## SEMESTER I

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OBJECTIVES

- To enable all students of engineering and technology develop their basic communication skills in English.
- To give special emphasis to the development of speaking skills amongst the students of engineering and technology.
- To ensure that students use the electronic media such as internet and supplement the learning materials used in the classroom.
- To inculcate the habit of reading for pleasure.

UNIT I

**Listening** - Introducing learners to GIE - Types of listening - Listening to audio (verbal & sounds); **Speaking** - Speaking about one’s place, important festivals etc. – Introducing oneself, one’s family / friend; **Reading** - Skimming a reading passage – Scanning for specific information - Note-making; **Writing** - Free writing on any given topic (My favourite place / Hobbies / School life, etc.) - Sentence completion - Autobiographical writing (writing about one’s leisure time activities, hometown, etc.); **Grammar** - Prepositions - Reference words - Wh-questions - Tenses (Simple); **Vocabulary** - Word formation - Word expansion (root words / etymology); **E-materials** - Interactive exercises for Grammar & Vocabulary - Reading comprehension exercises - Listening to audio files and answering questions.

UNIT II

**Listening** - Listening and responding to video lectures / talks; **Speaking** - Describing a simple process (filling a form, etc.) - Asking & answering questions - Telephone skills – Telephone etiquette; **Reading** – Critical reading - Finding key information in a given text - Sifting facts from opinions; **Writing** - Biographical writing (place, people) - Lab descriptions (general/specific description of laboratory experiments) - Definitions - Recommendations; **Grammar** - Use of imperatives - Subject-verb agreement; **Vocabulary** - Compound words - Word Association; **E-materials** - Interactive exercises for Grammar and Vocabulary - Listening exercises with sample telephone conversations / lectures – Picture-based activities.

UNIT III

**Listening** - Listening to specific task - focused audio tracks; **Speaking** - Role-play – Simulation - Group interaction - Speaking in formal situations (teachers, officials, foreigners); **Reading** - Reading and interpreting visual material; **Writing** - Jumbled sentences - Coherence and cohesion in writing - Channel conversion (flowchart into process) - Types of paragraph (cause
& effect / compare & contrast / narrative / analytical) - Informal writing (letter/e-mail/blogs) - Paraphrasing; **Grammar** - Tenses (Past) - Use of sequence words - Adjectives; **Vocabulary** - Different forms and uses of words, Cause and effect words; **E-materials** - Interactive exercises for Grammar and Vocabulary - Excerpts from films related to the theme and follow up exercises - Pictures of flow charts and tables for interpretations.

### UNIT IV

**Listening** - Watching videos / documentaries and responding to questions based on them;  
**Speaking** - Responding to questions - Different forms of interviews - Speaking at different types of interviews;  
**Reading** - Making inference from the reading passage - Predicting the content of a reading passage;  
**Writing** - Interpreting visual materials (line graphs, pie charts etc.) - Essay writing – Different types of essays;  
**Grammar** - Adverbs – Tenses – future time reference;  
**Vocabulary** - Single word substitutes - Use of abbreviations & acronyms;  
**E-materials** - Interactive exercises for Grammar and Vocabulary - Sample interviews - film scenes - dialogue writing.

### UNIT V

**Listening** - Listening to different accents, Listening to Speeches / Presentations, Listening to broadcast & telecast from Radio & TV;  
**Speaking** - Giving impromptu talks, Making presentations on given topics;  
**Reading** - Email communication - Reading the attachment files having a poem/joke/proverb - Sending their responses through email;  
**Writing** - Creative writing, Poster making;  
**Grammar** - Direct and indirect speech;  
**Vocabulary** - Lexical items (fixed / semi fixed expressions);  
**E-materials** - Interactive exercises for Grammar & Vocabulary - Sending emails with attachment – Audio / video excerpts of different accents, - Interpreting posters

**TOTAL : 60 PERIODS**

**TEXT BOOKS:**

**REFERENCES:**


**Extensive Readers:**

**Website Resources:**
1. www.uefap.com
2. www.eslcafe.com
3. www.listen-to-english.com
4. www.owl.english.purdue.edu
5. www.chompchomp.com

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**MA8151 MATHEMATICS – I L T P C**

(Common to all branches of B.E. / B.Tech. Programmes in I Semester) 3 1 0 4

**OBJECTIVES:**
- To develop the use of matrix algebra techniques. This is needed by engineers for practical applications.
- To make the student knowledgeable in the area of infinite series and their convergence so that he/ she will be familiar with limitations of using infinite series approximations for solutions arising in mathematical modeling.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.
UNIT I MATRICES 9+3

UNIT II INFINITE SERIES 9+3

UNIT III FUNCTIONS OF SEVERAL VARIABLES 9+3

UNIT IV IMPROPER INTEGRALS 9+3

UNIT V MULTIPLE INTEGRALS 9+3

TOTAL : 60 PERIODS

TEXT BOOKS:
REFERENCES:

PH8151 ENGINEERING PHYSICS (Common to ALL Branches of B.E./B.Tech. Programmes) 3 0 0 3

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

UNIT I PROPERTIES OF MATTER

UNIT II ACOUSTICS AND ULTRASONICS

UNIT III THERMAL PHYSICS
Thermal expansion - thermal stress - expansion joints - bimetallic strips - thermal conductivity - conduction in solids - Forbe’s and Lees’ disc methods - Rectilinear flow of heat through
UNIT IV  APPLIED OPTICS

UNIT V  SOLID STATE PHYSICS
Nature of bonding - growth of single crystals (qualitative) - crystal systems - crystal planes and directions - expressions for interplanar distance - coordination number and packing factor for simple structures: SC, BCC, FCC and HCP - structure and significance of NaCl, ZnS, diamond and graphite - crystal imperfections: point defects, dislocations and stacking faults - unit cell, Bravais space lattices - miller indices.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
and Gibbs free energy functions; Criteria of spontaneity; Gibbs-Helmholtz equation; Clausius-Clapeyron equation; Maxwell relations – Van’t Hoff isotherm and isochore. Chemical potential; Gibbs-Duhem equation – variation of chemical potential with temperature and pressure.

UNIT II POLYMER CHEMISTRY

Introduction: Classification of polymers – Natural and Synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerisation. Types and mechanism of polymerisation: Addition (Free Radical, cationic, anionic and living); condensation and copolymerisation. Properties of polymers: Tg, Tacticity, Molecular weight – weight average, number average and polydispersity index. Techniques of polymerisation: Bulk, emulsion, solution and suspension.

UNIT III KINETICS AND CATALYSIS


UNIT IV PHOTOCHEMISTRY AND SPECTROSCOPY


UNIT V NANO CHEMISTRY


TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCE BOOKS:

GE8151 COMPUTING TECHNIQUES

UNIT I INTRODUCTION

UNIT II C PROGRAMMING BASICS

UNIT III ARRAYS AND STRINGS

UNIT IV FUNCTIONS AND POINTERS
UNIT V  STRUCTURES AND UNIONS

Introduction – Need for structure data type – structure definition – Structure declaration – Structure within a structure - Union - Programs using structures and Unions – Storage classes, Pre-processor directives.

TOTAL: 45 PERIODS

TEXTBOOKS:

REFERENCES:

GE8152  ENGINEERING GRAPHICS  L T P C
2 0 3 4

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

Concepts and conventions (Not for Examination)  1
Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT I  PLANE CURVES AND FREE HAND SKETCHING  14

Basic Geometrical constructions, Curves used in engineering practices
Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction
of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves, **Scales:** Construction of Diagonal and Vernier scales.

**Visualization concepts and Free Hand sketching:** Visualization principles – Representation of Three Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects

**UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES** 14
Orthographic projection- principles-Principal planes-First angle projection-Projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and trapezoidal method and traces

Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

**UNIT III PROJECTION OF SOLIDS** 14
Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method and auxiliary plane method.

**UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES** 14
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. Development of lateral surfaces of solids with cut-outs and holes

**UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS** 15
Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method and vanishing point method.

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

**TOTAL: 75 PERIODS**

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

PH8161 PHYSICS LABORATORY
(common to all branches of B.E./B.Tech. Programmes)

1. Torsional pendulum – Determination of rigidity modulus of wire and moment of inertia of disc
2. Non-uniform bending – Determination of Young’s modulus
3. Lee’s disc – Determination of thermal conductivity of a bad conductor
4. Potentiometer – Determination of thermo e.m.f. of thermocouple
5. Air wedge – Determination of thickness of a thin sheet of paper
6. i. Optical fibre – Determination of Numerical Aperture and acceptance angle
   ii. Compact disc – Determination of width of the groove using laser
7. Acoustic grating – Determination of velocity of ultrasonic waves in liquids
8. Post office box – Determination of Band gap of a semiconductor
9. Spectrometer – Determination of wavelength using grating
10. Viscosity of liquids – Determination of co-efficient of viscosity of a liquid by Poiseuille’s flow

TOTAL: 30 PERIODS

CY8161 CHEMISTRY LABORATORY
(Common to all branches of Engineering and Technology)

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.
14. Determination of CMC.
15. Phase change in a solid.

TOTAL: 30 PERIODS

REFERENCES:

GE8161 COMPUTER PRACTICES LABORATORY

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

TOTAL: 45 PERIODS

GE8162 ENGINEERING PRACTICES LABORATORY
(Common to all Branches of B.E. / B.Tech. Programmes)

OBJECTIVE
To provide exposure to the students with hands-on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.
GROUP – A (CIVIL & ELECTRICAL)

1. **CIVIL ENGINEERING PRACTICE**

**Plumbing**
- Basic pipe connections involving the fittings like valves, taps, coupling, unions, reducers, elbows and other components used in household fittings. Preparation of plumbing line sketches.
- Laying pipe connection to the suction side of a pump – inlet.
- Laying pipe connection to the delivery side of a pump – outlet.
- Practice in mixed pipe connections: Metal, plastic and flexible pipes used in household appliances.

**Wood Work**
- Sawing, planning and making common joints: T-Joint, Mortise and Tennon joint, Dovetail joint.

**STUDY**
- Study of joints in door panels, wooden furniture
- Study of common industrial trusses using models.

2. **ELECTRICAL ENGINEERING PRACTICE**

- Basic household wiring using switches, fuse, indicator – lamp etc.,
- Preparation of wiring diagrams
- Stair case light wiring
- Tube – light wiring
- Study of iron-box, fan with regulator, emergency lamp

GROUP – B (MECHANICAL AND ELECTRONICS)

3. **MECHANICAL ENGINEERING PRACTICE**

**Welding**
- Arc welding of butt joints, lap joints, tee joints
- Gas welding Practice.
- Basic Machining
- Simple turning, drilling and tapping operations.
- Machine assembly Practice.
• Study and assembling the following:
• Centrifugal pump, mixies and air conditioners.
• Demonstration on
  (a) Smithy operations like the production of hexagonal bolt.
  (b) Foundry operation like mould preparation for grooved pulley.

4. **ELECTRONIC ENGINEERING PRACTICE**  
9
• Soldering simple electronic circuits and checking continuity.
• Assembling electronic components on a small PCB and testing.
• Study of Telephone, FM radio, low-voltage power supplies.

**TOTAL: 45 PERIODS**

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**HS8251 TECHNICAL ENGLISH II**  
(For all branches of B.E / B.Tech programmes)

**OBJECTIVES**

• To make the students acquire listening and speaking skills meant for both formal and informal contexts
• To help them develop their reading skills by exposing them to different types of reading strategies
• To equip them with writing skills needed for academic as well as workplace situations
• To make them acquire language skills at their own pace by using e-materials and language lab component

**UNIT I**

**Listening** - Listening to informal conversations and participating; **Speaking** - Opening a conversation (greetings, comments on something, weather) - Turn taking - Closing a conversation (excuses, general wish, positive comment, thanks); **Reading** - Developing analytical skills, Deductive and inductive reasoning - Extensive reading; **Writing** - Effective use of SMS for sending short notes and messages - Using ‘emoticons’ as symbols in email messages; **Grammar** - Regular & irregular verbs - Active and passive voice; **Vocabulary** - Homonyms (e.g. ‘can’) - Homophones (e.g. ‘some’, ‘sum’); **E-materials** - Interactive exercise on Grammar and vocabulary – blogging; **Language Lab** - Listening to different types of conversation and answering questions.
UNIT II

Listening - Listening to situation based dialogues; Speaking - Conversation practice in real life situations, asking for directions (using polite expressions), giving directions (using imperative sentences), Purchasing goods from a shop, Discussing various aspects of a film (they have already seen) or a book (they have already read); Reading - Reading a short story or an article from newspaper, Critical reading, Comprehension skills; Writing - Writing a review / summary of a story / article, Personal letter (Inviting your friend to a function, congratulating someone for his success, thanking one’s friend / relatives); Grammar - modal verbs, Purpose expressions; Vocabulary - Phrasal verbs and their meanings, Using phrasal verbs in sentences; E-materials - Interactive exercise on Grammar and vocabulary, Extensive reading activity (reading stories / novels from links), Posting reviews in blogs - Language Lab - Dialogues (Fill up exercises), Recording students’ dialogues.

UNIT III

Listening - Listening to the conversation - Understanding the structure of conversations; Speaking - Conversation skills with a sense of stress, intonation, pronunciation and meaning - Seeking information – expressing feelings (affection, anger, regret etc.); Reading - Speed reading – reading passages with the time limit - Skimming; Writing - Minutes of meeting – format and practice in the preparation of minutes - Writing summary after reading the articles from the journals - Format for the journal articles – elements of technical articles (abstract, introduction, methodology, results, discussion, conclusion, appendices, references) - Writing strategies; Grammar - Conditional clauses - Cause and effect expressions; Vocabulary - Words used as nouns and verbs without any change in the spelling (e.g. ‘rock’, ‘train’, ‘ring’); E-materials - Interactive exercise on Grammar & vocabulary - Speed Reading practice exercises; Language Lab - Intonation practice using EFLU materials – Attending a meeting and writing minutes.

UNIT IV

Listening - Listening to a telephone conversation, Viewing a model interview (face-to-face, telephonic and video conferencing) and observing the practices; Speaking - Role play practice in telephone skills - listening and responding, -asking questions, -note taking – passing on messages, Role play and mock interview for grasping the interview skills; Reading - Reading the job advertisements and the profile of the company concerned – scanning; Writing - Applying for a job – cover letter - résumé preparation – vision, mission and goals of the candidate; Grammar - Numerical expressions - Connectives (discourse markers); Vocabulary - Idioms and their meanings – using idioms in sentences; E-materials - Interactive exercises on Grammar & Vocabulary - Different forms of résumés- Filling up a résumé / cover letter; Language Lab - Telephonic interview – recording the responses - e-résumé writing.
UNIT V

Listening - Viewing a model group discussion and reviewing the performance of each participant - Identifying the characteristics of a good listener; Speaking - Group discussion skills – initiating the discussion – exchanging suggestions and proposals – expressing dissent/agreement – assertiveness in expressing opinions – mind mapping technique; Reading - Note making skills – making notes from books, or any form of written materials - Intensive reading; Writing - Types of reports – Feasibility / Project report – report format – recommendations / suggestions – interpretation of data (using charts for effective presentation); Grammar - Use of clauses; Vocabulary – Collocation; E-materials - Interactive grammar and vocabulary exercises - Sample GD - Pictures for discussion, Interactive grammar and vocabulary exercises - Pictures for discussion; Language Lab - Different models of group discussion

TOTAL : 60 PERIODS

TEXT BOOKS:

REFERENCES:

EXTENSIVE READERS

WEB RESOURCES
1. www.esl-lab.com
2. www.englishgrammar.org
OBJECTIVES:

- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- To acquaint the student with the concepts of vector calculus, needed for problems in all engineering disciplines.
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow of electric current.
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

UNIT I  DIFFERENTIAL EQUATIONS  9+3
Method of variation of parameters – Method of undetermined coefficients – Homogenous equation of Euler’s and Legendre’s type – System of simultaneous linear differential equations with constant coefficients.

UNIT II  VECTOR CALCULUS  9+3
Gradient and directional derivative – Divergence and Curl – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface integral and volume integral - Green’s, Gauss divergence and Stoke’s theorems – Verification and application in evaluating line, surface and volume integrals.

UNIT III  ANALYTIC FUNCTION  9+3

UNIT IV  COMPLEX INTEGRATION  9+3
Line integral - Cauchy’s integral theorem – Cauchy’s integral formula – Taylor’s and Laurent’s

UNIT V LAPLACE TRANSFORMS 9+3

TOTAL : 60 PERIODS

TEXT BOOKS:

REFERENCES:

PH8253 PHYSICS FOR INFORMATION SCIENCE L T P C (Common to Computer Science and Information Technology Branches) 3 0 0 3

OBJECTIVE: 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  ELECTRICAL PROPERTIES OF MATERIALS  

UNIT II  SEMICONDUCTORS AND TRANSPORT PHYSICS  

UNIT III  MAGNETIC PROPERTIES OF MATERIALS  

UNIT IV  OPTICAL PROPERTIES OF MATERIALS  
Classification of optical materials – Absorption in metals, insulators & Semiconductors - LED’s – Organic LED’s – Polymer light emitting materials – Plasma light emitting devices – LCD’s – Laser diodes – Optical data storage techniques (including DVD, Blue -ray disc, Holographic data storage).

UNIT V  NANO DEVICES  

TOTAL: 45 PERIODS
TEXT BOOKS:

REFERENCES:

CS8201 DIGITAL PRINCIPLES AND SYSTEM DESIGN

OBJECTIVE
Learn how to design digital circuits by simplifying the Boolean functions. Also, gives an idea about designs using PLDs, and writing HDL codes for designing larger digital systems.

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES

UNIT II COMBINATIONAL LOGIC

UNIT III SYNCHRONOUS SEQUENTIAL LOGIC

UNIT IV ASYNCHRONOUS SEQUENTIAL LOGIC
UNIT V  MEMORY AND PROGRAMMABLE LOGIC


TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:

CS8202 PRINCIPLES OF COMPUTER ENGINEERING  L T P C  3 0 0 3

OBJECTIVE
To provide a fundamental knowledge of Computer Engineering, which includes evolution of computers and its various components and applications.

UNIT I  INTRODUCTION

UNIT II  SOFTWARE & HARDWARE
UNIT III OPERATING SYSTEMS

UNIT IV DATABASE MANAGEMENT

UNIT V NETWORKS

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCE:

CS8203 PROGRAMMING USING C++

OBJECTIVE
To develop programming skill and to solve engineering related problems using Object Oriented Programming Concepts.

UNIT I POINTERS AND FILE HANDLING IN C
Introduction to Pointers – Pointers and arrays – Pointers and structures –Pointers to functions – Applications of pointers – File Handling – Case study
UNIT II INTRODUCTION TO OBJECT-ORIENTED PROGRAMMING
Introduction – Procedure vs. object oriented programming – Data types – control structures – Arrays and Strings – User defined types – Functions and Pointers – Case study

UNIT III OBJECT ORIENTED PROGRAMMING CONCEPTS
Classes and Objects – Operator Overloading – Inheritance – Polymorphism and Virtual Functions – Case study

UNIT IV TEMPLATES AND EXCEPTION HANDLING
Function templates and class templates – Name spaces – Casting – Exception Handling – Case study.

UNIT V FILES AND ADVANCED FEATURES

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
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 implementation of combinational circuits using MSI devices:
   - 4-bit binary adder/subtractor
   - Parity generator/checker
   - Magnitude Comparator
   - Application using multiplexers
4. Design and implementation of sequential circuits:
   - Shift registers
   - Synchronous and asynchronous counters
5. Coding combinational/sequential circuits using HDL.
6. Design and implementation of a simple digital system (Mini Project).

TOTAL: 45 PERIODS

LABORATORY REQUIREMENTS 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.

LIST OF EXPERIMENTS:
1. Programs using Functions and Pointers in C
2. Programs using Files in C
3. Programs using Classes and Objects
4. Programs using Operator Overloading
5. Programs using Inheritance, Polymorphism and its types
6. Programs using Arrays and Pointers
7. Programs using Dynamic memory allocation
8. Programs using Templates and Exceptions
9. Programs using Sequential and Random access files

TOTAL: 45 PERIODS

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS
• 30 Terminals with C and C++ Compiler

MA8351 ALGEBRA AND NUMBER THEORY (BRANCH SPECIFIC COURSE) 3 1 0 4

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

UNIT I FIELDS 9+3
Group Theory - Rings and Polynomials – Fields.

UNIT II FINITE FIELDS AND POLYNOMIALS 9+3
Finite Fields – Irreducible Polynomials over Finite fields – Factorization of Polynomials over Finite Fields.

UNIT III DIVISIBILITY THEORY AND CANONICAL DECOMPOSITIONS 9+3
UNIT IV  DIOPHANTINE EQUATIONS AND CONGRUENCES  7+3  
Linear Diophantine equations – Congruence’s – Linear Congruence’s – Applications: Divisibility tests – Modular Designs – Chinese remainder theorem – 2x2 linear systems.

UNIT V  CLASSICAL THEOREMS AND MULTIPLICATIVE FUNCTIONS  10+4  

TOTAL: 60 PERIODS

TEXT BOOKS:

REFERENCES:

GE8351  ENVIRONMENTAL SCIENCE AND ENGINEERING  L T P C  3 0 0 3

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

Field study of simple ecosystems – pond, river, hill slopes, etc.

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

Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT
UNIT-V  HUMAN POPULATION AND THE ENVIRONMENT  6


TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCE BOOKS:

CS8301  COMPUTER ARCHITECTURE  L T P C
3 1 0 4

OBJECTIVE
Identify the functional units in a digital computer system, distinguish between the various ISA styles, trace the execution sequence of an instruction through the processor, compare different approaches used for implementing a functional unit and evaluate different computer systems based on performance metrics.

UNIT I  FUNDAMENTALS OF A COMPUTER SYSTEM  9+3

UNIT II  BASIC PROCESSING UNIT  9+3

UNIT III  ADVANCED CONCEPTS IN ILP AND CURRENT TRENDS  9+3

UNIT IV  ARITHMETIC FOR COMPUTERS  9+3

UNIT V  MEMORY AND I/O  9+3
Need for a hierarchical memory system – Types and characteristics of memories – Cache memories – Improving cache performance – Virtual memory – Memory management techniques – Associative memories.

Accessing I/O devices – Programmed Input/Output – Interrupts – Direct Memory Access – Interface circuits – Need for Standard I/O Interfaces like PCI, SCSI, USB.

TOTAL: 45 +15:60 PERIODS

TEXT BOOK:

REFERENCES:

CS8302 DATA STRUCTURES

L T P C

3 0 0 3

OBJECTIVE
Learning program independent view of data structures, including its representation and operations performed on them, which are then linked to sorting, searching and indexing methods to increase the knowledge of usage of data structures in algorithmic perspective.

UNIT I LINEAR DATA STRUCTURES
Abstract Data Types - Asymptotic Notations: Big-Oh, Omega and Theta – Best, Worst and Average case Analysis: Definition and an example – Arrays and its representations – Stacks and Queues – Linked lists – Linked list based implementation of Stacks and Queues – Evaluation of Expressions – Linked list based polynomial addition.

UNIT II NON-LINEAR DATA STRUCTURES

UNIT III SEARCH STRUCTURES AND PRIORITY QUEUES
AVL Trees – Red-Black Trees – Splay Trees – Binary Heap – Leftist Heap

UNIT IV SORTING

UNIT V SEARCHING AND INDEXING
Linear Search – Binary Search - Hash tables – Overflow handling – Cylinder Surface Indexing – Hash Index – B-Tree Indexing.

TOTAL : 45 PERIODS
TEXT BOOKS:

REFERENCES:

CS8303 DATABASE MANAGEMENT SYSTEMS L T P C 3 0 0 3

OBJECTIVE
Classify modern and futuristic database applications based on size and complexity; design a database from understanding an Universe of Discourse, using ER diagrams; map ER model into Relational model and to normalize the relations; create a physical database from a design using DDL statements with appropriate key, domain and referential integrity constraints; analyze different ways of writing a query and justify which is the effective and efficient way; and compare and contrast various indexing strategies in different database systems and list key challenges in advanced database systems and to critique how they differ from traditional database systems.

UNIT I  INTRODUCTION TO DATABASE SYSTEMS 9
Data - Database Applications - Evolution of DB & DBMS - Need for data management – Data models & Database Architecture - Professions in DBMS - Key issues and challenges in Database Systems

UNIT II  ER AND RELATIONAL MODELS 9

UNIT III  DATA DEFINITION AND QUERYING 8
Basic DDL - Introduction to SQL - Data Constraints - Triggers - Database Security – Advanced SQL - Embedded & Dynamic SQL - Views
UNIT IV  TRANSACTIONS AND CONCURRENCY  10

UNIT V  ADVANCED TOPICS IN DATABASES  9

TOTAL : 45 PERIODS

TEXT BOOKS:

EC8303  ELECTRONIC DEVICES AND CIRCUITS FOR COMPUTER ENGINEERS  3 0 0 3

OBJECTIVE:
To know theorems and techniques to analyze electric circuits, electronic devices and their characteristics, important power supply designs, and design of amplifiers, oscillators and opamp circuits.

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

UNIT II  CIRCUIT ANALYSIS TECHNIQUES  9
Linearity and Superposition, Sources Transformation, Thevinin and Norton Equivalent Circuits,
Maximum Power Transfer, Delta-Wye Conversion, Single Phase and 3 Phase Circuits-Power Factor-Power-Concept of Phasor Diagrams.

UNIT III  SEMICONDUCTOR DEVICES  9

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

UNIT V  OPERATION AMPLIFIER  9

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

CS8311  DATA STRUCTURES LABORATORY  L T P C 0 0 3 2
1. Array based implementation of stack and queue.
2. Linked list implementations and problems related to linked list such as inverting list, concatenation, etc.
3. Linked list based implementation of stack and queue
4. Evaluation of expressions
5. Binary tree traversals
6. Graph traversals
7. Merge sort
8. Quick sort
9. Binary search
10. Binary Heap
11. AVL tree implementation
12. Hash Tables

TOTAL: 45 PERIODS

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS
30 Systems with C++ Compiler.

CS8312 DATABASE MANAGEMENT SYSTEMS LABORATORY

LIST OF EXPERIMENTS:
1. Data Definition Commands.
2. Data Manipulation Commands.
3. DML Command to perform Nested and Join Queries.
4. Views – Creation and Manipulation.
5. Cursors and Triggers.
7. Functions and Procedures.
8. Forms and Menu design using a Front End Tool.
9. Simple application development.
11. Data base connectivity techniques.
12. Design and implementation of a Database Application.

TOTAL: 45 PERIODS
LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS:

Softwares:
Oracle Server
Visual Basic

MA8354 PROBABILITY AND QUEUEING THEORY  
(Branch specific course)  
L T P C  
3 1 0 4

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

UNIT I RANDOM VARIABLES 9+3
Discrete and Continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions - Functions of a random variable.

UNIT II TWO-DIMENSIONAL RANDOM VARIABLES 9+3
Joint distributions – Marginal and Conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT III RANDOM PROCESSES 9+3

UNIT IV QUEUEING THEORY 9+3
Markovian queues – Birth and Death processes – Single and multiple server queueing models – Little’s formula - Queues with finite waiting rooms – Finite source models.

UNIT V NON-MARKOVIAN QUEUES AND QUEUEING NETWORKS 9+3
M/G/1 queue – Pollaczek Khinchin formula - M/D/1 and M/E_k/1 as special cases – Series queues – Open and closed Jackson networks.

TOTAL: 60 PERIODS
TEXT BOOKS:

REFERENCES:

CS8401 DESIGN AND ANALYSIS OF ALGORITHMS L T P C
3 0 2 4

Objective
Understanding various algorithm design techniques, and to know how to apply those techniques to various problems. Also, gives an understanding of parallel algorithm design, and provides the idea of NP-class of problems and their approximate solutions.

UNIT I ANALYSIS & DIVIDE-AND-CONQUER 9

Lab Component: 6
Implementing some recursive algorithms and study its theoretical time vs empirical time – Implement and analyze selection problem.

UNIT II GREEDY & DYNAMIC PROGRAMMING 9
Lab Component: 6
Implement and analyze: Minimum spanning tree problem and Traveling salesperson problem.

UNIT III BACKTRACKING & BRANCH-AND-BOUND 9

Lab Component: 6
Implement and analyze: Sum of subsets – Implement Branch and Bound based traveling salesperson problem and compare with dynamic programming.

UNIT IV STRING MATCHING & PARALLEL ALGORITHMS 9

Lab Component: 6
Implement and compare simple string matching and KMP algorithms. Implement prefix computation algorithm by using multiple threads or processes.

UNIT V NP PROBLEMS & APPROXIMATION ALGORITHMS 9

Lab Component: 6
Implement vertex cover and traveling salesman problems using approximation algorithm.

TOTAL: 45 + 30 : 75 PERIODS

TEXT BOOKS:
REFERENCES:

CS8402 JAVA AND INTERNET PROGRAMMING

OBJECTIVE
This course comprehends the concepts of core java and working principles of Internet, and the knowledge will be enhanced to the client and server side programming and web development.

UNIT I JAVA FUNDAMENTALS
Overview of Java, Fundamental Programming Structures, Strings – Objects Classes and Methods - Inheritance - Packages and Interfaces - Exception handling, Collections - Multithreading – Java I/O Streams, File Handling.

UNIT II INTERNET BASICS AND JAVA NETWORK PROGRAMMING

UNIT III CLIENT-SIDE PROGRAMMING

UNIT IV SERVER-SIDE PROGRAMMING
Types of servers - Configuring and Using Web servers, Setting up Databases, Java Database
Connectivity - Handling form data, validation, querying databases, information retrieval, response generation, Session management - using PHP, Servlets, JSP.

UNIT V  WEB APPLICATION DEVELOPMENT  12

TOTAL : 60 PERIODS

TEXT BOOKS:

REFERENCES:

CS8451  OPERATING SYSTEMS  L T P C  3 0 0 3

OBJECTIVE
Gives an idea about process synchronization, inter-process communication, scheduling, deadlock handling, and memory management.

UNIT I  OPERATING SYSTEMS OVERVIEW  9
Introduction to operating systems – Computer system organization, architecture – Operating system structure, operations – Process, memory, storage management – Protection and

UNIT II  PROCESS MANAGEMENT  9

UNIT III  STORAGE MANAGEMENT  9

UNIT IV  I/O SYSTEMS  9

UNIT V  CASE STUDY  9

TOTAL: 45 PERIODS

TEXT BOOK:
REFERENCES:

CS8452 SOFTWARE ENGINEERING L T P C
3 0 0 3

OBJECTIVE
This course is intended to provide the students with an overall view over Software Engineering discipline and with insight into the processes of software development.

UNIT I SOFTWARE PROCESS MODELS 9

UNIT II REQUIREMENT ENGINEERING 9

UNIT III ANALYSIS MODELLING 9
UNIT IV  DESIGN & TESTING

UNIT V  QUALITY & MAINTENANCE

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

EE8407 ELECTRICAL ENGINEERING AND CONTROL SYSTEMS 3 0 0 3

OBJECTIVE
To impart knowledge on Network analysis, principle of electrical machines, different system representation, block diagram reduction and Mason’s rule, time response and frequency response analysis of LTI systems, and State variable analysis.

UNIT I  ELECTRIC CIRCUITS
Dependent and independent sources - Kirchhoff’s laws - mesh current and node voltage methods - theorems - Thevenin’s - Norton’s - superposition - maximum power transfer-(DC Analysis only) Phasors - sinusoidal steady state response of simple RLC circuits.
UNIT II DC MACHINES
Construction of DC machines - Theory of operation of DC generators – Characteristics of DC
generators- Operating principle of DC motors - Types of DC motors and their characteristics -
Speed control of DC motors- Applications.

UNIT III AC MACHINES
Principles of single phase transformers; EMF equation-Operation of three-phase induction
motors-single-phase induction motor - double field revolving theory –starting methods.
Principles of synchronous machines -Equation of induced EMF.

UNIT IV MATHEMATICAL MODELS OF PHYSICAL SYSTEMS
Definition & classification of system - terminology & structure of feedback control theory -
Differential equation of physical systems - Block diagram algebra - Signal flow graphs.

UNIT V TRANSFER FUNCTION and STATE VARIABLE ANALYSIS
Time Response analysis of II order system -Frequency response - Bode plots – Concept of
state variable - State models for linear & continuous time systems.

TOTAL: 45 PERIODS

TEXT BOOKS:
   Hall, (pearson Education, Inc.), New Delhi, 2005.

REFERENCES:
   (Pearson Education Inc.), 2007.
   New Delhi.
LIST OF EXPERIMENTS:
1. Java classes and objects
2. Inheritance, Polymorphism
3. Interfaces and Exception Handling, Packages
4. Using InetAddress class
5. Socket Programming in Java
6. RMI
7. Client side scripting using
   - XHTML,
   - Javascript/DOM
   - CSS
8. XML DTD, Parsers, XSLT
9. Programming with AJAX, JQuery
10. Java Applets, AWT, Swings
11. Server Side programming (implement these modules using any of the server side scripting languages like PHP, Servlets, JSP etc.,)
   - Gathering form data
   - Querying the database
   - Response generation
   - Session management
12. MySQL/JDBC/Oracle
13. Application development
14. Develop applications using Dreamweaver/Flex/SilverLight etc.,

TOTAL: 45 PERIODS

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS:

Software:
1. Browser
2. JDK version 6 update 27
3. TOMCAT 7.0
4. MySQL 5.5,
5. Oracle 11i
6. Dreamweaver CS5.5
7. NetBeans IDE 7
8. XAMPP / WAMP

CS8461    OPERATING SYSTEMS LABORATORY       L T P C
                 0 0 3 2

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

TOTAL: 45 PERIODS

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS
1. Linux server
2. Terminals for 30 students

CS8501    DATA COMMUNICATION AND COMPUTER NETWORKS       L T P C
                 3 1 0 4

OBJECTIVE
Gets the idea of choosing the required functionality at each layer for a given application and trace the flow of information from one node to another node in the network. Then gives the
understanding of division of network functionalities into layers, the component required to build different types of networks and identify the solution for the functionalities in each layer.

UNIT I APPLICATION LAYER

UNIT II TRANSPORT LAYER

UNIT III NETWORK LAYER

UNIT IV DATA LINK LAYER

UNIT V DATA COMMUNICATIONS

TOTAL: 45+15 PERIODS

TEXT BOOKS:
REFERENCES:

CS8502 MICROPROCESSORS AND MICROCONTROLLERS L T P C
3 0 0 3

OBJECTIVE
Gives an understanding of functional blocks of a Microprocessor and programming in 8085 and 8086. It also explains the functions of common programmable peripheral controllers and interface a processor with another processor/co-processor and other peripheral devices. At the end, the students will be capable of building a Microprocessor/ Microcontroller based system for a given control application.

UNIT I THE 8085 MICROPROCESSOR 9
Introduction to 8085 – Microprocessor architecture – Instruction set – Programming the 8085.

UNIT II 8086 SOFTWARE ASPECTS 9

UNIT III 8086 SYSTEM DESIGN 9
8086 signals – Basic configurations – System bus timing – System design using 8086 – Multiprocessor configurations – Coprocessor, Closely coupled and loosely Coupled configurations – Introduction to advanced processors.

UNIT IV I/O INTERFACING 9
Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications.
UNIT V MICROCONTROLLERS


TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

CS8503 SYSTEM SOFTWARE INTERNALS

OBJECTIVES
Issues related to the design and implementation of assemblers, role of linkers and loaders as well as their interactions with hardware, working nature of macro processors and design of virtual machines are the core of this course.

UNIT I ASSEMBLERS
UNIT II LOADERS AND LINKERS

UNIT III MACROPROCESSORS AND EMULATORS

UNIT IV VIRTUAL MACHINES

UNIT V ADVANCED FEATURES

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVES
Learning about automata, grammar, language, and their relationships. Further, gives an understanding of the power of Turing machine, and the decidable nature of a problem. Also, gives the idea on some new trends and applications.

UNIT I REGULAR LANGUAGES 10

UNIT II CONTEXT FREE LANGUAGES 10
Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages – Equivalence of Parse trees and derivation - Normal forms for CFG - Definition of the Pushdown automata – Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG – Pumping lemma for CFL.

UNIT III CLOSURE PROPERTIES AND TURING MACHINES 8

UNIT IV UNDECIDABILITY 8
A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing Machine – Rice theorem for Recursive and Recursively enumerable languages – Post’s Correspondence Problem.

UNIT V RECENT TRENDS & APPLICATIONS 9

TOTAL : 45 PERIODS
TEXT BOOKS:

REFERENCES:

CS8551 OBJECT ORIENTED ANALYSIS AND DESIGN L T P C
3 0 0 3

OBJECTIVE
Gives and understanding of OOAD basics, UML diagrams, system modeling, design based on requirements, converting design to code, and design patterns.

UNIT I OOAD BASICS 10

UNIT II REQUIREMENTS & MORE MODELING 7

UNIT III DESIGN AND PRINCIPLES OF DESIGN 10

UNIT IV MAPPING TO CODE 8
Mapping designs to code – Test Driven development and refactoring – UML Tools and UML as blueprint
UNIT V  MORE PATTERNS


TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:

HS8561  EMPLOYABILITY SKILLS  L T P C
(Lab / Practical Course)  0 0 2 1
(Common to all branches of Fifth or Sixth Semester B.E / B.Tech programmes)

OBJECTIVES:
- To enhance the employability skills of students with a special focus on Presentation skills, Group discussion skills and Interview skills
- To help them improve their soft skills, including report writing, necessary for the workplace situations
2. Creating effective PPTs – presenting the visuals effectively
3. Using appropriate body language in professional contexts – gestures, facial expressions, etc.
4. Preparing job applications - writing covering letter and résumé
5. Applying for jobs online - email etiquette
6. Participating in group discussions – understanding group dynamics - brainstorming the topic
7. Training in soft skills - persuasive skills – People skills - questioning and clarifying skills – mock GD
8. Writing Project proposals – collecting, analyzing and interpreting data / drafting the final report
9. Attending job interviews – answering questions confidently
10. Interview etiquette – dress code – body language – mock interview

TOTAL: 30 PERIODS

REQUIREMENTS FOR A CLASS OF 30 STUDENTS
1. A PC or a lap top with one or two speakers
2. A Collar mike and a speaker
3. An LCD projector and a screen
4. CD’s and DVD’s on relevant topics

REFERENCE BOOKS:

EXTENSIVE READERS

WEB RESOURCES
1. www.humanresources.about.com
2. www.careerride.com
LIST OF EXPERIMENTS:
1. Study of case tools such as rational rose or equivalent tools
2. Requirements
   - Implementation of requirements engineering activities such as elicitation, validation, management using case tools
3. Analysis and design
   - Implementation of analysis and design using case tools.
4. Study and usage of software project management tools such cost estimates and scheduling
5. Documentation generators - Study and practice of Documentation generators.
6. Data modeling using automated tools.
7. Practice reverse engineering and re engineering using tools.
8. Exposure towards test plan generators, test case generators, test coverage and software metrics.
9. Meta modeling and software life cycle management.

TOTAL : 45 PERIODS

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS
1. Case tools such as rational rose or equivalent tools. (30 user license).
2. Any Project management tools such as JxProject (freeware).
3. 1 server + 32 PCs (P4 or higher version with atleast 2 GB RAM).

LIST OF EXPERIMENTS:
1. Simple Chat Program using TCP Sockets
2. Simulation of HTTP Protocol using TCP Sockets
3. Simulation of DNS using UDP Sockets
4. Learn to use commands like TCP Dump, Netstat, Trace Route
5. Simulation of Ping using Raw Sockets
6. Simulation of Distance Vector/Link State Routing algorithm
7. Study and configure functionalities of a router and switches (or by simulation)
8. Study of TCP/UDP performance using Simulation tool
9. Performance comparison of Routing protocols using Simulation tool
10. Simulation of error correction code (like CRC)

TOTAL: 45 PERIODS

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS
1. Linux Server - 1
2. Terminals for 30 students

CS8513  MICROPROCESSORS LABORATORY  L T P C
0 0 3 2

LIST OF EXPERIMENTS:
1. Simple programming exercises on 8085 (Like 8-bit multiplication, division).
2. Code conversion, decimal arithmetic and Matrix operations.
3. Floating point operations, string manipulations, sorting and searching.
4. Simple programming with 8086 with basic system calls for input/output (Arithmetic operations).
5. String manipulation - search, find and replace, copy operations, sorting and searching.
6. File manipulations with system calls.
8. Interfacing with 8085/8086 – 8279 and 8251.
9. Microprocessor based system development.
10. Application development using Micro controller.

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS

HARDWARE
1. 8085 trainer kits 30
2. 8086 trainer kits 30
3. Interface cards like stepper motor interface, traffic light controller, ADC / DAC
4. 8051 trainer kits 30
SOFTWARE
1. 8086 assembler.
2. Simulator for HDL.

CS8601 ARTIFICIAL INTELLIGENCE
3 0 0 3

OBJECTIVE
To search and discover intelligent characteristics of existing AI projects, map a new problem – as search and create an animation - showing different search strategies for a problem, program a new game/problem in Prolog, evaluate different Knowledge Representation schemes for typical AI problems, design and implement a typical AI problem to be solved Using Machine Learning Techniques, design and implement a futuristic AI application

UNIT I  INTRODUCTION

UNIT II  PROBLEM SOLVING METHODS

UNIT III  KNOWLEDGE REPRESENTATION

UNIT IV  MACHINE 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 -
UNIT V APPLICATIONS


TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

CS8602 COMPILER DESIGN

OBJECTIVE

To design the front end of the compiler, scanner, parser, intermediate code generator, object code generator, and the parallel compilation strategies.
UNIT I  FRONT END OF COMPILERS  
9+6
The structure of Compiler – Lexical analysis: Role of Lexical analyzer, Specification and recognition of tokens, Syntax Analysis: Top down parsing, Bottom up parsing, LR Parsers: SLR, CLR, and LALR.

Lab Component: Lexical analyzer generators, Parser generators

UNIT II  INTERMEDIATE CODE GENERATION  
9+6
Syntax Directed Definitions, Evaluation orders for syntax directed definitions, Syntax Directed Translation schemes, Intermediate languages: Three address code, Syntax tree, Postfix code – Declarations – Type checking – Expression translation – Back patching

Lab Component: Intermediate code generation of Expressions, Assignment statements with arrays, Control flow statements, Switch statements.

UNIT III  OBJECT CODE GENERATION  
9+6

Lab Component: Code generation for any specific architecture supported by open source compilers

UNIT IV  CODE OPTIMIZATION  
9+6

Lab Component: Exploring and customizing different types of optimizations supported by any open source compiler

UNIT V  PARALLELIZING COMPILER  
9+6
Basic concepts and examples – Iteration spaces – Affine array indexes – Data reuse – Array data dependence - Finding synchronization free parallelism – Synchronization between parallel loops, Locality optimizations.

Case study: Open source parallelizing compilers.

TOTAL: 45 + 30 PERIODS

67
TEXT BOOK:

REFERENCES:

CS8603 COMPUTER GRAPHICS AND MULTIMEDIA L T P C 3 0 0 3

OBJECTIVES:
- To develop, design and implement two and three dimensional graphical structures
- To enable students to acquire knowledge Multimedia compression and animations
- To learn Creation, Management and Transmission of Multimedia objects.

UNIT I 2D PRIMITIVES
Elements of pictures created in computer graphics – Graphics input primitives and devices

UNIT II 2D GEOMETRIC TRANSFORMATIONS

UNIT III 3D CONCEPTS
Projections - Three dimensional object representation – Parallel and Perspective Polygons,
Splines, Quadric Surfaces - Visualization of data sets - 3D affine transformations 3D Rotations using Quaternions – Viewing – Visible surface identification – Color Models, 3D Transformations in open GL

UNIT IV  MULTIMEDIA BASICS  9

UNIT V  MULTIMEDIA AUTHORING AND APPLICATIONS  9

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCE BOOKS:

CS8604 PROGRAMMING PARADIGMS  L T P C
3 0 0 3

OBJECTIVES
It explores a range of modern programming languages and programming techniques and performs comparison of the same, and gives the idea of evaluating programming language features critically with respect to the way they support good software engineering practice. Also, it describes analyzing of solving a problem in terms of several programming paradigms, so that one can determine the advantages and disadvantages of each approach.

UNIT I  INTRODUCTION  9
The art of Language design – Programming language spectrum - Compilation and Interpretation

UNIT II SEMANTICS 9

UNIT III FUNCTIONS 9

UNIT IV PROGRAMMING TECHNIQUES 9

UNIT V MODERN PROGRAMMING TECHNIQUES 9

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVE
This course provides the idea on design of analog and digital filters, and their classifications. Also, it provides a good knowledge of error correction in signal processing systems, which is then enriched with the applications to image and speech processing.

UNIT I  SIGNALS AND SYSTEMS  9

UNIT II  FREQUENCY TRANSFORMATIONS  9

UNIT III  IIR FILTER DESIGN  9
Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (LPF, HPF, BPF, BRF) filter design using frequency translation

UNIT IV  FIR FILTER DESIGN  9

UNIT V  APPLICATIONS  9

TOTAL: 45 PERIODS
TEXT BOOKS:

REFERENCES:

CS8611 COMPUTER GRAPHICS AND MULTIMEDIA LABORATORY L T P C
0 0 3 2

OBJECTIVE:
- To make the students understand graphics programming
- To create 3D graphical scenes using open graphics library suits
- To perform image manipulation, enhancement
- To create animations
- To create a multimedia presentation/Game/Project

IMPLEMENT THE EXERCISES FROM 1 TO 4 USING C / OPENGL / JAVA
1. Implementation of Algorithms for drawing 2D Primitives –
   Line (DDA, Bresenham) – all slopes
   Circle (Midpoint)
2. 2D Geometric transformations –
   Translation
   Rotation
   Scaling
   Reflection
   Shear
   Window-Viewport
3. Composite 2D Transformations
4. Liang - Barsky Line Clipping

**Implement the exercises from 5 to 7 using OpenGL**

5. 3D Transformations - Translation, Rotation, Scaling

6. 3D Projections – Parallel, Perspective

7. Creating 3D Scenes

8. Compression Algorithms - To implement text and image compression algorithms.

9. Image Editing and Manipulation - Basic Operations on image using any image editing software, Creating gif animated images, Image optimization

10. 2D Animation – To create Interactive animation using any authoring tool

**TOTAL: 45 PERIODS**

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**CS8612 CREATIVE AND INNOVATIVE PROJECT**

0 0 3 2

The goal of this course is to encourage the students to identify innovative projects that help in exploring variables that promote creativity and innovation. Each student is expected to choose a real life or socially relevant problem. At the end of the project, students should be familiar with the state of art in their respective fields. They would be able to apply the concepts learnt to relevant research problems or practical applications.

The goal of this course is to motivate them to learn concepts, models, frameworks, and tools that engineering graduates’ need in a world where creativity and innovation is fast becoming a pre-condition for competitive advantage.

**TOTAL: 45 PERIODS**

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**MG8653 PRINCIPLES OF MANAGEMENT**

3 0 0 3

**AIM:**

To learn the different principles and techniques of management in planning, organizing, directing and controlling.

**OBJECTIVES**

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

UNIT I  INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS  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

TEXT BOOKS:
OBJECTIVE:
To study the details of lower layers of mobile architectures in the context of pervasive computing and mobile applications.

UNIT I  PERVERSIVE COMPUTING
Basics and vision – Architecture and Applications requirements – Smart devices and operating systems, secure services – Smart mobiles, cards and device networks.

UNIT II  MOBILE APPLICATIONS

UNIT III  MEDIUM ACCESS AND TELECOMMUNICATIONS

UNIT IV  WIRELESS NETWORKS
UNIT V  MOBILE NETWORK AND TRANSPORT LAYERS

Mobile IP – DHCP – Routing in Mobile ad hoc networks – TCP improvements – TCP over 2.5/3G.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

CS8702  PARALLEL PROGRAMMING  L T P C
3 0 0 3

OBJECTIVE
To identify the scope for parallelism in a program, understand the various parallel programming models and the challenges involved in parallel programming, learn the basics of OpenMP and
MPI and programming with them, and the programming of heterogeneous systems using CUDA and OpenCL

UNIT I  FUNDAMENTALS OF PARALLEL COMPUTING  

UNIT II  CHALLENGES OF PARALLEL PROGRAMMING  

UNIT III  SHARED MEMORY MODELS AND OPENMP PROGRAMMING  

UNIT IV  MPI PROGRAMMING  

UNIT V  PROGRAMMING HETEROGENEOUS PROCESSORS  

TOTAL: 45 PERIODS

TEXT BOOKS:
REFERENCES:
6. MPI Programmer’s Manual

CS8703 SECURITY IN COMPUTING L T P C
3 0 0 3

OBJECTIVE
To understand the basics of cryptography, learn to find the vulnerabilities in programs and to overcome them, know the different kinds of security threats in networks, databases and the different solutions available, and learn about the models and standards for security.

UNIT I ELEMENTARY CRYPTOGRAPHY 9

UNIT II PROGRAM SECURITY 9

UNIT III SECURITY IN NETWORKS 9
UNIT IV SECURITY IN DATABASES


UNIT V SECURITY MODELS AND STANDARDS


TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

CS8711 MOBILE APPLICATION DEVELOPMENT LABORATORY

LIST OF EXPERIMENTS:
1. General Form Design
2. Mobile browser based interactive applications
3. Applications using controls
4. Mobile networking applications (SMS/Email)
5. Applications involving data retrieval
6. Launching services in a mobile phone
7. Web portal development
8. Applications using Android SDK framework (like interactive applications, applications that make use of accelerometer sensor, video applications)
9. Applications that use the iPhone SDK framework
10. Testing the applications using emulators

TOTAL: 45 PERIODS

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS
1. JDK environment
2. J2ME
3. Sun Java Wireless Toolkit
4. Android SDK
5. iPhone SDK

CS8712 SOFTWARE DEVELOPMENT LABORATORY

Develop a software package in any application relevant to any area of study of your curriculum by applying the Software Engineering Practices generally done by software industries, which are

1. Identification of Use cases for each application system and SRS preparation.
2. Identification of reusable Components/Frameworks from open source and customizing them for each application.
3. Coding/Customizing/Wrapping for components/subsystems.
4. Testing – Scenario testing and test case preparation for each components/subsystems
5. Integration of subsystems and Testing
6. Simulation of datasets and load testing to analyze performance of the system.

TOTAL: 45 PERIODS
OBJECTIVE:
Understand the concept of .NET framework, study the different techniques of security, introduce web services with ASP.NET, and explore window based applications.

UNIT I  C# LANGUAGE BASICS  9
C# and the .NET framework - C# basics - Objects and types - Inheritance - Arrays - Operators and casts – Indexes

UNIT II  C# ADVANCED FEATURES  9
Delegates and events - Strings and regular expressions - Generics - Collections - Memory management and pointers - Errors and exceptions

UNIT III  BASE CLASS LIBRARIES AND DATA MANIPULATION  9
Tracing and events - Threading and synchronization - .Net security - Localization - Manipulating XML - Managing the file system - Basic network programming

UNIT IV  DATABASE AND WEB SERVICES  9
Window based applications - Data access with .NET - basics of ASP .NET - Introduction to web services

UNIT V  .NET FRAMEWORK  9
Architecture - Assemblies - Shared assemblies - CLR hosting - Appdomains - Reflection

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:
OBJECTIVE

To study the protocols and the functionalities of ad hoc networks, understanding the various applications developed based on ad hoc networking, addressing issues and challenges created. To know about the sensor networks and addressing the challenges in establishing infrastructure for sensor networks and managing database.

UNIT I  INTRODUCTION AND MAC PROTOCOLS


UNIT II  ROUTING PROTOCOLS


UNIT III  TRANSPORT LAYER AND SECURITY ISSUES


UNIT IV  SENSOR NETWORKS AND NETWORKING SENSORS


UNIT V  INFRASTRUCTURE ESTABLISHMENT AND NETWORK DATABASE


TOTAL: 45 PERIODS

TEXT BOOKS:


REFERENCES:

CS8003 ADVANCED TOPICS ON DATABASES L T P C 3 0 0 3

OBJECTIVE
To know advanced concepts of database in large scale analytics, derive data maintenance, change schema, database update and Benchmark Object Databases, deals with uncertainties in advanced concepts of database, and open issues in database technologies.

UNIT I PARALLEL AND DISTRIBUTED DATABASES 9

UNIT II ACTIVE DATABASES 9

UNIT III TEMPORAL AND OBJECT DATABASES 9

UNIT IV COMPLEX QUERIES AND REASONING 9
Logic of Query Languages – Relational Calculi – Recursive rules – Syntax and semantics of

UNIT V SPATIAL, TEXT AND MULTIMEDIA DATABASES


TOTAL: 45 PERIODS

REFERENCES:
3. VLDB Journal.

FURTHER READING:
- http://video.google.com
- http://www.blinkvid.com/video
- http://www.crazyengineers.com/forum

CS8004 BIO INFORMATICS TECHNOLOGIES

OBJECTIVE:
To understand basic concepts of molecular biology and genetics, the concepts of computer science that relate to problems in biological sciences, computer as a tool for biomedical research, and important functional relationships from gene data.

UNIT I INTRODUCTION
Need for Bioinformatics technologies – Overview of Bioinformatics technologies Structural bioinformatics – Data format and processing – Secondary resources and applications – Role of Structural bioinformatics - Biological Data Integration System.
UNIT II  DATAWAREHOUSING AND DATAMINING IN BIOINFORMATICS  9
Bioinformatics data – Data warehousing architecture – data quality – Biomedical data analysis – DNA data analysis – Protein data analysis – Machine learning – Neural network architecture and applications in bioinformatics

UNIT III  MODELING FOR BIOINFORMATICS  9

UNIT IV  PATTERN MATCHING AND VISUALIZATION  9

UNIT V  MICROARRAY ANALYSIS  9

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVE
This course gives the idea of evolution of cloud computing and its services available today, which may lead to the design and development of simple cloud service. It also focused on some key challenges and issues around cloud computing.

UNIT I INTRODUCTION

UNIT II CLOUD SERVICES
Types of Cloud services: Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service - Monitoring as a Service –Communication as services. Service providers- Google, Amazon, Microsoft Azure, IBM, Sales force.

UNIT III COLLABORATING USING CLOUD SERVICES

UNIT IV VIRTUALIZATION FOR CLOUD
Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization –System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

UNIT V SECURITY, STANDARDS AND APPLICATIONS

TOTAL: 45 PERIODS
TEXT BOOKS:

REFERENCES:
2. Lee Badger, Tim Grance, Robert Patt-Corner, Jeff Voas, NIST, Draft cloud computing synopsis and recommendation, May 2011.

CS8006 COMPUTATIONAL INTELLIGENCE L T P C 3 0 0 3

OBJECTIVE
To examine work at the frontiers of research in computing where ideas from biology are inspirations to build truly intelligent computer systems; analyse the dependencies among biology, complexity, computer science, informatics, cognitive science, robotics, and cybernetics.; introduce concepts, models, algorithms, and tools for development of intelligent systems; create an understanding of the fundamental Computational Intelligence models; explore the theory and applications of two classes of system inspired by biology: neural networks and evolutionary computation; and apply Computational Intelligence techniques to classification, pattern recognition, prediction, rule extraction, and optimization problems.

UNIT I THEORETICAL FOUNDATIONS 9
UNIT II  LEARNING  

UNIT III  EVOLUTIONARY COMPUTING  
Neural Networks – Back propagation Networks – Hopfield Neural Networks – Radial Basis Function Networks – Learning Vector Quantisation - Artificial Neural Networks

Fuzzy Classifiers – Fuzzy Cognitive Maps – Collective Intelligence - Swarm Intelligence – Ant routing – Adaptivity and self-organisation – quantitative emergence and control - Self-Organising Feature Maps

UNIT IV  ARTIFICIAL IMMUNE SYSTEMS  

UNIT V  ADVANCED TOPICS  

TOTAL: 45 PERIODS

TEXT BOOKS:
REFERENCES:

CS8007 DATA WAREHOUSING AND DATA MINING L T P C 3 0 0 3

OBJECTIVE
This course deals with evolving multidimensional intelligent model from a typical system, representation of multi dimensional data for a data warehouse, discovering the knowledge imbibed in the high dimensional system, finding the hidden interesting patterns in data, and gives the idea to evaluate various mining techniques on complex data objects.

UNIT I INTRODUCTION TO DATA WAREHOUSING 8
Evolution of Decision Support Systems- Data warehousing Components –Building a Data warehouse, Data Warehouse and DBMS, Data marts, Metadata, Multidimensional data model, OLAP vs OLTP, OLAP operations, Data cubes, Schemas for Multidimensional Database: Stars, Snowflakes and Fact constellations.

UNIT II DATA WAREHOUSE PROCESS AND ARCHITECTURE 9
Types of OLAP servers, 3–Tier data warehouse architecture, distributed and virtual data warehouses. Data warehouse implementation , tuning and testing of data warehouse. Data Staging (ETL) Design and Development, data warehouse visualization, Data Warehouse Deployment, Maintenance, Growth, Business Intelligence Overview- Data Warehousing and Business Intelligence Trends - Business Applications- tools-SAS

UNIT III INTRODUCTION TO DATA MINING 9
Data mining-KDD versus datamining, Stages of the Data Mining Process-task premitives, Data Mining Techniques -Data mining knowledge representation – Data mining query languages, Integration of a Data Mining System with a Data Warehouse – Issues, Data preprocessing –
UNIT IV  CLASSIFICATION AND CLUSTERING  
Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods- Clustering techniques –, Partitioning methods- k-means-Hierarchical Methods - distance-based agglomerative and divisive clustering, Density-Based Methods – expectation maximization -Grid Based Methods – Model-Based Clustering Methods – Constraint – Based Cluster Analysis – Outlier Analysis

UNIT V  DATA WAREHOUSING AND DATA MINING SOFTWARE’S AND APPLICATIONS
Mining complex data objects, Spatial databases, temporal databases, Multimedia databases, Time series and Sequence data; Text Mining –Graph mining-web mining-Application and trends in data mining

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVE
To use Tuning tools for different operations; optimization to different mechanism of Database; and change Schema, Database update and Benchmark Databases.

UNIT I  SQL TUNING

UNIT II  DESIGN OPTIMIZATION

UNIT III  PERFORMANCE TUNING

UNIT IV  TROUBLESHOOTING

UNIT V  CASE STUDIES
Monitoring and Tuning Activities – Benchmarking results of Oracle SQL* Forms – Oracle 11g – Informix.

TOTAL: 45 PERIODS

TEXT BOOKS:
OBJECTIVE

To analyze and compare different on-line E-Learning tools, design course content for a specific subject from different perspective, plan and design the instruction and support needs of learners of various backgrounds, levels and situations based on different learning methodologies, outline the various tasks of a typical online course facilitator, and Design and Implement an E-Learning Course Content for a complete online course

UNIT I  INTRODUCTION


UNIT II  E-LEARNING STRATEGY


UNIT III  PRINCIPLES OF E-LEARNING

Philosophy of E-Learning – theory of learning – Applying principles of multimedia - Applying principles of contiguity - Applying principles of modality - Applying principles of redundancy - Applying principles of coherency - Applying principles of personalization- web-based learning communities - knowledge sharing and Knowledge management in e-learning- social networks and social media in e-learning

UNIT IV  DESIGN

On line E-Learning technologies – visual communication techniques- Computer-based technologies - Computer-mediated communication (CMC) - Assessment and evaluation- Organizing and designing learning sequences, Characteristics of Interactive Online Learning Media

UNIT V  IMPLEMENTATION

Leverages example in E-Learning – collaborative E-Learning- Learner control in E-Learning- guidelines to solve issues in E-Learning – Implementation of an E-Learning Course Content
for a complete online course, Research in content retrieval and generation for E-Learning, Role of cloud and semantic Grid in E-Learning

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
4. Topics (Wiley Series on Parallel and Distributed Computing)

CS8010 GRAPH THEORY AND COMBINATORICS L T P C
3 0 0 3

OBJECTIVE
This course comprehends the graphs as a modeling and analysis tool in computer science & Engineering. It introduces the structures such as graphs & trees and techniques of counting and combinations, which are needed in number theory based computing and network security studies in Computer Science.

UNIT I INTRODUCTION
UNIT II  TREES, CONNECTIVITY & PLANARITY  9

UNIT III  MATRICES, COLOURING AND DIRECTED GRAPH  8

UNIT IV  PERMUTATIONS & COMBINATIONS  9
Fundamental principles of counting - Permutations and combinations - Binomial theorem - combinations with repetition - Combinatorial numbers - Principle of inclusion and exclusion - Derangements - Arrangements with forbidden positions.

UNIT V  GENERATING FUNCTIONS  10
Generating functions - Partitions of integers - Exponential generating function - Summation operator - Recurrence relations - First order and second order – Non-homogeneous recurrence relations - Method of generating functions.

TOTAL: 45 PERIODS

TEXT BOOKS:

References:
OBJECTIVE
To acquire knowledge to adopt green computing practices to minimize negative impacts on the environment, skill in energy saving practices in their use of hardware, examine technology tools that can reduce paper waste and carbon footprint by user, and to understand how to minimize equipment disposal requirements.

UNIT I FUNDAMENTALS

UNIT II GREEN ASSETS AND MODELING

UNIT III GRID FRAMEWORK

UNIT IV GREEN COMPLIANCE

UNIT V CASE STUDIES
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
TEXT BOOKS:

REFERENCES:

CS8012 HUMAN COMPUTER INTERACTION

OBJECTIVE
Determine the need for computers and evaluate the use of computers, identify the stages in software engineering that need to be modified for effectiveness of interacting with computers, discover the various models that can be used for designing systems, evaluate the design techniques by applying the apt statistical approach, and design dialogue for representation to computers.

UNIT I DESIGN PROCESS

UNIT II DESIGN AND EVALUATION OF INTERACTIVE SYSTEMS
Interface management system – Evaluation techniques – evaluation design – Evaluating implementations – Observational Methods

UNIT III  MODELS

UNIT IV  EXPERIMENTAL DESIGN AND STATISTICAL ANALYSIS OF HCI

UNIT V  THEORIES

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCE:
OBJECTIVE
To use an open source search engine framework and explore its capabilities, represent documents in different ways and discuss its effect on similarity calculations and on search, modify Page Rank and HITS algorithms or Personalization, Semantic or any other aspect, design and implement an innovative feature in a search engine and explain the search components affected by the innovation, design a smart information management system with Information Retrieval components.

UNIT I INTRODUCTION
Introduction - History of IR - Components of IR - Issues - Open source Search engine Frameworks, The impact of the web on IR - The role of artificial intelligence (AI) in IR – IR Versus Web Search - Components of a Search engine - Characterizing the web

UNIT II INFORMATION RETRIEVAL
Boolean and vector-space retrieval models - Term weighting - TF-IDF weighting - cosine similarity – Preprocessing - Inverted indices - efficient processing with sparse vectors – Language Model based IR - Probabilistic IR – Latent Semantic Indexing - Relevance feedback and query expansion

UNIT III WEB SEARCH ENGINE – INTRODUCTION AND CRAWLING
Web search overview, web structure, the user, paid placement, search engine optimization/spam. Web size measurement - search engine optimization/spam – Web Search Architectures - crawling - meta-crawlers - Focused Crawling - web indexes -- Near-duplicate detection - Index Compression - XML retrieval

UNIT IV WEB SEARCH – LINK ANALYSIS AND SPECIALIZED SEARCH
Link Analysis – hubs and authorities - PageRank and HITS algorithms - Searching and Ranking – Relevance Scoring and ranking for Web – Similarity - Hadoop & MapReduce - Evaluation - Personalized search - Collaborative filtering and content-based recommendation of documents and products – handling “invisible” Web - Snippet generation, Summarization, Question Answering, Cross-Lingual Retrieval

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

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

CS8014 MIDDLEWARE TECHNOLOGIES L T P C
3 0 0 3

OBJECTIVE
This course provides a sound knowledge in various middleware technologies for distributed applications. Also, it gives familiarization web service architectures and their standards.

UNIT I INTRODUCTION
UNIT II  EJB and CORBA  
EJB architecture - Overview of EJB software architecture, EJB Conversation, Building and Deploying EJBs, Roles, applications - EJB Session Beans, EJB entity beans - Lifecycle of Beans - EJB clients - developing an application - Deployment. CORBA – components - architectural features - method invocations - static and dynamic: IDL - CORBA's self-describing data - interface repository - Building an application using CORBA - Overview of CORBA Services - Object location Services, Messaging Services - CORBA Component Model.

UNIT III  COM and .NET  
Evolution of DCOM - Introduction to COM - COM clients and servers - COM IDL - COM Interfaces COM Threading Models – Marshalling - Custom and standard marshalling - Comparison COM and CORBA - Introduction to .NET - Overview of .NET architecture - Remoting.

UNIT IV  SOA and WEB SERVICES  

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

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

CS8015 NANO COMPUTING L T P C
3 0 0 3

OBJECTIVE
This course is intended to provide the students with the prospects, challenges, imperfections, reliability and with insight into Nanoscale Quantum Computing and QCA implementation.

UNIT I NANO COMPUTERING-PROSPECTS AND CHALLENGES 9

UNIT II NANO计算机ING WITH IMPERFECTIONS 9
Introduction - Nanocomputing in the Presence of Defects and Faults - Defect Tolerance - Towards Quadrillion Transistor Logic Systems

UNIT III RELIABILITY OF NANO COMPUTERING 9
Markov Random Fields - Reliability Evaluation Strategies - NANOLAB - NANOPRISM - Reliable Manufacturing and Behavior from Law of Large Numbers

UNIT IV NANO SCALE QUANTUM COMPUTERING 9
Quantum Computers - Hardware Challenges to Large Quantum Computers - Fabrication, Test, and Architectural Challenges - Quantum-dot Cellular Automata (QCA) - Computing with QCA - QCA Clocking - QCA Design Rules

UNIT V QCADESIGNER SOFTWARE AND QCA IMPLEMENTATION 9
Basic QCA Circuits using QCADesigner - QCA Implementation - Molecular and Optical Computing: Molecular Computing - Optimal Computing - Ultrafast Pulse Shaping and Tb/sec Data Speeds

TOTAL: 45 PERIODS
TEXT BOOK:

REFERENCES:

CS8016 NATURAL LANGUAGE PROCESSING L T P C
3 0 0 3

OBJECTIVE
To tag a given text with basic Language processing features, design an innovative application using NLP components, implement a rule based system to tackle morphology/syntax of a Language, design a tag set to be used for statistical processing keeping an application in mind, design a Statistical technique for a new application, Compare and contrast use of different statistical approaches for different types of applications.

UNIT I INTRODUCTION 9

UNIT II MORPHOLOGY AND PART OF SPEECH TAGGING 9

UNIT III SYNTAX PARSING 9
Syntax Parsing - Grammar formalisms and treebanks - Parsing with Context Free Grammars - Features and Unification -Statistical parsing and probabilistic CFGs (PCFGs)-Lexicalized PCFGs.
UNIT IV  SEMANTIC ANALYSIS  

UNIT V  APPLICATIONS  
Named entity recognition and relation extraction- IE using sequence labeling-Machine Translation (MT) - Basic issues in MT-Statistical translation-word alignment- phrase-based translation – Question Answering  

TOTAL: 45 PERIODS

TEXT BOOKS:
2. Foundations of Statistical Natural Language Processing by Christopher D. Manning and Hinrich Schuetze, MIT Press, 1999  
3. Steven Bird, Ewan Klein and Edward Loper Natural Language Processing with Python, O'Reilly Media; 1 edition, 2009  

REFERENCES:
3. NLTK – Natural Language Tool Kit - http://www.nltk.org/

CS8017  NETWORK ANALYSIS AND MANAGEMENT  
OBJECTIVE  
To learn the network analysis and flow analysis with a network tool and to evaluate the performance of the design issues and architecture to meet the network communication requirements, and to understand how network management technology works to manage today's system.
UNIT I  INRODUCTION

UNIT II  ARCHITECTURE

UNIT III  NETWORK MANAGEMENT

UNIT IV  NETWORK MANAGEMENT ORGANIZATION

UNIT V  MANAGEMENT INTEGRATION

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVE
To learn about wired and wireless network security with various cryptographic techniques, which include private and public keys algorithms along with attacks types.

UNIT I  CLASSICAL CRYPTOSYSTEM 9

UNIT II  BLOCK CIPHER 9

UNIT III  MESSAGE AUTHENTICATION 9

UNIT IV NETWORK SECURITY 9

UNIT V  WIRELESS NETWORK SECURITY 9

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

CS8019 PRINCIPLES OF DISTRIBUTED SYSTEMS L T P C 3 0 0 3

OBJECTIVE:
Explain the goals and types of distributed systems, describe and implement distributed systems in the areas of system processes, communication applications, naming and synchronization, design distributed systems that take into account consistency, replication and/or fault tolerance, and to evaluate the security of distributed systems.

UNIT I INTRODUCTION
Introduction to Distributed systems - challenges - architectural models - fundamental models - P2P systems - Introduction to interprocess communications - external data representation and marshalling- client server communication - group communication-multicast/pubsub - Energy Efficient Computing - Cloud computing

UNIT II DISTRIBUTED OBJECTS AND FILE SYSTEM
Introduction - Communication between distributed objects - Remote procedure call - Events and notifications - Java RMI case Study - Introduction to DFS - File service architecture – Google file system - Introduction to Name Services- Name services and DNS - Directory and directory services-ClusterComputing-mapreduce/bigtable.

UNIT III DISTRIBUTED OPERATING SYSTEM SUPPORT
The operating system layer – Protection - Process and threads - Communication and invocation - Operating system architecture - Introduction to time and global states - Clocks, Events and Process states - Synchronizing physical clocks - Logical time and logical clocks - Global states - Distributed mutual exclusion - Overlay Networks - DHT
UNIT IV TRANSACTION AND CONCURRENCY CONTROL-DISTRIBUTED TRANSACTIONS

Transactions – Nested transaction – Locks - Optimistic concurrency control - Timestamp ordering - Comparison of methods for concurrency control - Introduction to distributed transactions - Flat and nested distributed transactions - Atomic commit protocols - Concurrency control in distributed transactions - Distributed deadlocks - Transaction recovery - Data- Intensive Computing and Map Reduce

UNIT V FAULT TOLERANCE, SECURITY AND REPLICATION


Case study: Multiplayer online games, Social networking services, Large object CDN’s (video/audio streaming systems)

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

CS8020 PRINCIPLES OF EMBEDDED AND REAL TIME SYSTEMS 3 0 0 3

OBJECTIVE:
To obtain a broad understanding of the technologies and applications of embedded and real-time systems; understand the architecture of embedded systems and real-time systems; have
a basic knowledge on the various issues involved in real-time databases; know how these systems can be made more fault tolerant; and learn about embedded/real-time operating systems and the various issues associated with them.

**UNIT I  INTRODUCTION TO EMBEDDED SYSTEM ARCHITECTURE**


**UNIT II  REAL-TIME SYSTEM AND TASKS**


**UNIT III  REAL-TIME DATABASES AND COMMUNICATION**


**UNIT IV  FAULT-TOLERANCE TECHNIQUES**


**UNIT V  EMBEDDED/REAL-TIME OPERATING SYSTEMS**


**TOTAL: 45 PERIODS**

**TEXT BOOKS:**


REFERENCES:

CS8021 SERVICE ORIENTED ARCHITECTURE

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

UNIT I FUNDAMENTALS OF SOA

UNIT II COMBINING SOA AND WEB SERVICES

UNIT III MULTI CHANNEL ACCESS AND WEB SERVICES COMPOSITION
UNIT IV  JAVA WEB SERVICES  
SOA support in J2EE – Java API for XML-based web services(JAX-WS)-Java Architecture for XML binding (JAXB) – Java API for XML Registries(JAXR)-Java API for XML based RPC (JAX-RPC)- Web Services Interoperability-SOA support in .NET – ASP.NET web services – Case Studies- Web Services Enhancements (WSE)

UNIT V  WEB SERVICES SECURITY AND TRANSACTION  

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

CS8022  SOFTWARE AGENTS  

OBJECTIVE
Understand the how software agents reduce information overhead, gain knowledge in use of software agents for cooperative learning and personal assistance, to know how agent can communicate and share knowledge using agent communication language, gain knowledge in design of an agent interpreter and intelligent agent, and understand the concept of mobile technology and mobile agents and its security.
UNIT I AGENT AND USER EXPERIENCE
Agent characteristics- object Vs agent. Agent types- Interacting with Agents - Agent From Direct Manipulation to Delegation - Interface Agent, Metaphor with Character – Designing Agents –problem solving agent, rational agent. Direct Manipulation versus Agent Path to Predictable

UNIT II AGENTS FOR LEARNING AND ASSISTANCE

UNIT III AGENT COMMUNICATION AND COLLABORATION
Overview of Agent Oriented Programming - Agent Communication Language – KQML-Per formatives. Agent Based Framework of Interoperability. Virtual agents: agents in games and virtual environments; companion and coaching agents; modeling personality, emotions; multimodal interaction; verbal and non-verbal expressiveness.

UNIT IV AGENT ARCHITECTURE

UNIT V MOBILE AGENTS

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:

CS8023 SOFTWARE QUALITY AND TESTING  L T P C
3 0 0 3

OBJECTIVE
Gives an understanding of the basics of Software Quality, Functional testing, Control Flow based testing, Data Flow based testing Mutation testing, Software Reliability, and formal verification of programs.

UNIT I INTRODUCTION TO SOFTWARE QUALITY 8

UNIT II SOFTWARE QUALITY METRICS AND RELIABILITY 9

UNIT III TEST CASE DESIGN 11

UNIT IV TEST MANAGEMENT 9
Testing and Debugging Goals and Policies – Test Planning – Test Plan Components – Test Plan

UNIT V CONTROLLING AND MONITORING


TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

CS8024 SYSTEM MODELING AND SIMULATION

OBJECTIVE
To understand the system, specify systems using natural models of computation, modeling techniques, prediction of behavior, and decision support.

UNIT– I INTRODUCTION TO SIMULATION

Introduction – Simulation Terminologies- Application areas – Model Classification Types of Simulation- Steps in a Simulation study- Concepts in Discrete Event Simulation Example.
UNIT II MATHMATICLAL MODELS

UNIT III ANALYSIS OF SIMULATION DATA

UNIT IV VERIFICATION AND VALIDATION
Building – Verification of Simulation Models – Calibration and Validation of Models – Validation of Model Assumptions – Validating Input – Output Transformations.

UNIT V SIMULATION OF COMPUTER SYSTEMS AND CASE STUDIES
Simulation Tools – Model Input – High level computer system simulation – CPU – Memory Simulation – Comparison of systems via simulation – Simulation Programming techniques - Development of Simulation models.

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
OBJECTIVE
To understand Computer Forensics, Computing Investigations, Enforcement Agency Investigations, Corporate Investigations, forensically sound principles and practices related to digital evidence collection, management, and handling.

UNIT I TYPES OF COMPUTER FORENSICS 9

UNIT II DATA RECOVERY 9

UNIT III ELECTRONIC EVIDENCE 9

UNIT IV THREATS 9

UNIT V SURVEILLANCE 9

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:
OBJECTIVE
To get subsequent understanding of game design and development, which includes the processes, mechanics, issues in game design, game engine development, modeling, techniques, handling situations, and logic. At the end, the student will be in a position to create interactive games. To learn this course an exposure to 3D graphics principles and animation techniques are the prerequisite.

UNIT I 3D GRAPHICS FOR GAME PROGRAMMING 9
Coordinate Systems, Ray Tracing, Modeling in Game Production, Vertex Processing, Rasterization, Fragment Processing and Output Merging, Illumination and Shaders, Parametric Curves and Surfaces, Shader Models, Image Texturing, Bump Mapping, Advanced Texturing, Character Animation, Physics-based Simulation

UNIT II GAME DESIGN PRINCIPLES 9
Character development, Story Telling, Narration, Game Balancing, Core mechanics, Principles of level design, Genres of Games, Collision Detection, Game Logic, Game AI, Path Finding

UNIT III GAMING ENGINE DESIGN 9
Renderers, Software Rendering, Hardware Rendering, and Controller based animation, Spatial Sorting, Level of detail, collision detection, standard objects, and physics

UNIT IV GAMING PLATFORMS AND FRAMEWORKS 9
Flash, DirectX, OpenGL, Java, Python, XNA with Visual Studio, Mobile Gaming for the Android, iOS, Game engines - Adventure Game Studio, DXStudio, Unity

UNIT V GAME DEVELOPMENT 9
Developing 2D and 3D interactive games using OpenGL, DirectX – Isometric and Tile Based Games, Puzzle games, Single Player games, Multi Player games.

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:
6. Andy Harris, “Beginning Flash Game Programming For Dummies”, For Dummies; Updated edition, 2005.

CS8073 SEMANTIC WEB L T P C 3 0 0 3

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

UNIT I  INTRODUCTION

UNIT II  ONTOLOGICAL ENGINEERING
Ontologies – Taxonomies –Topic Maps – Classifying Ontologies - Terminological aspects: concepts, terms, relations between them – Complex Objects -Subclasses and Sub-properties definitions –Upper Ontologies – Quality – Uses - Types of terminological resources for ontology building – Methods and methodologies for building ontologies – Multilingual Ontologies -Ontology Development process and Life cycle – Methods for Ontology Learning – Ontology Evolution – Versioning

UNIT III  STRUCTURING AND DESCRIBING WEB RESOURCES

UNIT IV  WEB ONTOLOGY LANGUAGE

UNIT V  SEMANTIC WEB TOOLS AND APPLICATIONS

TOTAL: 45 PERIODS

TEXT BOOKS:
OBJECTIVE
To provide knowledge about Unix operating system working principles, its file system and programming for interprocess communication. It also gives an understanding for using various system calls.

UNIT I  OVERVIEW
UNIT II    FILE SUBSYSTEM
Internal representation of files: Inodes – Structure of a regular file – Directories – Conversion of a path name to an Inode – Super block – Inode assignment to a new file – Allocation of disk blocks

UNIT III    SYSTEM CALLS FOR THE FILE SYSTEM

UNIT IV    PROCESSES

UNIT V    MEMORY MANAGEMENT AND I/O

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:
UNIT I  HUMAN VALUES

UNIT II  ENGINEERING ETHICS

UNIT III  ENGINEERING AS SOCIAL EXPERIMENTATION
Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law – The Challenger Case Study

UNIT IV  SAFETY, RESPONSIBILITIES AND RIGHTS


UNIT V  GLOBAL ISSUES

TEXTBOOK:

REFERENCES:

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

MG8654 TOTAL QUALITY MANAGEMENT L T P C
3 0 0 3

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

OBJECTIVES
- To understand the various principles, practices of TQM to achieve quality.
- To learn the various statistical approaches for Quality control.
- To understand the TQM tools for continuous process improvement.
- To learn the importance of ISO and Quality systems

UNIT I INTRODUCTION

UNIT II TQM PRINCIPLES
Quality statements - Customer focus –Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Continuous process improvement – PDCA cycle, 5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating.
UNIT III   TQM TOOLS & TECHNIQUES I  


UNIT IV   TQM TOOLS & TECHNIQUES II  


UNIT V   QUALITY SYSTEMS  


TOTAL : 45 PERIODS

TEXT BOOK:

REFERENCES:

IT8071 DIGITAL IMAGE PROCESSING

OBJECTIVE:
This course gives the knowledge of effectively storing images, extracting interesting patterns from an image, discriminate between different classes of images, and mathematical
fundamentals for image processing. This may lead to the confidence in developing image-processing applications.

UNIT I  FUNDAMENTALS OF IMAGE PROCESSING  9
Introduction - Steps in image processing systems - Image acquisition - Sampling and Quantization - Pixel relationships - Color fundamentals and models - File Formats, Image operations: Arithmetic, Geometric and Morphological.

UNIT II  IMAGE ENHANCEMENT  9
Spatial Domain - Gray level transformations - Histogram processing - Spatial filtering - Smoothing and sharpening - Frequency domain: Filtering in frequency domain - DFT, FFT, DCT - Smoothing and sharpening filters - Homomorphic filtering

UNIT III  IMAGE SEGMENTATION AND FEATURE ANALYSIS  9
Detection of discontinuities - Edge operators - Edge linking and boundary Detection - Thresholding - Region based segmentation - Morphological Watersheds - Motion segmentation, Feature analysis and extraction

UNIT IV  MULTI RESOLUTION ANALYSIS AND COMPRESSIONS  9

UNIT V  APPLICATIONS OF IMAGE PROCESSING  9
Image classification - Image recognition - Image understanding - Video motion analysis - Image fusion - Steganography - Digital compositing - Mosaics - Color image processing

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCE BOOKS:
OBJECTIVE:
To provide exposure in FOSS and to develop open source software for society.

UNIT I   PHILOSOPHY
Linux, GNU and Freedom, Brief history of GNU, Licensing free software – GPL and copy Left, trends and potential – global and Indian, overview and usage of various Linux Distributions – userfriendliness perspective – scientific perspective

UNIT II   SYSTEM ADMINISTRATION
GNU and linux installation – Boot process, Commands Using bash features, The man pages, files and file systems, File security, Partitions, Processes, Managing processes, I/O redirection, Graphical environment, Installing software, Backup techniques

UNIT III   FOSS PROGRAMMING PRACTICES
GNU debugging tools, Using source code versioning and managing tools, Review of common programming practices and guidelines for GNU/Linux and FOSS, Documentation

UNIT IV   PROGRAMMING TECHNIQUES
Application programming – Basics of X Windows server architecture – QT programming – GTK + Programming- Python programming – Open source equivalent of existing Commercial software

UNIT V   PROJECTS AND CASE STUDIES
Linux for portable Devices, Creation of Bootable CD and USB from command line, Case Studies – Samba, Libreoffice, Assistive technology

TEXT BOOK:
REFERENCE BOOKS:
1. Philosophy of GNU URL: http://www.gnu.org/philosophy/
4. Linux: Rute’s User tutorial and exposition, URL: http://rute.2038bug.com/index.html.gz
5. Version control system, URL: http://git-scm.com/
6. SVN version control, URL: http://svnbook.red-bean.com/
7. GTK+/GNOME
8. Application
9. Development,
10. Havoc
11. Pennington.
12. URL:
14. Python Tutorial, Guido van Rossum, Fred L. Drake, Jr., Editor. URL:
16. Doug Abbot, Linux for Embedded and Embedded and Real time applications, Newnes
17. Case study SAMBA: URL: http://www.samba.org/

IT8073 TCP/IP DESIGN AND IMPLEMENTATION L T P C

3 0 0 3

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

- Understand the internals of the TCP/IP protocols
- Understand how TCP/IP is actually implemented
- Understand the interaction among the protocols in a protocol stack

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

UNIT I FUNDAMENTALS
Internetworking concepts - IP and datagram forwarding - TCP services - Interactive data flow - Timeout and retransmission - Bulk data flow - Persist timer – Keep-alive timer

UNIT II ARP AND IP
Structure of TCP/IP in OS - Data structures for ARP - Cache design and management - IP software design and organization - Sending a datagram to IP

UNIT III IP ROUTING IMPLEMENTATION
Routing table - Routing algorithms - Fragmentation and reassembly - Error processing (ICMP) - Multicast Processing (IGMP)

UNIT IV TCP I/O PROCESSING AND FSM
Data structure and input processing - Transmission control blocks - Segment format - Comparison - Finite state machine implementation - Output processing - Mutual exclusion - Computing TCP data length

UNIT V TCP TIMER AND FLOW CONTROL
Timers - Events and messages - Timer process - Deleting and inserting timer event - Flow control and adaptive retransmission - Congestion avoidance and control - Urgent data processing and push function

TOTAL : 45 PERIODS

TEXT BOOKS

REFERENCE: