Nos.

ELECTRONICS

1. Soldering guns 10 Nos.
2. Assorted electronic components for making circuits 50 Nos.
3. Small PCBs 10 Nos.
5. Study purpose items: Telephone, FM radio, low-voltage power supply

CS8261 C PROGRAMMING LABORATORY L T P C 0 0 4 2

OBJECTIVES:
- To develop programs in C using basic constructs.
- To develop applications in C using strings, pointers, functions, structures
- To develop applications in C using file processing

LIST OF EXPERIMENTS:
1. Programs using I/O statements and expressions.
2. Programs using decision-making constructs.
3. Write a program to find whether the given year is leap year or Not? (Hint: not every centurion year is a leap. For example 1700, 1800 and 1900 is not a leap year)
4. Design a calculator to perform the operations, namely, addition, subtraction, multiplication, division and square of a number.
5. Check whether a given number is Armstrong number or not?
6. Given a set of numbers like <10, 36, 54, 89, 12, 27>, find sum of weights based on the following conditions
   - 5 if it is a perfect cube
   - 4 if it is a multiple of 4 and divisible by 6
   - 3 if it is a prime number
   Sort the numbers based on the weight in the increasing order as shown below:
   <10,its weight>,<36,its weight>,<89,its weight>
7. Populate an array with height of persons and find how many persons are above the average height.
8. Populate a two dimensional array with height and weight of persons and compute the Body Mass Index of the individuals.
9. Given a string "a$bc.d./fg" find its reverse without changing the position of special characters.
   (Example input:a@gh%;j and output:j@hg%;a)
10. Convert the given decimal number into binary, octal and hexadecimal numbers using user defined functions.
11. From a given paragraph perform the following using built-in functions:
    a. Find the total number of words.
    b. Capitalize the first word of each sentence.
    c. Replace a given word with another word.
13. Sort the list of numbers using pass by reference.
15. Compute internal marks of students for five different subjects using structures and functions.
16. Insert, update, delete and append telephone details of an individual or a company into a telephone directory using random access file.
17. Count the number of account holders whose balance is less than the minimum balance using sequential access file.

Mini Project
18. Create a “Railway reservation system” with the following modules
    - Booking
    - Availability checking
    - Cancellation
    - Prepare chart

OUTCOMES:
Upon completion of the course, the students will be able to
- Develop C programs for simple applications making use of basic constructs, arrays and strings.
- Develop C programs involving functions, recursion, pointers, and structures.
- Design applications using sequential and random access file processing.
OBJECTIVES:
• To write simple scripts for the creation of web sites
• To create various information technology enabled applications

1. Creation of interactive web sites - Design using HTML and authoring tools
2. Creation of simple PHP scripts - Dynamism in web sites
3. Handling multimedia content in web sites
4. Database applications using PHP and MySQL
5. Study of computer networking components
6. Creation of information retrieval system using web, PHP and MySQL
7. Study of Technologies associated with mobile devices
8. Creation of Personal Information System

TOTAL: 30 PERIODS

OUTCOMES:
On Completion of the course, the students should be able to:
• Design interactive websites using basic HTML tags, different styles, links and with all basic control elements.
• Create client side and server side programs using scripts using PHP.
• Design dynamic web sites and handle multimedia components
• Create applications with PHP connected to database.
• Create Personal Information System
• Implement the technologies behind computer networks and mobile communication.

OBJECTIVES:
• To extend student’s logical and mathematical maturity and ability to deal with abstraction.
• To introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.
• To understand the basic concepts of combinatorics and graph theory.
• To familiarize the applications of algebraic structures.
• To understand the concepts and significance of lattices and boolean algebra which are widely used in computer science and engineering.

UNIT I LOGIC AND PROOFS 12

UNIT II COMBINATORICS 12
UNIT III  GRAPHS  12
Graphs and graph models – Graph terminology and special types of graphs – Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamilton paths.

UNIT IV  ALGEBRAIC STRUCTURES  12

UNIT V  LATTICES AND BOOLEAN ALGEBRA  12

TOTAL : 60 PERIODS

OUTCOMES:
At the end of the course, students would:

- Have knowledge of the concepts needed to test the logic of a program.
- Have an understanding in identifying structures on many levels.
- Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.
- Be aware of the counting principles.
- Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.

TEXTBOOKS:

REFERENCES:

CS8351  DIGITAL PRINCIPLES AND SYSTEM DESIGN  L  T  P  C
4  0  0  4

OBJECTIVES:
- To design digital circuits using simplified Boolean functions
- To analyze and design combinational circuits
- To analyze and design synchronous and asynchronous sequential circuits
- To understand Programmable Logic Devices
- To write HDL code for combinational and sequential circuits

UNIT I  BOOLEAN ALGEBRA AND LOGIC GATES  12
UNIT II  COMBINATIONAL LOGIC  12
Combinational Circuits – Analysis and Design Procedures - Binary Adder-Subtractor -
Decimal Adder - Binary Multiplier - Magnitude Comparator - Decoders – Encoders –
Multiplexers - Introduction to HDL – HDL Models of Combinational circuits.

UNIT III  SYNCHRONOUS SEQUENTIAL LOGIC  12
Sequential Circuits - Storage Elements: Latches, Flip-Flops - Analysis of Clocked
Sequential Circuits - State Reduction and Assignment - Design Procedure - Registers and
Counters - HDL Models of Sequential Circuits.

UNIT IV  ASYNCHRONOUS SEQUENTIAL LOGIC  12
Analysis and Design of Asynchronous Sequential Circuits – Reduction of State and Flow
Tables – Race-free State Assignment – Hazards.

UNIT V  MEMORY AND PROGRAMMABLE LOGIC  12
RAM – Memory Decoding – Error Detection and Correction - ROM - Programmable Logic
Array – Programmable Array Logic – Sequential Programmable Devices.

TOTAL:  60 PERIODS

OUTCOMES:
On Completion of the course, the students should be able to:
• Simplify Boolean functions using KMap
• Design and Analyze Combinational and Sequential Circuits
• Implement designs using Programmable Logic Devices
• Write HDL code for combinational and Sequential Circuits

TEXT BOOK:

REFERENCES
1. G. K. Kharate, Digital Electronics, Oxford University Press, 2010
CENGAGE Learning, 2013

CS8391  DATA STRUCTURES  L T P C
3 0 0 3

OBJECTIVES:
• To understand the concepts of ADTs
• To Learn linear data structures – lists, stacks, and queues
• To understand sorting, searching and hashing algorithms
• To apply Tree and Graph structures
UNIT I \hspace{1cm} \textbf{LINEAR DATA STRUCTURES – LIST} \hspace{1cm} 9
Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation — singly linked lists- circularly linked lists- doubly-linked lists – applications of lists – Polynomial Manipulation – All operations (Insertion, Deletion, Merge, Traversal).

UNIT II \hspace{1cm} \textbf{LINEAR DATA STRUCTURES – STACKS, QUEUES} \hspace{1cm} 9

UNIT III \hspace{1cm} \textbf{NON LINEAR DATA STRUCTURES – TREES} \hspace{1cm} 9

UNIT IV \hspace{1cm} \textbf{NON LINEAR DATA STRUCTURES - GRAPHS} \hspace{1cm} 9

UNIT V \hspace{1cm} \textbf{SEARCHING, SORTING AND HASHING TECHNIQUES} \hspace{1cm} 9

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Implement abstract data types for linear data structures.
- Apply the different linear and non-linear data structures to problem solutions.
- Critically analyze the various sorting algorithms.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To understand Object Oriented Programming concepts and basic characteristics of Java
- To know the principles of packages, inheritance and interfaces
- To define exceptions and use I/O streams
- To develop a java application with threads and generics classes
- To design and build simple Graphical User Interfaces

UNIT I  INTRODUCTION TO OOP AND JAVA FUNDAMENTALS

UNIT II  INHERITANCE AND INTERFACES
Inheritance – Super classes- sub classes –Protected members – constructors in sub classes- the Object class – abstract classes and methods- final methods and classes – Interfaces – defining an interface, implementing interface, differences between classes and interfaces and extending interfaces - Object cloning - inner classes, ArrayLists - Strings

UNIT III  EXCEPTION HANDLING AND I/O
Exceptions - exception hierarchy - throwing and catching exceptions – built-in exceptions, creating own exceptions, Stack Trace Elements. Input / Output Basics – Streams – Byte streams and Character streams – Reading and Writing Console – Reading and Writing Files

UNIT IV  MULTITHREADING AND GENERIC PROGRAMMING
Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, Inter-thread communication, daemon threads, thread groups. Generic Programming – Generic classes – generic methods – Bounded Types – Restrictions and Limitations.

UNIT V  EVENT DRIVEN PROGRAMMING

OUTCOMES:
Upon completion of the course, students will be able to:
- Develop Java programs using OOP principles
- Develop Java programs with the concepts inheritance and interfaces
- Build Java applications using exceptions and I/O streams
- Develop Java applications with threads and generics classes
- Develop interactive Java programs using swings
TEXT BOOKS:

REFERENCES:

EC8394 ANALOG AND DIGITAL COMMUNICATION  L T P C
3 0 0 3

OBJECTIVES:
The student should be made to:
- Understand analog and digital communication techniques.
- Learn data and pulse communication techniques.
- Be familiarized with source and Error control coding.
- Gain knowledge on multi-user radio communication.

UNIT I ANALOG COMMUNICATION 9

UNIT II PULSE AND DATA COMMUNICATION 9

Data Communication: History of Data Communication - Standards Organizations for Data Communication- Data Communication Circuits - Data Communication Codes - Data communication Hardware - serial and parallel interfaces.

UNIT III DIGITAL COMMUNICATION 9

UNIT IV SOURCE AND ERROR CONTROL CODING 9
Entropy, Source encoding theorem, Shannon fano coding, Huffman coding, mutual information, channel capacity, Error Control Coding, linear block codes, cyclic codes - ARQ Techniques.

UNIT V MULTI-USER RADIO COMMUNICATION 9
Global System for Mobile Communications (GSM) - Code division multiple access (CDMA) – Cellular Concept and Frequency Reuse - Channel Assignment and Handover Techniques - Overview of Multiple Access Schemes - Satellite Communication - Bluetooth.

TOTAL: 45 PERIODS
OUTCOMES:
At the end of the course, the student should be able to:
- Apply analog and digital communication techniques.
- Use data and pulse communication techniques.
- Analyze Source and Error control coding.
- Utilize multi-user radio communication.

TEXT BOOK:

REFERENCES:

CS8381 DATA STRUCTURES LABORATORY L T P C
0 0 4 2

OBJECTIVES
- To implement linear and non-linear data structures
- To understand the different operations of search trees
- To implement graph traversal algorithms
- To get familiarized to sorting and searching algorithms

1. Array implementation of Stack and Queue ADTs
2. Array implementation of List ADT
3. Linked list implementation of List, Stack and Queue ADTs
4. Applications of List, Stack and Queue ADTs
5. Implementation of Binary Trees and operations of Binary Trees
6. Implementation of Binary Search Trees
7. Implementation of AVL Trees
9. Graph representation and Traversal algorithms
10. Applications of Graphs
11. Implementation of searching and sorting algorithms
12. Hashing – any two collision techniques

TOTAL:60 PERIODS
OUTCOMES:
At the end of the course, the students will be able to:
- Write functions to implement linear and non-linear data structure operations
- Suggest appropriate linear / non-linear data structure operations for solving a given problem
- Appropriately use the linear / non-linear data structure operations for a given problem
- Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval

CS8383  OBJECT ORIENTED PROGRAMMING LABORATORY  LTPC  0042

OBJECTIVES
- To build software development skills using java programming for real-world applications.
- To understand and apply the concepts of classes, packages, interfaces, arraylist, exception handling and file processing.
- To develop applications using generic programming and event handling.

LIST OF EXPERIMENTS
1. Develop a Java application to generate Electricity bill. Create a class with the following members: Consumer no., consumer name, previous month reading, current month reading, type of EB connection (i.e domestic or commercial). Compute the bill amount using the following tariff.
   If the type of the EB connection is domestic, calculate the amount to be paid as follows:
   - First 100 units - Rs. 1 per unit
   - 101-200 units - Rs. 2.50 per unit
   - 201 -500 units - Rs. 4 per unit
   - > 501 units - Rs. 6 per unit
   If the type of the EB connection is commercial, calculate the amount to be paid as follows:
   - First 100 units - Rs. 2 per unit
   - 101-200 units - Rs. 4.50 per unit
   - 201 -500 units - Rs. 6 per unit
   - > 501 units - Rs. 7 per unit

2. Develop a java application to implement currency converter (Dollar to INR, EURO to INR, Yen to INR and vice versa), distance converter (meter to KM, miles to KM and vice versa), time converter (hours to minutes, seconds and vice versa) using packages.

3. Develop a java application with Employee class with Emp_name, Emp_id, Address, Mail_id, Mobile_no as members. Inherit the classes, Programmer, Assistant Professor, Associate Professor and Professor from employee class. Add Basic Pay (BP) as the member of all the inherited classes with 97% of BP as DA, 10 % of BP as HRA, 12% of BP as PF, 0.1% of BP for staff club fund. Generate pay slips for the employees with their gross and net salary.

4. Design a Java interface for ADT Stack. Implement this interface using array. Provide necessary exception handling in both the implementations.

5. Write a program to perform string operations using Array List. Write functions for the following
   a. Append - add at end
   b. Insert – add at particular index
   c. Search
   d. List all string starts with given letter
6. Write a Java Program to create an abstract class named Shape that contains two integers and an empty method named print Area(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area() that prints the area of the given shape.

7. Write a Java program to implement user defined exception handling.

8. Write a Java program that reads a file name from the user, displays information about whether the file exists, whether the file is readable, or writable, the type of file and the length of the file in bytes.

9. Write a java program that implements a multi-threaded application that has three threads. First thread generates a random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.

10. Write a java program to find the maximum value from the given type of elements using a generic function.

11. Design a calculator using event-driven programming paradigm of Java with the following options.
   a) Decimal manipulations
   b) Scientific manipulations

12. Develop a mini project for any application using Java concepts.

TOTAL : 60 PERIODS

OUTCOMES
Upon completion of the course, the students will be able to
- Develop and implement Java programs for simple applications that make use of classes, packages and interfaces.
- Develop and implement Java programs with arraylist, exception handling and multithreading.
- Design applications using file processing, generic programming and event handling.

CS8382 DIGITAL SYSTEMS LABORATORY L T P C
0 0 4 2

OBJECTIVES:
- To understand the various basic logic gates
- To design and implement the various combinational circuits
- To design and implement combinational circuits using MSI devices.
- To design and implement sequential circuits
- To understand and code with HDL programming

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

TOTAL: 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Implement simplified combinational circuits using basic logic gates
- Implement combinational circuits using MSI devices
- Implement sequential circuits like registers and counters
- Simulate combinational and sequential circuits using HDL

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

LABORATORY REQUIREMENT FOR BATCH OF 30 STUDENTS HARDWARE:
1. Digital trainer kits - 30
2. Digital ICs required for the experiments in sufficient numbers

SOFTWARE:
1. HDL simulator.

OBJECTIVES:
The Course will enable learners to:
- Equip students with the English language skills required for the successful undertaking of academic studies with primary emphasis on academic speaking and listening skills.
- Provide guidance and practice in basic general and classroom conversation and to engage in specific academic speaking activities.
- Improve general and academic listening skills.
- Make effective presentations.

UNIT I
Listening as a key skill- its importance- speaking - give personal information - ask for personal information - express ability - enquire about ability - ask for clarification Improving pronunciation - pronunciation basics taking lecture notes - preparing to listen to a lecture - articulate a complete idea as opposed to producing fragmented utterances.
UNIT II
Listen to a process information- give information, as part of a simple explanation - conversation starters: small talk - stressing syllables and speaking clearly - intonation patterns - compare and contrast information and ideas from multiple sources- converse with reasonable accuracy over a wide range of everyday topics.

UNIT III
Lexical chunking for accuracy and fluency- factors influence fluency, deliver a five-minute informal talk - greet - respond to greetings - describe health and symptoms - invite and offer - accept - decline - take leave - listen for and follow the gist- listen for detail

UNIT IV
Being an active listener: giving verbal and non-verbal feedback - participating in a group discussion - summarizing academic readings and lectures conversational speech listening to and participating in conversations - persuade.

UNIT V
Formal and informal talk - listen to follow and respond to explanations, directions and instructions in academic and business contexts - strategies for presentations and interactive communication - group/pair presentations - negotiate disagreement in group work.

TOTAL :30PERIODS

OUTCOMES:
At the end of the course Learners will be able to:

- Listen and respond appropriately.
- Participate in group discussions
- Make effective presentations
- Participate confidently and appropriately in conversations both formal and informal

TEXT BOOKS:

REFERENCES:
MA8391 PROBABILITY AND STATISTICS

OBJECTIVES:

- This course aims at providing the required skill to apply the statistical tools in engineering problems.
- To introduce the basic concepts of probability and random variables.
- To introduce the basic concepts of two dimensional random variables.
- To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems.
- To introduce the basic concepts of classifications of design of experiments which plays very important roles in the field of agriculture and statistical quality control.

UNIT I PROBABILITY AND RANDOM VARIABLES 12

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

UNIT III TESTING OF HYPOTHESIS 12
Sampling distributions - Estimation of parameters - Statistical hypothesis - Large sample tests based on Normal distribution for single mean and difference of means - Tests based on t, Chi-square and F distributions for mean, variance and proportion - Contingency table (test for independent) - Goodness of fit.

UNIT IV DESIGN OF EXPERIMENTS 12
One way and Two way classifications - Completely randomized design – Randomized block design – Latin square design - $2^2$ factorial design.

UNIT V STATISTICAL QUALITY CONTROL 12
Control charts for measurements (X and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits - Acceptance sampling.

TOTAL : 60 PERIODS

OUTCOMES:

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

- Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
- Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
- Apply the concept of testing of hypothesis for small and large samples in real life problems.
- Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.
- Have the notion of sampling distributions and statistical techniques used in engineering and management problems.
TEXT BOOKS:

REFERENCES:

CS8491 COMPUTER ARCHITECTURE

L T P C
3 0 0 3

OBJECTIVES:
• To learn the basic structure and operations of a computer.
• To learn the arithmetic and logic unit and implementation of fixed-point and floating point arithmetic unit.
• To learn the basics of pipelined execution.
• To understand parallelism and multi-core processors.
• To understand the memory hierarchies, cache memories and virtual memories.
• To learn the different ways of communication with I/O devices.

UNIT I BASIC STRUCTURE OF A COMPUTER SYSTEM
9

UNIT II ARITHMETIC FOR COMPUTERS
9
Addition and Subtraction – Multiplication – Division – Floating Point Representation – Floating Point Operations – Subword Parallelism

UNIT III PROCESSOR AND CONTROL UNIT
9
A Basic MIPS implementation – Building a Datapath – Control Implementation Scheme – Pipelining – Pipelined datapath and control – Handling Data Hazards & Control Hazards – Exceptions.

UNIT IV PARALLELISM
9
UNIT V MEMORY & I/O SYSTEMS


TOTAL : 45 PERIODS

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

- Understand the basics structure of computers, operations and instructions.
- Design arithmetic and logic unit.
- Understand pipelined execution and design control unit.
- Understand parallel processing architectures.
- Understand the various memory systems and I/O communication.

TEXT BOOKS:

REFERENCES:

CS8492 DATABASE MANAGEMENT SYSTEMS

OBJECTIVES
- To learn the fundamentals of data models and to represent a database system using ER diagrams.
- To study SQL and relational database design.
- To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
- To understand the fundamental concepts of transaction processing- concurrency control techniques and recovery procedures.
- To have an introductory knowledge about the Storage and Query processing Techniques

UNIT I RELATIONAL DATABASES
UNIT II DATABASE DESIGN

UNIT III TRANSACTIONS

UNIT IV IMPLEMENTATION TECHNIQUES

UNIT V ADVANCED TOPICS

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

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To understand and apply the algorithm analysis techniques.
- To critically analyze the efficiency of alternative algorithmic solutions for the same problem.
- To understand different algorithm design techniques.
- To understand the limitations of Algorithmic power.

UNIT I INTRODUCTION

UNIT II BRUTE FORCE AND DIVIDE-AND-CONQUER

UNIT III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE

UNIT IV ITERATIVE IMPROVEMENT
The Simplex Method - The Maximum-Flow Problem – Maximum Matching in Bipartite Graphs, Stable marriage Problem.

UNIT V COPING WITH THE LIMITATIONS OF ALGORITHM POWER

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the students should be able to:
- Design algorithms for various computing problems.
- Analyze the time and space complexity of algorithms.
- Critically analyze the different algorithm design techniques for a given problem.
- Modify existing algorithms to improve efficiency.

TEXT BOOKS:
REFERENCES:
5. http://nptel.ac.in/

CS8493 OPERATING SYSTEMS L T P C 3 0 0 3

OBJECTIVES:
- To understand the basic concepts and functions of operating systems.
- To understand Processes and Threads
- To analyze Scheduling algorithms.
- To understand the concept of Deadlocks.
- To analyze various memory management schemes.
- To understand I/O management and File systems.
- To be familiar with the basics of Linux system and Mobile OS like iOS and Android.

UNIT I OPERATING SYSTEM OVERVIEW

UNIT II PROCESS MANAGEMENT
Processes - Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication; CPU Scheduling - Scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Real time scheduling; Threads- Overview, Multithreading models, Threading issues; Process Synchronization - The critical-section problem, Synchronization hardware, Mutex locks, Semaphores, Classic problems of synchronization, Critical regions, Monitors; Deadlock - System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

UNIT III STORAGE MANAGEMENT
Main Memory – Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with paging, 32 and 64 bit architecture Examples; Virtual Memory – Background, Demand Paging, Page Replacement, Allocation, Thrashing; Allocating Kernel Memory, OS Examples.

UNIT IV FILE SYSTEMS AND I/O SYSTEMS
UNIT V  CASE STUDY

OUTCOMES:
At the end of the course, the students should be able to:
- Analyze various scheduling algorithms.
- Understand deadlock, prevention and avoidance algorithms.
- Compare and contrast various memory management schemes.
- Understand the functionality of file systems.
- Perform administrative tasks on Linux Servers.
- Compare iOS and Android Operating Systems.

TEXT BOOK:

REFERENCES:

GE8291  ENVIRONMENTAL SCIENCE AND ENGINEERING  L T P C
3 0 0 3

OBJECTIVES:
- To the study of nature and the facts about environment.
- To find and implement scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth’s interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.
UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY


Field Study of Common Plants, Insects, Birds
Field Study of Simple Ecosystems – Pond, River, Hill Slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION

Definition – Causes, Effects and Control Measures of: (A) Air Pollution (B) Water Pollution (C) Soil Pollution (D) Marine Pollution (E) Noise Pollution (F) Thermal Pollution (G) Nuclear Hazards – Soil Waste Management: Causes, Effects and Control Measures of Municipal Solid Wastes – Role of an Individual in Prevention of Pollution – Pollution Case Studies – Disaster Management: Floods, Earthquake, Cyclone and Landslides.

Field Study of Local Polluted Site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES


Field Study of Local Area to Document Environmental Assets – River / Forest / Grassland / Hill / Mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT

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

TEXT BOOKS:

REFERENCES:

CS8481 DATABASE MANAGEMENT SYSTEMS LABORATORY L T P C
0 0 4 2

AIM:
The aim of this laboratory is to inculcate the abilities of applying the principles of the database management systems. This course aims to prepare the students for projects where a proper implementation of databases will be required.

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

1. Data Definition Commands, Data Manipulation Commands for inserting, deleting, updating and retrieving Tables and Transaction Control statements
2. Database Querying – Simple queries, Nested queries, Sub queries and Joins
3. Views, Sequences, Synonyms
4. Database Programming: Implicit and Explicit Cursors
5. Procedures and Functions
6. Triggers
7. Exception Handling
8. Database Design using ER modeling, normalization and Implementation for any application
9. Database Connectivity with Front End Tools
10. Case Study using real life database applications

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
• Use typical data definitions and manipulation commands.
• Design applications to test Nested and Join Queries
• Implement simple applications that use Views
• Implement applications that require a Front-end Tool
• Critically analyze the use of Tables, Views, Functions and Procedures

CS8461 OPERATING SYSTEMS LABORATORY

OBJECTIVES
• To learn Unix commands and shell programming
• To implement various CPU Scheduling Algorithms
• To implement Process Creation and Inter Process Communication.
• To implement Deadlock Avoidance and Deadlock Detection Algorithms
• To implement Page Replacement Algorithms
• To implement File Organization and File Allocation Strategies

LIST OF EXPERIMENTS
1. Basics of UNIX commands
2. Write programs using the following system calls of UNIX operating system fork, exec, getpid, exit, wait, close, stat, opendir, readdir
3. Write C programs to simulate UNIX commands like cp, ls, grep, etc.
4. Shell Programming
5. Write C programs to implement the various CPU Scheduling Algorithms
6. Implementation of Semaphores
7. Implementation of Shared memory and IPC
8. Bankers Algorithm for Deadlock Avoidance
9. Implementation of Deadlock Detection Algorithm
10. Write C program to implement Threading & Synchronization Applications
11. Implementation of the following Memory Allocation Methods for fixed partition
   a) First Fit   b) Worst Fit   c) Best Fit
12. Implementation of Paging Technique of Memory Management
13. Implementation of the following Page Replacement Algorithms
   a) FIFO   b) LRU   c) LFU
14. Implementation of the various File Organization Techniques
15. Implementation of the following File Allocation Strategies
   a) Sequential   b) Indexed   c) Linked

TOTAL: 60 PERIODS
OUTCOMES:
At the end of the course, the student should be able to

- Compare the performance of various CPU Scheduling Algorithms
- Implement Deadlock avoidance and Detection Algorithms
- Implement Semaphores
- Create processes and implement IPC
- Analyze the performance of the various Page Replacement Algorithms
- Implement File Organization and File Allocation Strategies

HS8461

ADVANCED READING AND WRITING

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OBJECTIVES:

- Strengthen the reading skills of students of engineering.
- Enhance their writing skills with specific reference to technical writing.
- Develop students’ critical thinking skills.
- Provide more opportunities to develop their project and proposal writing skills.

UNIT I

Reading - Strategies for effective reading- Use glosses and footnotes to aid reading comprehension- Read and recognize different text types- Predicting content using photos and title Writing - Plan before writing- Develop a paragraph: topic sentence, supporting sentences, concluding sentence – Write a descriptive paragraph

UNIT II

Reading - Read for details- Use of graphic organizers to review and aid comprehension Writing - State reasons and examples to support ideas in writing- Write a paragraph with reasons and examples- Write an opinion paragraph

UNIT III

Reading - Understanding pronoun reference and use of connectors in a passage- speed reading techniques Writing - Elements of a good essay- Types of essays- descriptive-narrative- issue-based- argumentative-analytical.

UNIT IV

Reading - Genre and Organization of Ideas- Writing - Email writing- visumes – Job application- project writing-writing convincing proposals.

UNIT V

Reading - Critical reading and thinking- understanding how the text positions the reader- identify Writing - Statement of Purpose- letter of recommendation- Vision statement

TOTAL: 30 PERIODS
OUTCOMES:
At the end of the course Learners will be able to:

- Write different types of essays.
- Write winning job applications.
- Read and evaluate texts critically.
- Display critical thinking in various professional contexts.

TEXT BOOKS:

REFERENCES:

MA8551 ALGEBRA AND NUMBER THEORY

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

UNIT I  GROUPS AND RINGS

UNIT II  FINITE FIELDS AND POLYNOMIALS
Rings - Polynomial rings - Irreducible polynomials over finite fields - Factorization of polynomials over finite fields.
UNIT III  DIVISIBILITY THEORY AND CANONICAL DECOMPOSITIONS  12
Division algorithm – Base - b representations – Number patterns – Prime and composite numbers – GCD – Euclidean algorithm – Fundamental theorem of arithmetic – LCM.

UNIT IV  DIOPHANTINE EQUATIONS AND CONGRUENCES  12
Linear Diophantine equations – Congruence’s – Linear Congruence’s - Applications : Divisibility tests - Modular exponentiation-Chinese remainder theorem – 2 x 2 linear systems.

UNIT V  CLASSICAL THEOREMS AND MULTIPLICATIVE FUNCTIONS  12
Wilson’s theorem – Fermat’s little theorem – Euler’s theorem – Euler’s Phi functions – Tau and Sigma functions.

TOTAL: 60 PERIODS

OUTCOMES :
Upon successful completion of the course, students should be able to:
- Apply the basic notions of groups, rings, fields which will then be used to solve related problems.
- Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.
- Demonstrate accurate and efficient use of advanced algebraic techniques.
- Demonstrate their mastery by solving non-trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the text.
- Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.

TEXTBOOKS:

REFERENCES :

CS8591  COMPUTER NETWORKS  L T P C
3 0 0 3

OBJECTIVES:
- To understand the protocol layering and physical level communication.
- To analyze the performance of a network.
- To understand the various components required to build different networks.
- To learn the functions of network layer and the various routing protocols.
- To familiarize the functions and protocols of the Transport layer.
UNIT I  INTRODUCTION AND PHYSICAL LAYER  9

UNIT II  DATA-LINK LAYER & MEDIA ACCESS  9

UNIT III  NETWORK LAYER  9

UNIT IV  TRANSPORT LAYER  9

UNIT V  APPLICATION LAYER  9
WWW and HTTP – FTP – Email –Telnet –SSH – DNS – SNMP.

TOTAL : 45 PERIODS

OUTCOMES:
On Completion of the course, the students should be able to:
- Understand the basic layers and its functions in computer networks.
- Evaluate the performance of a network.
- Understand the basics of how data flows from one node to another.
- Analyze and design routing algorithms.
- Design protocols for various functions in the network.
- Understand the working of various application layer protocols

TEXT BOOK:

REFERENCES
OBJECTIVES:

- To understand the Architecture of 8086 microprocessor.
- To learn the design aspects of I/O and Memory Interfacing circuits.
- To interface microprocessors with supporting chips.
- To study the Architecture of 8051 microcontroller.
- To design a microcontroller based system

UNIT I  THE 8086 MICROPROCESSOR

Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming – Modular Programming - Linking and Relocation - Stacks - Procedures – Macros – Interrupts and interrupt service routines – Byte and String Manipulation.

UNIT II  8086 SYSTEM BUS STRUCTURE


UNIT III  I/O INTERFACING


UNIT IV  MICROCONTROLLER

Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming.

UNIT V  INTERFACING MICROCONTROLLER

Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation - Comparison of Microprocessor, Microcontroller, PIC and ARM processors

OUTCOMES:

At the end of the course, the students should be able to:

- Understand and execute programs based on 8086 microprocessor.
- Design Memory Interfacing circuits.
- Design and interface I/O circuits.
- Design and implement 8051 microcontroller based systems.

TEXT BOOKS:

REFERENCES:

IT8501 WEB TECHNOLOGY

OBJECTIVES:
- To understand about client-server communication and protocols used during communication.
- To design interactive web pages using Scripting languages.
- To learn server side programming using servlets and JSP.
- To develop web pages using XML/XSLT.

UNIT I WEB SITE BASICS AND HTML

UNIT II CSS AND CLIENT SIDE SCRIPTING

UNIT III SERVER SIDE SCRIPTING

UNIT IV JSP AND XML

UNIT V AJAX AND WEB SERVICES

TOTAL 45 PERIODS
OUTCOMES:
At the end of the course, the student should be able to:
- Design simple web pages using markup languages like HTML and XHTML.
- Create dynamic web pages using DHTML and java script that is easy to navigate and use.
- Program server side web pages that have to process request from client side web pages.
- Represent web data using XML and develop web pages using JSP.
- Understand various web services and how these web services interact.

TEXT BOOK:

REFERENCES

OBJECTIVES:
- To understand the phases in a software project
- To understand fundamental concepts of requirements engineering and Analysis Modeling.
- To understand the various software design methodologies
- To learn various testing and maintenance measures

UNIT I SOFTWARE PROCESS AND AGILE DEVELOPMENT 9

UNIT II REQUIREMENTS ANALYSIS AND SPECIFICATION 9

UNIT III SOFTWARE DESIGN 9
UNIT IV TESTING AND MAINTENANCE

UNIT V PROJECT MANAGEMENT

OUTCOMES:
On Completion of the course, the students should be able to:
- Identify the key activities in managing a software project.
- Compare different process models.
- Concepts of requirements engineering and Analysis Modeling.
- Apply systematic procedure for software design and deployment.
- Compare and contrast the various testing and maintenance.
- Manage project schedule, estimate project cost and effort required.

TEXT BOOKS:

REFERENCES:
5. http://nptel.ac.in/.

EC8681 MICROPROCESSORS AND MICROCONTROLLERS LABORATORY

OBJECTIVES:
- To Introduce ALP concepts, features and Coding methods
- Write ALP for arithmetic and logical operations in 8086 and 8051
- Differentiate Serial and Parallel Interface
- Interface different I/Os with Microprocessors
- Be familiar with MASM
LIST OF EXPERIMENTS:
8086 Programs using kits and MASM
1. Basic arithmetic and Logical operations
2. Move a data block without overlap
3. Code conversion, decimal arithmetic and Matrix operations.
4. Floating point operations, string manipulations, sorting and searching
5. Password checking, Print RAM size and system date
6. Counters and Time Delay

Peripherals and Interfacing Experiments
7. Traffic light controller
8. Stepper motor control
9. Digital clock
10. Key board and Display
11. Printer status
12. Serial interface and Parallel interface
13. A/D and D/A interface and Waveform Generation

8051 Experiments using kits and MASM
14. Basic arithmetic and Logical operations
15. Square and Cube program, Find 2’s complement of a number
16. Unpacked BCD to ASCII

TOTAL: 60 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Write ALP Programmes for fixed and Floating Point and Arithmetic operations
- Interface different I/Os with processor
- Generate waveforms using Microprocessors
- Execute Programs in 8051
- Explain the difference between simulator and Emulator

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:

HARDWARE:
8086 development kits - 30 nos
Interfacing Units - Each 10 nos
Microcontroller - 30 nos

SOFTWARE:
Intel Desktop Systems with MASM - 30 nos
8086 Assembler
8051 Cross Assembler

CS8581 NETWORKS LABORATORY

OBJECTIVES:
- To learn and use network commands.
- To learn socket programming.
- To implement and analyze various network protocols.
- To learn and use simulation tools.
- To use simulation tools to analyze the performance of various network protocols.
LIST OF EXPERIMENTS
1. Learn to use commands like tcpdump, netstat, ifconfig, nslookup and traceroute. Capture ping and traceroute PDUs using a network protocol analyzer and examine.
2. Write a HTTP web client program to download a web page using TCP sockets.
3. Applications using TCP sockets like:
   - Echo client and echo server
   - Chat
   - File Transfer
4. Simulation of DNS using UDP sockets.
5. Write a code simulating ARP /RARP protocols.
6. Study of Network simulator (NS) and Simulation of Congestion Control Algorithms using NS.
7. Study of TCP/UDP performance using Simulation tool.
8. Simulation of Distance Vector/ Link State Routing algorithm.
10. Simulation of error correction code (like CRC).

TOTAL: 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Implement various protocols using TCP and UDP.
- Compare the performance of different transport layer protocols.
- Use simulation tools to analyze the performance of various network protocols.
- Analyze various routing algorithms.
- Implement error correction codes.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

LABORATORY REQUIREMENT FOR BATCH OF 30 STUDENTS:
HARDWARE:
1. Standalone desktops 30 Nos

SOFTWARE:
2. C / C++ / Java / Python / Equivalent Compiler 30
3. Network simulator like NS2/Glomosim/OPNET/ Packet Tracer / Equivalent

OBJECTIVES:
- To design interactive web pages using Scripting languages.
- To learn server side programming using servlets and JSP.
- To develop web pages using XML/XSLT.

LIST OF EXPERIMENTS
1. Create a web page with the following using HTML.
   i) To embed an image map in a web page.
   ii) To fix the hot spots.
   iii) Show all the related information when the hot spots are clicked
2. Create a web page with all types of Cascading style sheets.
3. Client Side Scripts for Validating Web Form Controls using DHTML.
4. Installation of Apache Tomcat web server.
5. Write programs in Java using Servlets:
   To invoke servlets from HTML forms.
   Session Tracking.
6. Write programs in Java to create three-tier applications using JSP and Databases
   • For conducting on-line examination.
   • For displaying student mark list. Assume that student information is available in a
     database which has been stored in a database server.
7. Programs using XML – Schema – XSLT/XSL.
8. Programs using DOM and SAX parsers.
9. Programs using AJAX.
10. Consider a case where we have two web Services- an airline service and a travel agent and the
    travel agent is searching for an airline. Implement this scenario using Web Services and Data
    base.

TOTAL: 60PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
• Design simple web pages using markup languages like HTML and XHTML.
• Create dynamic web pages using DHTML and java script that is easy to navigate and use.
• Program server side web pages that have to process request from client side web pages.
• Represent web data using XML and develop web pages using JSP.
• Understand various web services and how these web services interact.

SOFTWARE REQUIRED:
• Dream Weaver or Equivalent, MySQL or Equivalent, Apache Server, WAMP/XAMPP

IT8601    COMPUTATIONAL INTELLIGENCE  L T P C
          3 0 0 3

OBJECTIVES:
• To provide a strong foundation on fundamental concepts in Computational Intelligence.
• To enable Problem-solving through various searching techniques.
• To apply these techniques in applications which involve perception, reasoning and learning.
• To apply Computational Intelligence techniques for information retrieval
• To apply Computational Intelligence techniques primarily for machine learning.

UNIT I    INTRODUCTION
Introduction to Artificial Intelligence-Search-Heuristic Search-A* algorithm-Game Playing- Alpha-Beta
Pruning-Expert systems-Inference-Rules-Forward Chaining and Backward Chaining- Genetic
Algorithms.

UNIT II    KNOWLEDGE REPRESENTATION AND REASONING
Proposition Logic - First Order Predicate Logic – Unification – Forward Chaining -Backward Chaining -
Resolution – Knowledge Representation - Ontological Engineering - Categories and Objects – Events -
Mental Events and Mental Objects - Reasoning Systems for Categories - Reasoning with Default
Information - Prolog Programming.
UNIT III
Uncertainty


UNIT IV
Learning

Probability basics - Bayes Rule and its Applications - Bayesian Networks - Exact and Approximate Inference in Bayesian Networks - Hidden Markov Models - Forms of Learning - Supervised Learning - Learning Decision Trees - Regression and Classification with Linear Models - Artificial Neural Networks - Nonparametric Models - Support Vector Machines - Statistical Learning - Learning with Complete Data - Learning with Hidden Variables - The EM Algorithm - Reinforcement Learning

UNIT V
Intelligence and Applications


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

1. Provide a basic exposition to the goals and methods of Computational Intelligence.
2. Study of the design of intelligent computational techniques.
3. Apply the Intelligent techniques for problem solving.
4. Improve problem solving skills using the acquired knowledge in the areas of, reasoning, natural language understanding, computer vision, automatic programming and machine learning.

Text Books:

References:
UNIT II  STATIC UML DIAGRAMS

Class Diagram— Elaboration – Domain Model – Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies – Aggregation and Composition - Relationship between sequence diagrams and use cases – When to use Class Diagrams

UNIT III  DYNAMIC AND IMPLEMENTATION UML DIAGRAMS


Implementation Diagrams - UML package diagram - When to use package diagrams - Component and Deployment Diagrams – When to use Component and Deployment diagrams

UNIT IV  DESIGN PATTERNS

GRASP: Designing objects with responsibilities – Creator – Information expert – Low Coupling – High Cohesion – Controller


UNIT V  TESTING

Object Oriented Methodologies – Software Quality Assurance – Impact of object orientation on Testing – Develop Test Cases and Test Plans

TOTAL: 45 PERIODS

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

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
The student should be made to:
- Understand the basic concepts of mobile computing
- Understand Wireless LAN, Bluetooth and WiFi Technologies
- Be familiar with the network protocol stack
- Learn the basics of mobile telecommunication system
- Be exposed to Ad-Hoc networks

UNIT I  INTRODUCTION

UNIT II  MOBILE TELECOMMUNICATION SYSTEM

UNIT III  WIRELESS NETWORKS
Wireless LANs and PANs – IEEE 802.11 Standard – Architecture – Services – Blue Tooth- Wi-Fi – WiMAX

UNIT IV  MOBILE NETWORK LAYER

UNIT V  MOBILE TRANSPORT AND APPLICATION LAYER

OUTCOMES:
At the end of the course, the student should be able to:
- Explain the basics of mobile telecommunication system
- Illustrate the generations of telecommunication systems in wireless network
- Understand the architecture of Wireless LAN technologies
- Determine the functionality of network layer and Identify a routing protocol for a given Ad hoc networks
- Explain the functionality of Transport and Application layer

TEXT BOOKS:

TOTAL: 45 PERIODS
REFERENCES:


CS8091

BIG DATA ANALYTICS

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

UNIT I

INTRODUCTION TO BIG DATA

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

UNIT II

CLUSTERING AND CLASSIFICATION


UNIT III

ASSOCIATION AND RECOMMENDATION SYSTEM

UNIT IV       STREAM MEMORY

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

OUTCOMES:
Upon completion of the course, the students will be able to:
- Work with big data tools and its analysis techniques
- Analyze data by utilizing clustering and classification algorithms
- Learn and apply different mining algorithms and recommendation systems for large volumes of data
- Perform analytics on data streams
- Learn NoSQL databases and management.

TEXT BOOKS:

REFERENCES:
CS8092  COMPUTER GRAPHICS AND MULTIMEDIA  L  T  P  C
3  0  0  3

OBJECTIVES:
• To develop an understanding and awareness how issues such as content, information architecture, motion, sound, design, and technology merge to form effective and compelling interactive experiences for a wide range of audiences and end users.
• To become familiar with various software programs used in the creation and implementation of multi-media
• To appreciate the importance of technical ability and creativity within design practice.
• To gain knowledge about graphics hardware devices and software used.
• To understand the two-dimensional graphics and their transformations.
• To understand the three-dimensional graphics and their transformations.
• To appreciate illumination and color models
• To become familiar with understand clipping techniques
• To become familiar with Blender Graphics

UNIT I  ILLUMINATION AND COLOR MODELS  9
Light sources - basic illumination models – halftone patterns and dithering techniques; Properties of light - Standard primaries and chromaticity diagram; Intuitive colour concepts - RGB colour model - YIQ colour model - CMY colour model - HSV colour model - HLS colour model; Colour selection. Output primitives – points and lines, line drawing algorithms, loading the frame buffer, line function; circle and ellipse generating algorithms; Pixel addressing and object geometry, filled area primitives.

UNIT II  TWO-DIMENSIONAL GRAPHICS  9
Two dimensional geometric transformations – Matrix representations and homogeneous coordinates, composite transformations; Two dimensional viewing – viewing pipeline, viewing coordinate reference frame; window-to-viewport coordinate transformation, Two dimensional viewing functions; clipping operations – point, line, and polygon clipping algorithms.

UNIT III  THREE-DIMENSIONAL GRAPHICS  9
Three dimensional concepts; Three dimensional object representations – Polygon surfaces-Polygon tables- Plane equations - Polygon meshes - Curved Lines and surfaces, Quadratic surfaces; Blobby objects; Spline representations – Bezier curves and surfaces -B-Spline curves and surfaces. TRANSFORMATION AND VIEWING: Three dimensional geometric and modeling transformations – Translation, Rotation, Scaling, composite transformations; Three dimensional viewing – viewing pipeline, viewing coordinates, Projections, Clipping; Visible surface detection methods.

UNIT IV  MULTIMEDIA SYSTEM DESIGN & MULTIMEDIA FILE HANDLING  9
UNIT V          HYPERMEDIA

OUTCOMES:
At the end of the course, the students should be able to:
- Design two dimensional graphics.
- Apply two dimensional transformations.
- Design three dimensional graphics.
- Apply three dimensional transformations.
- Apply Illumination and color models.
- Apply clipping techniques to graphics.
- Understood Different types of Multimedia File Format
- Design Basic 3d Scenes using Blender

TEXT BOOKS:

REFERENCES:
   https://www.blender.org/support/tutorials/

CS8662 MOBILE APPLICATION DEVELOPMENT LABORATORY

OBJECTIVES:
- To understand the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
- To understand how to work with various mobile application development frameworks.
- To learn the basic and important design concepts and issues of development of mobile applications.
- To understand the capabilities and limitations of mobile devices.
LIST OF EXPERIMENTS
1. Develop an application that uses GUI components, Font and Colours
2. Develop an application that uses Layout Managers and event listeners.
3. Write an application that draws basic graphical primitives on the screen.
4. Develop an application that makes use of databases.
5. Develop an application that makes use of Notification Manager
6. Implement an application that uses Multi-threading
7. Develop a native application that uses GPS location information
8. Implement an application that writes data to the SD card.
9. Implement an application that creates an alert upon receiving a message
10. Write a mobile application that makes use of RSS feed
11. Develop a mobile application to send an email.
12. Develop a Mobile application for simple needs (Mini Project)

TOTAL: 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Develop mobile applications using GUI and Layouts.
- Develop mobile applications using Event Listener.
- Develop mobile applications using Databases.
- Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multi-threading and GPS.
- Analyze and discover own mobile app for simple needs.

REFERENCES:
1. Build Your Own Security Lab, Michael Gregg, Wiley India

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS
Standalone desktops with Windows or Android or iOS or Equivalent Mobile Application Development Tools with appropriate emulators and debuggers - 30 Nos

CS8582 OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY

OBJECTIVES:
- To capture the requirements specification for an intended software system
- To draw the UML diagrams for the given specification
- To map the design properly to code
- To test the software system thoroughly for all scenarios
- To improve the design by applying appropriate design patterns.

Draw standard UML diagrams using an UML modeling tool for a given case study and map design to code and implement a 3 layered architecture. Test the developed code and validate whether the SRS is satisfied.

1. Identify a software system that needs to be developed.
2. Document the Software Requirements Specification (SRS) for the identified system.
3. Identify use cases and develop the Use Case model.
4. Identify the conceptual classes and develop a Domain Model and also derive a Class Diagram from that.
5. Using the identified scenarios, find the interaction between objects and represent them using UML Sequence and Collaboration Diagrams.
6. Draw relevant State Chart and Activity Diagrams for the same system.
7. Implement the system as per the detailed design.
8. Test the software system for all the scenarios identified as per the usecase diagram.
9. Improve the reusability and maintainability of the software system by applying appropriate design patterns.
10. Implement the modified system and test it for various scenarios.

**SUGGESTED DOMAINS FOR MINI-PROJECT:**
1. Passport automation system.
2. Book bank.
3. Exam registration.
4. Stock maintenance system.
5. Online course reservation system.
6. Airline/Railway reservation system.
7. Software personnel management system.
8. Credit card processing.
10. Recruitment system.
11. Foreign trading system.
12. Conference management system.
13. BPO management system.
14. Library management system.
15. Student information system.

**TOTAL: 60 PERIODS.**

**OUTCOMES:**
Upon completion of this course, the students will be able to:
- Perform OO analysis and design for a given problem specification.
- Identify and map basic software requirements in UML mapping.
- Improve the software quality using design patterns and to explain the rationale behind applying specific design patterns.
- Test the compliance of the software with the SRS.

**HARDWARE REQUIREMENTS**
Standard PC

**SOFTWARE REQUIREMENTS**
1. Windows 7 or higher.
2. ArgoUML that supports UML 1.4 and higher.
3. Selenium, JUnit or Apache JMeter.
OBJECTIVES:
The course aims to:
- Enhance the Employability and Career Skills of students
- Orient the students towards grooming as a professional
- Make them Employable Graduates
- Develop their confidence and help them attend interviews successfully.

UNIT I
Introduction to Soft Skills - Hard skills & soft skills - employability and career Skills—Grooming as a professional with values—Time Management—General awareness of Current Affairs

UNIT II
Self-Introduction-organizing the material - Introducing oneself to the audience – introducing the topic – answering questions – individual presentation practice— presenting the visuals effectively – 5 minute presentations

UNIT III
Introduction to Group Discussion— Participating in group discussions – understanding group dynamics - brainstorming the topic --- questioning and clarifying –GD strategies- activities to improve GD skills

UNIT IV
Interview etiquette – dress code – body language – attending job interviews– telephone/skype interview -one to one interview &panel interview – FAQs related to job interviews

UNIT V
Recognizing differences between groups and teams- managing time-managing stress- networking professionally- respecting social protocols-understanding career management-developing a long-term career plan-making career changes

TOTAL : 30 PERIODS

OUTCOMES:
At the end of the course Learners will be able to:
- Make effective presentations
- Participate confidently in Group Discussions.
- Attend job interviews and be successful in them.
- Develop adequate Soft Skills required for the workplace

Recommended Software
1. Open Source Software
2. Win English

REFERENCES:
OBJECTIVES:
- To enable the students to study the evolution of Management, to study the functions and principles of management and to learn the application of the principles in an organization.

UNIT I INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS 9

UNIT II PLANNING 9

UNIT III ORGANISING 9

UNIT IV DIRECTING 9

UNIT V CONTROLLING 9
System and process of controlling – budgetary and non-budgetary control techniques – use of computers and IT in Management control – Productivity problems and management – control and performance – direct and preventive control – reporting.

TOTAL: 45 PERIODS

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

TEXTBOOKS:

REFERENCES:
OBJECTIVES:

- To understand Cryptography Theories, Algorithms and Systems.
- To understand necessary Approaches and Techniques to build protection mechanisms in order to secure computer networks.

UNIT I

INTRODUCTION


UNIT II

SYMMETRIC CRYPTOGRAPHY


UNIT III

PUBLIC KEY CRYPTOGRAPHY


UNIT IV

MESSAGE AUTHENTICATION AND INTEGRITY


UNIT V

SECURITY PRACTICE AND SYSTEM SECURITY


TOTAL 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to:

- Understand the fundamentals of networks security, security architecture, threats and vulnerabilities
- Apply the different cryptographic operations of symmetric cryptographic algorithms
- Apply the different cryptographic operations of public key cryptography
- Apply the various Authentication schemes to simulate different applications.
- Understand various Security practices and System security standards

TEXT BOOK:

REFERENCES:
1. C K Shyamala, N Harini and Dr. T R Padmanabhan: Cryptography and Network Security, Wiley India Pvt.Ltd

CS8791 CLOUD COMPUTING
L T P C 3 0 0 3

OBJECTIVES:
- To understand the concept of cloud computing.
- To appreciate the evolution of cloud from the existing technologies.
- To have knowledge on the various issues in cloud computing.
- To be familiar with the lead players in cloud.
- To appreciate the emergence of cloud as the next generation computing paradigm.

UNIT I INTRODUCTION

UNIT II CLOUD ENABLING TECHNOLOGIES

UNIT III CLOUD ARCHITECTURE, SERVICES AND STORAGE

UNIT IV RESOURCE MANAGEMENT AND SECURITY IN CLOUD

UNIT V CLOUD TECHNOLOGIES AND ADVANCEMENTS

TOTAL: 45 PERIODS
OUTCOMES:
On Completion of the course, the students should be able to:

- Articulate the main concepts, key technologies, strengths and limitations of cloud computing.
- Learn the key and enabling technologies that help in the development of cloud.
- Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
- Explain the core issues of cloud computing such as resource management and security.
- Be able to install and use current cloud technologies.
- Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.

TEXT BOOKS:

REFERENCES:

IT8711 FOSS AND CLOUD COMPUTING LABORATORY

OBJECTIVES:

- To learn and develop applications using gcc and make
- To learn and use version control systems
- To develop web applications in cloud
- To learn the design and development process involved in creating a cloud based application
- To learn to implement and use parallel programming using Hadoop
- Use gcc to compile c-programs. Split the programs to different modules and create an application using make command.
- Use version control systems command to clone, commit, push, fetch, pull, checkout, reset, and delete repositories.
- Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of windows7 or 8.
- Install a C compiler in the virtual machine created using virtual box and execute Simple Programs
- Install Google App Engine. Create hello world app and other simple web applications using python/java.
- Use GAE launcher to launch the web applications.
- Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.
- Find a procedure to transfer the files from one virtual machine to another virtual machine.
- Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)
- Install Hadoop single node cluster and run simple applications like wordcount.

TOTAL : 60 PERIODS
OUTCOMES:
On completion of this course, the students will be able to:
- Configure various virtualization tools such as Virtual Box, VMware workstation.
- Design and deploy a web application in a PaaS environment.
- Learn how to simulate a cloud environment to implement new schedulers.
- Install and use a generic cloud environment that can be used as a private cloud.
- Manipulate large data sets in a parallel environment.

IT8761 SECURITY LABORATORY

OBJECTIVES:
- To learn different cipher techniques
- To implement the algorithms DES, RSA, MD5, SHA-1
- To use network security tools and vulnerability assessment tools

LIST OF EXPERIMENTS
1. Perform encryption, decryption using the following substitution techniques
   (i) Caesar cipher, (ii) playfair cipher (iii) Hill Cipher (iv) Vigenere cipher
2. Perform encryption and decryption using following transposition techniques
   (i) Rail fence (ii) row & Column Transformation
3. Apply DES algorithm for practical applications.
4. Apply AES algorithm for practical applications.
5. Implement RSA Algorithm using HTML and JavaScript
7. Calculate the message digest of a text using the SHA-1 algorithm.
8. Implement the SIGNATURE SCHEME - Digital Signature Standard.
9. Demonstrate intrusion detection system (IDS) using any tool eg. Snort or any other s/w.
10. Automated Attack and Penetration Tools
    Exploring N-Stalker, a Vulnerability Assessment Tool
11. Defeating Malware
    i) Building Trojans ii) Rootkit Hunter

TOTAL: 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to:
- Develop code for classical Encryption Techniques to solve the problems.
- Build cryptosystems by applying symmetric and public key encryption algorithms.
- Construct code for authentication algorithms.
- Develop a signature scheme using Digital signature standard.
- Demonstrate the network security system using open source tools

REFERENCES:
1. Build Your Own Security Lab, Michael Gregg, Wiley India

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS: SOFTWARE: C / C++ / Java or equivalent compiler GnuPG, Snort, N-Stalker or Equivalent HARDWARE: Standalone desktops - 30 Nos. (or) Server supporting 30 terminals or more.
OBJECTIVES:

- To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination.

The students in a group of 3 to 4 works on a topic approved by the head of the department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.

TOTAL: 300 PERIODS

OUTCOME:

- On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

OBJECTIVES:

- To learn the criteria for test cases.
- To learn the design of test cases.
- To understand test management and test automation techniques.
- To apply test metrics and measurements.

UNIT I INTRODUCTION

UNIT II TEST CASE DESIGN STRATEGIES

UNIT III LEVELS OF TESTING
The need for Levels of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – Scenario testing – Defect bash elimination System

UNIT IV TEST MANAGEMENT

UNIT V TEST AUTOMATION

OUTCOMES:
At the end of the course the students will be able to:
- Design test cases suitable for a software development for different domains.
- Identify suitable tests to be carried out.
- Prepare test planning based on the document.
- Document test plans and test cases designed.
- Use automatic testing tools.
- Develop and validate a test plan.

TEXT BOOKS:

REFERENCES:

CS8077 GRAPH THEORY AND APPLICATIONS

OBJECTIVES:
- To understand fundamentals of graph theory.
- To study proof techniques related to various concepts in graphs.
- To explore modern applications of graph theory.

UNIT I
Introduction - Graph Terminologies - Types of Graphs - Sub Graph- Multi Graph - Regular Graph - Isomorphism - Isomorphic Graphs - Sub-graph - Euler graph - Hamiltonian Graph - Related Theorems.
UNIT II 9

UNIT III 9
Network Flows - Planar Graph - Representation - Detection - Dual Graph - Geometric and Combinatorial Dual - Related Theorems - Digraph - Properties - Euler Digraph.

UNIT IV 9

UNIT V 9
Graph Algorithms - Connectedness and Components - Spanning Tree - Fundamental Circuits - Cut Vertices - Directed Circuits - Shortest Path - Applications overview.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the students should be able to
- Understand the basic concepts of graphs, and different types of graphs
- Understand the properties, theorems and be able to prove theorems.
- Apply suitable graph model and algorithm for solving applications.

TEXT BOOKS:

REFERENCES

IT8071 DIGITAL SIGNAL PROCESSING L T P C
3 0 0 3

OBJECTIVES:
- To understand the basics of discrete time signals, systems and their classifications.
- To analyze the discrete time signals in both time and frequency domain.
- To design lowpass digital IIR filters according to predefined specifications based on analog filter theory and analog-to-digital filter transformation.
- To design Linear phase digital FIR filters using fourier method, window technique
- To realize the concept and usage of DSP in various engineering fields.
UNIT I  DISCRETE TIME SIGNALS AND SYSTEMS  9

UNIT II  ANALYSIS OF LTI DISCRETE TIME SIGNALS AND SYSTEMS  9

UNIT III  INFINITE IMPULSE RESPONSE FILTERS  9

UNIT IV  FINITE IMPULSE RESPONSE FILTERS  9

UNIT V  APPLICATIONS OF DSP  9

TOTAL  45  PERIODS

OUTCOMES:
At the end of the course, the students should be able to:

- Perform mathematical operations on signals.
- Understand the sampling theorem and perform sampling on continuous-time signals to get discrete time signal by applying advanced knowledge of the sampling theory.
- Transform the time domain signal into frequency domain signal and vice-versa.
- Apply the relevant theoretical knowledge to design the digital IIR/FIR filters for the given analog specifications.

TEXT BOOK:

REFERENCES
OBJECTIVES:
- To understand the basic components of Storage System Environment.
- To understand the Storage Area Network Characteristics and Components.
- To examine emerging technologies including IP-SAN.
- To describe the different backup and recovery topologies and their role in providing disaster recovery and business continuity capabilities.
- To understand the local and remote replication technologies.

UNIT I  STORAGE SYSTEMS

UNIT II  STORAGE NETWORKING TECHNOLOGIES

UNIT III  ADVANCED STORAGE NETWORKING AND VIRTUALIZATION

UNIT IV  BUSINESS CONTINUITY

UNIT V  REPLICATION

TOTAL: 45 PERIODS

OUTCOMES:
On Successful completion of the course, Students will be able to
- Understand the logical and physical components of a Storage infrastructure.
- Evaluate storage architectures, including storage subsystems, DAS, SAN, NAS, and CAS.
- Understand the various forms and types of Storage Virtualization.
• Describe the different role in providing disaster recovery and business continuity capabilities.
• Distinguish different remote replication technologies.

TEXT BOOK:
1. EMC Corporation, Information Storage and Management, Wiley, India.

REFERENCES:

CS8072 AGILE METHODOLOGIES

OBJECTIVES:
• To provide students with a theoretical as well as practical understanding of agile software development practices and how small teams can apply them to create high-quality software.
• To provide a good understanding of software design and a set of software technologies and APIs.
• To do a detailed examination and demonstration of Agile development and testing techniques.
• To understand the benefits and pitfalls of working in an Agile team.
• To understand Agile development and testing.

UNIT I AGILE METHODOLOGY

UNIT II AGILE PROCESSES

UNIT III AGILITY AND KNOWLEDGE MANAGEMENT

UNIT IV AGILITY AND REQUIREMENTS ENGINEERING

UNIT V AGILITY AND QUALITY ASSURANCE
OUTCOMES:
Upon completion of the course, the students will be able to:

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

TEXT BOOKS:

REFERENCES:

IT8072 EMBEDDED SYSTEMS

OBJECTIVES:
- To learn the architecture and programming of ARM processor.
- To become familiar with the embedded computing platform design and analysis.
- To get thorough knowledge in interfacing concepts
- To design an embedded system and to develop programs

UNIT I INTRODUCTION TO EMBEDDED COMPUTING AND ARM PROCESSORS
Complex systems and micro processors—Embedded system design process—Design example: Model train controller- Instruction sets preliminaries - ARM Processor – CPU: programming input and output-supervisor mode, exceptions and traps – Co-processors- Memory system mechanisms – CPU performance- CPU power consumption.

UNIT II EMBEDDED COMPUTING PLATFORM DESIGN
The CPU Bus-Memory devices and systems—Designing with computing platforms – consumer electronics architecture – platform-level performance analysis - Components for embedded programs- Models of programs- Assembly, linking and loading – compilation techniques- Program level performance analysis – Software performance optimization – Program level energy and power analysis and optimization – Analysis and optimization of program size- Program validation and testing.
UNIT III SENSOR INTERFACING WITH ARDUINO
Basics of hardware design and functions of basic passive components-sensors and actuators-Arduino code - library file for sensor interfacing-construction of basic applications

UNIT IV EMBEDDED Firmware
Reset Circuit, Brown-out Protection Circuit-Oscillator Unit - Real Time Clock-Watchdog Timer - Embedded Firmware Design Approaches and Development Languages.

UNIT V EMBEDDED C PROGRAMMING
Introduction-Creating ‘hardware delays’ using Timer 0 and Timer 1-Reading switches-Adding Structure to the code-Generating a minimum and maximum delay-Example: Creating a portable hardware delay- Timeout mechanisms-Creating loop timeouts-Testing loop timeouts- hardware timeouts-Testing a hardware timeout

OUTCOMES:
Upon completion of the course, students will be able to:
• Describe the architecture and programming of ARM processor.
• Explain the concepts of embedded systems
• Understand the Concepts of peripherals and interfacing of sensors.
• Capable of using the system design techniques to develop firmware
• Illustrate the code for constructing a system

TEXT BOOKS:
2. https://www.coursera.org/learn/interface-with-arduino#syllabus (Unit III)

REFERENCES:

GE8075 INTELLECTUAL PROPERTY RIGHTS L T P C
3 0 0 3

OBJECTIVE:
• To give an idea about IPR, registration and its enforcement.

UNIT I INTRODUCTION
Introduction to IPRs, Basic concepts and need for Intellectual Property - Patents, Copyrights, Geographical Indications, IPR in India and Abroad – Genesis and Development – the way from WTO to WIPO –TRIPS, Nature of Intellectual Property, Industrial Property, technological Research, Inventions and Innovations – Important examples of IPR.

UNIT II REGISTRATION OF IPRs
Meaning and practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications, Trade Secrets and Industrial Design registration in India and Abroad
UNIT III AGREEMENTS AND LEGISLATIONS

UNIT IV DIGITAL PRODUCTS AND LAW

UNIT V ENFORCEMENT OF IPRs
Infringement of IPRs, Enforcement Measures, Emerging issues – Case Studies.

TOTAL : 45 PERIODS

OUTCOME:
- Ability to manage Intellectual Property portfolio to enhance the value of the firm.

TEXT BOOKS:

REFERENCES:

IT8002 WEB DEVELOPMENT FRAMEWORKS

OBJECTIVES:
The student should be made to:
- Understand the fundamentals of web framework
- Know the concept of Java web framework
- Learn the technologies of Python web framework
- Be exposed to the concepts of Web framework
- Be familiar with Web framework

UNIT I FUNDAMENTALS OF WEB FRAMEWORK

UNIT II JAVA WEB FRAMEWORK
Java Web Frameworks-Struts-The Struts Framework- The Struts Tag Libraries- - Struts Configuration Files- Applying Struts-
UNIT III  STRUTS 2  9
Struts and Agile Development -Basic Configuration-Actions and Action Support-Results and Result Types-OGNL, the Value Stack, and Custom Tags-Form Tags-Form Validation and Type Conversion-Exceptions and Logging-Getting Started with JavaScript-Advanced JavaScript, the DOM, and CSS-Themes and Templates-Rich Internet Applications.

UNIT IV  PYTHON WEB FRAMEWORKS  9
Introduction to Python Frameworks-Web 2.0, Python, and Frameworks-The Role of AJAX in Web 2.0-Web 2.0 with Traditional Python-Introducing the Frameworks-Web Application Frameworks-MVC in Web Application Frameworks-Common Web Application Framework Capabilities

UNIT V  TURBOGEARS WEB FRAMEWORK  9
Introduction to TurboGears-TurboGears History-Main TurboGears Components-Alternate Components-MVC Architecture in TurboGears-Creating an Example Application-The Controller and View-Introduction to Django-Django History-Django Components-Alternate Components-MVC Architecture in Django-Creating an Example Application

TOTAL : 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Analyze the fundamentals of web framework
- Use the concept of Java web framework
- Implement the concept using Struts framework
- Apply the concept of python web framework to the problem solutions.
- Critically analyze the various Web frameworks.

TEXT BOOKS:
4. Programming with Django and TurboGears”, Wiley Publishing
5. Carlos De La Guardia,"Python Web Frameworks", O'Reilly

REFERENCES:

CS8082  MACHINE LEARNING TECHNIQUES  L T P C
         3 0 0 3

OBJECTIVES:
- To understand the need for machine learning for various problem solving
- To study the various supervised, semi-supervised and unsupervised learning algorithms in machine learning
- To learn the new approaches in machine learning
- To design appropriate machine learning algorithms for problem solving

UNIT I  INTRODUCTION  9
Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and

UNIT II NEURAL NETWORKS AND GENETIC ALGORITHMS

UNIT III BAYESIAN AND COMPUTATIONAL LEARNING

UNIT IV INSTANT BASED LEARNING
K- Nearest Neighbour Learning – Locally weighted Regression – Radial Bases Functions – Case Based Learning.

UNIT V ADVANCED LEARNING

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the students will be able to
- Differentiate between supervised, unsupervised, semi-supervised machine learning approaches
- Apply specific supervised or unsupervised machine learning algorithm for a particular problem
- Analyse and suggest the appropriate machine learning approach for the various types of problem
- Design and make modifications to existing machine learning algorithms to suit an individual application
- Provide useful case studies on the advanced machine learning algorithms

TEXT BOOK:

REFERENCES:
OBJECTIVES:
- To understand a finite automata for a given language.
- To understand the relation between grammar and language
- To understand the basic principles of working of a compiler
- To study about the type checking procedure during the compilation
- To understand the storage structure of the running program

UNIT I AUTOMATA

UNIT II CONTEXT FREE GRAMMARS AND LANGUAGES

UNIT III BASICS OF COMPILATION

UNIT IV TYPE CHECKING AND RUNTIME ENVIRONMENTS

UNIT V CODE GENERATION AND OPTIMIZATION
Issues in the design of a code generator - The target machine - Run-time storage management - Basic blocks and flow graphs - Next-use information - A simple code generator - Register allocation and assignment - The dag representation of basic blocks - Generating code from DAG – Dynamic programming code generation algorithm – Code generator generators - Code optimization.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students should be able to:
- Design a finite automaton for a specific language.
- Design a Turing machine.
- Select appropriate grammar for the implementation of compiler phases
- Design a lexical analyzer
- Design a simple parser
- Design and implement techniques used for optimization by a compiler.
- Write a very simple code generator
TEXT BOOKS:

REFERENCES:

CS8081 INTERNET OF THINGS L T P C
3 0 0 3

OBJECTIVES:
• To understand Smart Objects and IoT Architectures
• To learn about various IOT-related protocols
• To build simple IoT Systems using Arduino and Raspberry Pi.
• To understand data analytics and cloud in the context of IoT
• To develop IoT infrastructure for popular applications

UNIT I FUNDAMENTALS OF IoT 9

UNIT II IoT PROTOCOLS 9
IoT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.15.4g, 802.15.4e, 1901.2a, 802.11ah and LoRaWAN – Network Layer: IP versions, Constrained Nodes and Constrained Networks – Optimizing IP for IoT: From 6LoWPAN to 6Lo, Routing over Low Power and Lossy Networks – Application Transport Methods: Supervisory Control and Data Acquisition – Application Layer Protocols: CoAP and MQTT

UNIT III DESIGN AND DEVELOPMENT 9
Design Methodology - Embedded computing logic - Microcontroller, System on Chips - IoT system building blocks - Arduino - Board details, IDE programming - Raspberry Pi - Interfaces and Raspberry Pi with Python Programming.

UNIT IV DATA ANALYTICS AND SUPPORTING SERVICES 9

106
UNIT V  CASE STUDIES/INDUSTRIAL APPLICATIONS
Cisco IoT system - IBM Watson IoT platform – Manufacturing - Converged Plantwide Ethernet Model (CPwE) – Power Utility Industry – GridBlocks Reference Model - Smart and Connected Cities: Layered architecture, Smart Lighting, Smart Parking Architecture and Smart Traffic Control

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student should be able to:
- Explain the concept of IoT.
- Analyze various protocols for IoT.
- Design a PoC of an IoT system using Raspberry Pi/Arduino
- Apply data analytics and use cloud offerings related to IoT.
- Analyze applications of IoT in real time scenario

TEXTBOOK:

REFERENCES:

OBJECTIVES:
- To understand the Software Project Planning and Evaluation techniques.
- To plan and manage projects at each stage of the software development life cycle (SDLC).
- To learn about the activity planning and risk management principles.
- To manage software projects and control software deliverables.
- To develop skills to manage the various phases involved in project management and people management.
- To deliver successful software projects that support organization’s strategic goals.
UNIT I  PROJECT EVALUATION AND PROJECT PLANNING  9

UNIT II  PROJECT LIFE CYCLE AND EFFORT ESTIMATION  9

UNIT III  ACTIVITY PLANNING AND RISK MANAGEMENT  9

UNIT IV  PROJECT MANAGEMENT AND CONTROL  9

UNIT V  STAFFING IN SOFTWARE PROJECTS  9

TOTAL 45 PERIODS

OUTCOMES:
At the end of the course, the students should be able to:

• Understand Project Management principles while developing software.
• Gain extensive knowledge about the basic project management concepts, framework and the process models.
• Obtain adequate knowledge about software process models and software effort estimation techniques.
• Estimate the risks involved in various project activities.
• Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles.
• Learn staff selection process and the issues related to people management

TEXT BOOK:

REFERENCES:
OBJECTIVES:
- To learn fundamentals of XML
- To provide an overview of Service Oriented Architecture and Web services and their importance
- To learn web services standards and technologies
- To learn service oriented analysis and design for developing SOA based applications

UNIT I  XML  9

UNIT II  SERVICE ORIENTED ARCHITECTURE (SOA) BASICS  9
Characteristics of SOA, Benefits of SOA, Comparing SOA with Client-Server and Distributed architectures — Principles of Service Orientation – Service layers

UNIT III  WEB SERVICES (WS) AND STANDARDS  8

UNIT IV  WEB SERVICES EXTENSIONS  8

UNIT V  SERVICE ORIENTED ANALYSIS AND DESIGN  11
SOA delivery strategies – Service oriented analysis – Service Modelling – Service oriented design – Standards and composition guidelines -- Service design – Business process design – Case Study

OUTCOMES:
Upon successful completion of this course, the students will be able to:
- Understand XML technologies
- Understand service orientation, benefits of SOA
- Understand web services and WS standards
- Use web services extensions to develop solutions
- Understand and apply service modeling, service oriented analysis and design for application development

TEXTBOOKS:

REFERENCES:
OBJECTIVE:
- To facilitate the understanding of Quality Management principles and process.

UNIT I  INTRODUCTION

UNIT II  TQM PRINCIPLES
Leadership - Quality Statements, Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, 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
The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types.

UNIT IV  TQM TOOLS AND TECHNIQUES II
Quality Circles - Cost of Quality - Quality Function Deployment (QFD) - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures.

UNIT V  QUALITY MANAGEMENT SYSTEM

OUTCOMES:
- The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

TEXT BOOK:

REFERENCES:
4. ISO9001-2015 standards
OBJECTIVES:

- To learn the foundations of Human Computer Interaction.
- To become familiar with the design technologies for individuals and persons with disabilities.
- To be aware of mobile HCI.
- To learn the guidelines for user interface.

UNIT I FOUNDATIONS OF HCI


UNIT II DESIGN & SOFTWARE PROCESS


UNIT III MODELS AND THEORIES

HCI Models: Cognitive models: Socio-Organizational issues and stakeholder requirements – Communication and collaboration models - Hypertext, Multimedia and WWW.

UNIT IV MOBILE HCI


UNIT V WEB INTERFACE DESIGN

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow - Case Studies

TOTAL: 45 PERIODS

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

- Design effective dialog for HCI
- Design effective HCI for individuals and persons with disabilities.
- Assess the importance of user feedback.
- Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.
- Develop meaningful user interface.

TEXT BOOKS:

OBJECTIVES:
- To learn basic programming in C# and the object oriented programming concepts.
- To update and enhance skills in writing Windows applications, ADO.NET and ASP.NET.
- To study the advanced concepts in data connectivity, WPF, WCF and WWF with C# and .NET 4.5.
- To implement mobile applications using .Net compact framework.
- To understand the working of base class libraries, their operations and manipulation of data using XML.

UNIT I  C# LANGUAGE BASICS  9
.Net Architecture - Core C# - Variables - Data Types - Flow control - Objects and Types - Classes and Structs - Inheritance - Generics – Arrays and Tuples - Operators and Casts - Indexers

UNIT II  C# ADVANCED FEATURES  9
Delegates - Lambdas - Lambda Expressions - Events - Event Publisher - Event Listener - Strings and Regular Expressions - Generics - Collections - Memory Management and Pointers - Errors and Exceptions - Reflection

UNIT III  BASE CLASS LIBRARIES AND DATA MANIPULATION  9

UNIT IV  WINDOW BASED APPLICATIONS, WCF AND WWF  9
Window based applications - Core ASP.NET - ASP.NET Web forms -Windows Communication Foundation (WCF)- Introduction to Web Services - .Net Remoting - Windows Service - Windows Workflow Foundation (WWF) - Activities – Workflows

UNIT V  .NET FRAMEWORK AND COMPACT FRAMEWORK  9

TOTAL :45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Write various applications using C# Language in the .NET Framework.
- Develop distributed applications using .NET Framework.
- Create mobile applications using .NET compact Framework.
TEXT BOOKS:

REFERENCES

CS8088 WIRELESS ADHOC AND SENSOR NETWORKS L T P C 3 0 0 3

OBJECTIVES:
- To learn about the issues and challenges in the design of wireless ad hoc networks.
- To understand the working of MAC and Routing Protocols for ad hoc and sensor networks.
- To learn about the Transport Layer protocols and their QoS for ad hoc and sensor networks.
- To understand various security issues in ad hoc and sensor networks and the corresponding solutions.

UNIT I MAC & ROUTING IN AD HOC NETWORKS 9

UNIT II TRANSPORT & QOS IN AD HOC NETWORKS 9

UNIT III MAC & ROUTING IN WIRELESS SENSOR NETWORKS 9

UNIT IV TRANSPORT & QOS IN WIRELESS SENSOR NETWORKS 9
UNIT V      SECURITY IN AD HOC AND SENSOR NETWORKS


OUTCOMES:
Upon completion of the course, the students will be able to:
- Identify different issues in wireless ad hoc and sensor networks .
- To analyze protocols developed for ad hoc and sensor networks .
- To identify and understand security issues in ad hoc and sensor networks.

TEXT BOOKS:

REFERENCES:

GE8072      FOUNDATION SKILLS IN INTEGRATED PRODUCT DEVELOPMENT
L T P C
3 0 0 3

OBJECTIVES:
- To understand the global trends and development methodologies of various types of products and services
- To conceptualize, prototype and develop product management plan for a new product based on the type of the new product and development methodology integrating the hardware, software, controls, electronics and mechanical systems
- To understand requirement engineering and know how to collect, analyze and arrive at requirements for new product development and convert them in to design specification
- To understand system modeling for system, sub-system and their interfaces and arrive at the optimum system specification and characteristics
- To develop documentation, test specifications and coordinate with various teams to validate and sustain up to the EoL (End of Life) support activities for engineering customer
UNIT I FUNDAMENTALS OF PRODUCT DEVELOPMENT 9

UNIT II REQUIREMENTS AND SYSTEM DESIGN 9

UNIT III DESIGN AND TESTING 9

UNIT IV SUSTENANCE ENGINEERING AND END-OF-LIFE (EOL) SUPPORT 9

UNIT V BUSINESS DYNAMICS – ENGINEERING SERVICES INDUSTRY 9

TOTAL: 45 PERIODS

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

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

CS8071 ADVANCED TOPICS ON DATABASES  L T P C

OBJECTIVES:
• To learn the modeling and design of databases.
• To acquire knowledge on parallel and distributed databases and their applications.
• To study the usage and applications of Object Oriented and Intelligent databases.
• To understand the usage of advanced data models.
• To learn emerging databases such as XML, Cloud and Big Data.
• To acquire inquisitive attitude towards research topics in databases.

UNIT I PARALLEL AND DISTRIBUTED DATABASES

UNIT II OBJECT AND OBJECT RELATIONAL DATABASES

UNIT III INTELLIGENT DATABASES

UNIT IV ADVANCED DATA MODELS
UNIT V  EMERGING TECHNOLOGIES


TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able,
- To develop in-depth understanding of relational databases and skills to optimize database performance in practice.
- To understand and critique on each type of databases.
- To design faster algorithms in solving practical database problems.
- To implement intelligent databases and various data models.

TEXT BOOKS:

REFERENCES:

GE8074  HUMAN RIGHTS  

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

UNIT I  

UNIT II  

UNIT III  
Theories and perspectives of UN Laws – UN Agencies to monitor and compliance.

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

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

REFERENCES:

GE8071
DISASTER MANAGEMENT

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

UNIT I
INTRODUCTION TO DISASTERS
Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

UNIT II
APPROACHES TO DISASTER RISK REDUCTION (DRR)
Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake-holders- Institutional Processes and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT III
INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT
Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.
UNIT IV DISASTER RISK MANAGEMENT IN INDIA
Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

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

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

TEXTBOOKS:

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

CS8085 SOCIAL NETWORK ANALYSIS L T P C
3 0 0 3

OBJECTIVES:
- To understand the concept of semantic web and related applications.
- To learn knowledge representation using ontology.
- To understand human behaviour in social web and related communities.
- To 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

UNIT V  VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students should be able to:
- Develop semantic web related applications.
- Represent knowledge using ontology.
- Predict human behaviour in social web and related communities.
- Visualize social networks.

TEXT BOOKS:
REFERENCES:

CS8086 SOFT COMPUTING L T P C
60 0 0 3

OBJECTIVES:
- To learn the basic concepts of Soft Computing
- To become familiar with various techniques like neural networks, genetic algorithms and fuzzy systems.
- To apply soft computing techniques to solve problems.

UNIT I INTRODUCTION TO SOFT COMPUTING

UNIT II ARTIFICIAL NEURAL NETWORKS
Back propagation Neural Networks - Kohonen Neural Network - Learning Vector Quantization - Hamming Neural Network - Hopfield Neural Network - Bi-directional Associative Memory - Adaptive Resonance Theory Neural Networks - Support Vector Machines - Spike Neuron Models.

UNIT III FUZZY SYSTEMS

UNIT IV GENETIC ALGORITHMS

UNIT V HYBRID SYSTEMS

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of this course, the students should be able to
- Apply suitable soft computing techniques for various applications.
- Integrate various soft computing techniques for complex problems.

TEXT BOOKS:

REFERENCES:

CS8074 CYBER FORENSICS  L   T   P   C  
3   0   0   3

OBJECTIVES:
- To learn computer forensics
- To become familiar with forensics tools
- To learn to analyze and validate forensics data

UNIT I  INTRODUCTION TO COMPUTER FORENSICS  9

UNIT II  EVIDENCE COLLECTION AND FORENSICS TOOLS  9

UNIT III  ANALYSIS AND VALIDATION  9
Validating Forensics Data – Data Hiding Techniques – Performing Remote Acquisition – Network Forensics – Email Investigations – Cell Phone and Mobile Devices Forensics

UNIT IV  ETHICAL HACKING  9
Introduction to Ethical Hacking - Footprinting and Reconnaissance - Scanning Networks - Enumeration - System Hacking - Malware Threats - Sniffing
UNIT V ETHICAL HACKING IN WEB

TOTAL 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Understand the basics of computer forensics
- Apply a number of different computer forensic tools to a given scenario
- Analyze and validate forensics data
- Identify the vulnerabilities in a given network infrastructure
- Implement real-world hacking techniques to test system security

TEXT BOOKS:

REFERENCES

IT8073 INFORMATION SECURITY

OBJECTIVES:
- To understand the basics of Information Security
- To know the legal, ethical and professional issues in Information Security
- To know the aspects of risk management
- To become aware of various standards in this area
- To know the technological aspects of Information Security

UNIT I INTRODUCTION

UNIT II SECURITY INVESTIGATION
UNIT III SECURITY ANALYSIS

UNIT IV LOGICAL DESIGN

UNIT V PHYSICAL DESIGN

TOTAL 45 PERIODS

OUTCOMES:
At the end of this course, the students should be able to:
- Discuss the basics of information security
- Illustrate the legal, ethical and professional issues in information security
- Demonstrate the aspects of risk management.
- Become aware of various standards in the Information Security System
- Design and implementation of Security Techniques.

TEXT BOOK:

REFERENCES:

EC8093 DIGITAL IMAGE PROCESSING

OBJECTIVES:
- To become familiar with digital image fundamentals
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To become familiar with image compression and recognition methods

UNIT I DIGITAL IMAGE FUNDAMENTALS
UNIT II  IMAGE ENHANCEMENT  9
Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering—
Smoothing and Sharpening Spatial Filtering, Frequency Domain: Introduction to Fourier Transform—
Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters,
Homomorphic filtering, Color image enhancement.

UNIT III  IMAGE RESTORATION  9
Image Restoration - degradation model, Properties, Noise models – Mean Filters – Order Statistics –
Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering –
Inverse Filtering – Wiener filtering

UNIT IV  IMAGE SEGMENTATION  9
Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation –
Region growing – Region splitting and merging – Morphological processing- erosion and dilation,
Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed
segmentation algorithm.

UNIT V  IMAGE COMPRESSION AND RECOGNITION  9
Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG
standard, MPEG. Boundary representation, Boundary description, Fourier Descriptor, Regional
Descriptors – Topological feature, Texture - Patterns and Pattern classes - Recognition based on
matching.

TOTAL  45  PERIODS

OUTCOMES:
At the end of the course, the students should be able to:

- Know and understand the basics and fundamentals of digital image processing, such as
digitization, sampling, quantization, and 2D-transforms.
- Operate on images using the techniques of smoothing, sharpening and enhancement.
- Understand the restoration concepts and filtering techniques.
- Learn the basics of segmentation, features extraction, compression and recognition methods
for color models.

TEXT BOOKS:
   2010.

REFERENCES
OBJECTIVES:
- Learn definitions of network analysis, architecture, and design and the importance of network analysis
- study about different types of requirements from the user, application, device and network component
- learn how to identify and characterize traffic flows
- learn several concepts about network design process
- Learn about SNMP

UNIT I
A SYSTEM APPROACH TO NETWORK DESIGN AND REQUIREMENT ANALYSIS

UNIT II
FLOW ANALYSIS

UNIT III
LOGICAL DESIGN

UNIT IV
NETWORK DESIGN: PHYSICAL, ADDRESSING AND ROUTING

UNIT V
NETWORK MANAGEMENT AND SNMP PROTOCOL MODEL
Network and System management, Network management system platform: Current SNMP Broadband and TMN management, Network management standards. SNMPV1, SNMPV2 system architecture, SNMPV2, structure of management information. SNMPV2 – MIB – SNMPV2 protocol, SNMPV3 - Architecture, Application, MIB, security user based security model, access control RMON

TOTAL: 45 PERIODS
OUTCOMES:
On Successful completion of the course, Students will be able to
- Gather, derive, define and validate real requirements for the specified network.
- Understand different types of requirements from the user, application, device and network component
- Develop traceability between requirements, architecture decisions, and design decisions
- Implement how and where addressing and routing, security, network management, and performance are required in the network.
- Use SNMPv1, v2 and v3 protocols.

TEXT BOOKS:

REFERENCES:

GE8076                     PROFESSIONAL ETHICS IN ENGINEERING
                             L  T  P  C
                             3  0  0  3

OBJECTIVE:
- To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

UNIT I  HUMAN VALUES

UNIT II  ENGINEERING ETHICS
UNIT III  ENGINEERING AS SOCIAL EXPERIMENTATION  9
Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

UNIT IV  SAFETY, RESPONSIBILITIES AND RIGHTS  9

UNIT V  GLOBAL ISSUES  8

TOTAL: 45 PERIODS

OUTCOMES:
- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

TEXT BOOKS:

REFERENCES:

Web sources:
1. www.onlineethics.org
2. www.nispe.org
3. www.globalethics.org
4. www.ethics.org

CS8080  INFORMATION RETRIEVAL TECHNIQUES  L T P C
3 0 0 3

OBJECTIVES:
- To understand the basics of Information Retrieval.
- To understand machine learning techniques for text classification and clustering.
- To understand various search engine system operations.
- To learn different techniques of recommender system.
UNIT I  INTRODUCTION  9

UNIT II  MODELING AND RETRIEVAL EVALUATION  9

UNIT III  TEXT CLASSIFICATION AND CLUSTERING  9

UNIT IV  WEB RETRIEVAL AND WEB CRAWLING  9

UNIT V  RECOMMENDER SYSTEM  9

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Use an open source search engine framework and explore its capabilities
- Apply appropriate method of classification or clustering.
- Design and implement innovative features in a search engine.
- Design and implement a recommender system.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To learn the fundamentals of Green Computing.
- To analyze the Green computing Grid Framework.
- To understand the issues related with Green compliance.
- To study and develop various case studies.

UNIT I  FUNDAMENTALS  9
Green IT Fundamentals: Business, IT, and the Environment – Green computing: carbon
foot print, scoop on power – Green IT Strategies: Drivers, Dimensions, and Goals –

UNIT II  GREEN ASSETS AND MODELING  9
Green Assets: Buildings, Data Centers, Networks, and Devices – Green Business
Process Management: Modeling, Optimization, and Collaboration – Green Enterprise
Architecture – Environmental Intelligence – Green Supply Chains – Green Information

UNIT III  GRID FRAMEWORK  9
Virtualization of IT systems – Role of electric utilities, Telecommuting, teleconferencing
and teleporting – Materials recycling – Best ways for Green PC – Green Data center –
Green Grid framework.

UNIT IV  GREEN COMPLIANCE  9
Socio-cultural aspects of Green IT – Green Enterprise Transformation Roadmap –
Green Compliance: Protocols, Standards, and Audits – Emergent Carbon Issues:
Technologies and Future.

UNIT V  CASE STUDIES  9
The Environmentally Responsible Business Strategies (ERBS) – Case Study Scenarios
for Trial Runs – Case Studies – Applying Green IT Strategies and Applications to a
Home, Hospital, Packaging Industry and Telecom Sector.

TOTAL : 45  PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to:
- Acquire knowledge to adopt green computing practices to minimize negative
  impacts on the environment.
- Enhance the skill in energy saving practices in their use of hardware.
- Evaluate technology tools that can reduce paper waste and carbon footprint by the
  stakeholders.
- Understand the ways to minimize equipment disposal requirements.
TEXT BOOKS:

REFERENCES:

CS8084 NATURAL LANGUAGE PROCESSING L T P C
3 0 0 3

OBJECTIVES:
- To learn the fundamentals of natural language processing
- To understand the use of CFG and PCFG in NLP
- To understand the role of semantics of sentences and pragmatics
- To apply the NLP techniques to IR applications

UNIT I INTRODUCTION
9

UNIT II WORD LEVEL ANALYSIS
9

UNIT III SYNTACTIC ANALYSIS
9

UNIT IV SEMANTICS AND PRAGMATICS
10
UNIT V   DISCOURSE ANALYSIS AND LEXICAL RESOURCES 8
Discourse segmentation, Coherence – Reference Phenomena, Anaphora Resolution
using Hobbs and Centering Algorithm – Coreference Resolution – Resources: Porter
Stemmer, Lemmatizer, Penn Treebank, Brill’s Tagger, WordNet, PropBank, FrameNet,
Brown Corpus, British National Corpus (BNC).
TOTAL :45 PERIODS

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

TEXT BOOKS:
1. Daniel Jurafsky, James H. Martin—Speech and Language Processing: An
Introduction to Natural Language Processing, Computational Linguistics and
2. Steven Bird, Ewan Klein and Edward Loper, —Natural Language Processing with

REFERENCES:
1. Breck Baldwin, —Language Processing with Java and LingPipe Cookbook,
Atlantic Publisher, 2015.
2. Richard M Reese, —Natural Language Processing with Javall, O’Reilly Media,
2015.
3. Nitin Indurkhya and Fred J. Damerau, —Handbook of Natural Language
4. Tanveer Siddiqui, U.S. Tiwary, “Natural Language Processing and Information

IT8077   SPEECH PROCESSING   L T P C
3 0 0 3

OBJECTIVES:
- To understand the fundamentals of the speech processing
- Explore the various speech models
- Gather knowledge about the phonetics and pronunciation processing
- Perform wavelet analysis of speech
- To understand the concepts of speech recognition

UNIT I   INTRODUCTION 9
Introduction - knowledge in speech and language processing - ambiguity - models and
algorithms - language - thought - understanding - regular expression and automata - words
& transducers – N grams
UNIT II  SPEECH MODELLING  9

UNIT III  SPEECH PRONUNCIATION AND SIGNAL PROCESSING  9
Phonetics - speech sounds and phonetic transcription - articulatory phonetics - phonological categories and pronunciation variation - acoustic phonetics and signals - phonetic resources - articulatory and gestural phonology

UNIT IV  SPEECH IDENTIFICATION  9
Speech synthesis - text normalization - phonetic analysis - prosodic analysis – diphone waveform synthesis - unit selection waveform synthesis - evaluation

UNIT V  SPEECH RECOGNITION  9

TOTAL :45 PERIODS

OUTCOMES:
On Successful completion of the course ,Students will be able to
- Create new algorithms with speech processing
- Derive new speech models
- Perform various language phonetic analysis
- Create a new speech identification system
- Generate a new speech recognition system

TEXT BOOK:

REFERENCES:
OBJECTIVES:
- To Learn the basic concepts in HTML, CSS, Javascript
- To Understand the responsive design and development
- To learn the web project management and maintenance process
- To Design a Website with HTML, JS, CSS / CMS - Word press

UNIT I WEB DESIGN - HTML MARKUP FOR STRUCTURE
Working of Web - HTML Markup for Structure - Creating simple page - Marking up text - Adding Links - Adding Images - Table Markup - Forms - HTML5

UNIT II CSS AND JAVASCRIPT
CSS - Formatting text - Colours and Background - Padding, Borders and Margins - Floating and positioning - Page Layout with CSS - Transition, Transforms and Animation - Javascript - Using Java Script

UNIT III RESPONSIVE WEB DESIGN
Sass for Responsive Web Design - Marking Content with HTML5 - Mobile-First or Desktop-First - CSS Grids, CSS Frameworks, UI Kits, and Flexbox for RWD - Designing small UIs by Large Finger - Images and Videos in Responsive Web Design - Meaningful Typography for Responsive Web Design

UNIT IV WEB PROJECT MANAGEMENT
Project Life Cycle - Project Definition - Discovery and Requirements - Project Schedule and Budgeting - Running the project - Technical Documentation - Development, Communicaton, Documentation - QA and testing - Deployment - Support and operations

UNIT V PROJECT CASE STUDY
Using HTML, CSS, JS or using Opensource CMS like Wordpress, design and develop a Website having Aesthetics, Advanced and Minimal UI Transitions based on the project - Host and manage the project live in any public hosting

OUTCOMES:
On Successful completion of the course, Students will be able to
- Design Website using HTML CSS and JS
- Design Responsive Sites
- Manage, Maintain and Support Web Apps

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To Learn the E-Commerce Platform and its concepts
- To Understand the Technology, infrastructure and Business in E-Commerce
- To Understand the Security and Challenges in E-Commerce
- To Build an Own E-Commerce using Open Source Frameworks

UNIT I  INTRODUCTION TO E-COMMERCE AND TECHNOLOGY INFRASTRUCTURE  9
Working of Web - HTML Markup for Structure - Creating simple page - Marking up text - Adding Links - Adding Images - Table Markup - Forms - HTML5

UNIT II  BUILDING AN E-COMMERCE WEBSITE, MOBILE SITE AND APPS  9
Systematic approach to build an E-Commerce: Planning, System Analysis, System Design, Building the system, Testing the system, Implementation and Maintenance, Optimize Web Performance – Choosing hardware and software – Other E-Commerce Site tools – Developing a Mobile Website and Mobile App

UNIT III  E-COMMERCE SECURITY AND PAYMENT SYSTEMS  9

UNIT IV  BUSINESS CONCEPTS IN E-COMMERCE  9
Digital Commerce Marketing and Advertising strategies and tools – Internet Marketing Technologies – Social Marketing – Mobile Marketing – Location based Marketing – Ethical, Social, Political Issues in E-Commerce

UNIT V  PROJECT CASE STUDY  9
Case Study : Identify Key components, strategy, B2B, B2C Models of E-commerce Business model of any e-commerce website - Mini Project : Develop E-Commerce project in any one of Platforms like Woo-Commerce, Magento or Opencart

TOTAL : 45    PERIODS

OUTCOMES:
On Successful completion of the course ,Students will be able to
- Design Website using HTML CSS and JS
- Design Responsive Sites
- Manage, Maintain and Support Web Apps

TEXT BOOK:

REFERENCES
1. http://docs.opencart.com/

135
OBJECTIVE:
To learn about basis of nanomaterial science, preparation method, types and application

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

UNIT III   NANOMATERIALS
Nanoforms of Carbon - Buckminster fullerene- graphene and carbon nanotube, Single wall carbon Nanotubes (SWCNT) and Multi wall carbon nanotubes (MWCNT) - methods of synthesis(arc-growth, laser ablation, CVD routes, Plasma CVD), structure-property Relationships applications- Nanometal oxides-ZnO, TiO2,MgO, ZrO2, NiO, nanoalumina, CaO, AgTiO2, Ferrites, Nanoclays-
functionalization and applications-Quantum wires, Quantum dots-preparation, properties and applications.

UNIT IV   CHARACTERIZATION TECHNIQUES
X-ray diffraction technique, Scanning Electron Microscopy - environmental techniques, Transmission Electron Microscopy including high-resolution imaging, Surface Analysis techniques- AFM, SPM, STM, SNOM, ESCA, SIMS.

UNIT V   APPLICATIONS

OUTCOMES:
• Will familiarize about the science of nanomaterials
• Will demonstrate the preparation of nanomaterials
• Will develop knowledge in characteristic nanomaterial

TEXT BOOKS:

REFERENCES: