## ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
R-2013
B.TECH INFORMATION TECHNOLOGY
I - VIII SEMESTERS CURRICULUM AND SYLLABUS

### SEMESTER I

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### SEMESTER VII – ELECTIVE II

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### SEMESTER VIII - ELECTIVE V

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OBJECTIVES:
- To enable learners of Engineering and Technology develop their basic communication skills in English.
- To emphasize specially the development of speaking skills amongst learners of Engineering and Technology.
- To ensure that learners use the electronic media such as internet and supplement the learning materials used in the classroom.
- To inculcate the habit of reading and writing leading to effective and efficient communication.

UNIT I
9+3
Listening - Introducing learners to GIE - Types of listening - Listening to audio (verbal & sounds); Speaking - Describing a simple process (filling a form, etc.) - Asking and 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) - Process descriptions (general/specific) - Definitions - Recommendations - Instructions; Grammar - Use of imperatives - Subject-verb agreement; Vocabulary - Compound words - Word Association (connotation); E-materials - Interactive exercises for Grammar and Vocabulary - Listening exercises with sample telephone conversations / lectures – Picture-based activities.

UNIT II
9+3
Listening - Listening and responding to video lectures / talks; 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 and effect / compare and 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 III
9+3
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 - 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 and acronyms; E-materials - Interactive exercises for Grammar and Vocabulary - Sample interviews - film scenes - dialogue writing.
UNIT V
9+3
Listening - Listening to different accents, Listening to Speeches/Presentations, Listening to broadcast and telecast from Radio and 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 and Vocabulary - Sending emails with attachment – Audio / video excerpts of different accents - Interpreting posters.

TOTAL (L:45+T:15): 60 PERIODS

OUTCOMES:
Learners should be able to:
- Speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
- Write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
- Read different genres of texts adopting various reading strategies.
- Listen/view and comprehend different spoken discourses/excerpts in different accents.

TEXTBOOKS:

REFERENCES:

EXTENSIVE Reading (Not for Examination)

WEBSITES:

TEACHING METHODS:
- Lectures
- Activities conducted individually, in pairs and in groups like self introduction, peer introduction, group poster making, grammar and vocabulary games, etc.
- Discussions
- Role play activities
- Short presentations
- Listening and viewing activities with follow up activities like discussion, filling up worksheets, writing exercises (using language lab wherever necessary/possible) etc.
EVALUATION PATTERN:
Internal assessment: 20%
3 tests of which two are pen and paper tests and the other is a combination of different modes of assessment like
- Project
- Assignment
- Reviews
- Creative writing
- Poster making, etc.

All the four skills are to be tested with equal weightage given to each.
- Speaking assessment: Individual speaking activities, Pair work activities like role play, Interview, Group discussions
- Reading assessment: Reading passages with comprehension questions graded from simple to complex, from direct to inferential
- Writing assessment: Writing paragraphs, essays etc. Writing should include grammar and vocabulary.
- Listening/Viewing assessment: Lectures, dialogues, film clippings with questions on verbal as well as audio/visual content.

End Semester Examination: 80%

MA6151 MATHEMATICS – I

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

UNIT II SEQUENCES AND SERIES
UNIT III  APPLICATIONS OF DIFFERENTIAL CALCULUS  9+3
Curvature in Cartesian co-ordinates – Centre and radius of curvature – Circle of curvature – Evolutes – Envelopes - Evolute as envelope of normals.

UNIT IV  DIFFERENTIAL CALCULUS OF SEVERAL VARIABLES  9+3

UNIT V  MULTIPLE INTEGRALS  9+3

TOTAL (L:45+T:15): 60 PERIODS

OUTCOMES:
- This course equips students to have basic knowledge and understanding in one fields of materials, integral and differential calculus.

TEXT BOOKS:

REFERENCES:

PH6151  ENGINEERING PHYSICS – I  L T P C  3 0 0 3

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

UNIT I  CRYSTAL PHYSICS  9
Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – d spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – Diamond and graphite structures (qualitative treatment)- Crystal growth techniques –solution, melt (Bridgman and Czochralski) and vapour growth techniques (qualitative)
UNIT II PROPERTIES OF MATTER AND THERMAL PHYSICS  
Elasticity- Hooke’s law - Relationship between three modulii of elasticity (qualitative) – stress -strain diagram – Poisson’s ratio –Factors affecting elasticity –Bending moment – Depression of a cantilever –Young’s modulus by uniform bending- I-shaped girders

UNIT III QUANTUM PHYSICS  

UNIT IV ACOUSTICS AND ULTRASONICS  
Production of ultrasonics by magnetostriction and piezoelectric methods - acoustic grating -Non Destructive Testing – pulse echo system through transmission and reflection modes - A,B and C – scan displays, Medical applications - Sonogram

UNIT V PHOTONICS AND FIBRE OPTICS  
Principle and propagation of light in optical fibres – Numerical aperture and Acceptance angle - Types of optical fibres (material, refractive index, mode) – attenuation, dispersion, bending - Fibre Optical Communication system (Block diagram) - Active and passive fibre sensors- Endoscope.

TOTAL: 45 PERIODS

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

TEXT BOOKS:

REFERENCES:
1. Sears and Zemansky. University Physics, 2009
OBJECTIVES:
- To make the students conversant with basics of polymer chemistry.
- To make the student acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications in all disciplines.
- To acquaint the student with concepts of important photophysical and photochemical processes and spectroscopy.
- To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
- To acquaint the students with the basics of nano materials, their properties and applications.

UNIT I  POLYMER CHEMISTRY  9
Introduction: Classification of polymers – Natural and synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerization. Types and mechanism of polymerization: Addition (Free Radical, cationic and anionic); condensation and copolymerization. Properties of polymers: Tg, Tacticity, Molecular weight – weight average, number average and polydispersity index. Techniques of polymerization: Bulk, emulsion, solution and suspension. Preparation, properties and uses of Nylon 6,6, and Epoxy resin.

UNIT II  CHEMICAL THERMODYNAMICS  9
Terminology of thermodynamics - Second law: Entropy - entropy change for an ideal gas, reversible and irreversible processes; entropy of phase transitions; Clausius inequality. Free energy and work function: Helmholtz and Gibbs free energy functions (problems); Criteria of spontaneity; Gibbs-Helmholtz equation (problems); Clausius-Clapeyron equation; Maxwell relations – Van't Hoff isotherm and isochores(problems).

UNIT III  PHOTOCHEMISTRY AND SPECTROSCOPY  9

UNIT IV  PHASE RULE AND ALLOYS  9

UNIT V  NANOCHEMISTRY  9
Basics - distinction between molecules, nanoparticles and bulk materials; size-dependent properties. nanoparticles: nano cluster, nano rod, nanotube(CNT) and nanowire. Synthesis: precipitation, thermolysis, hydrothermal, solvothermal, electrodeposition, chemical vapour deposition, laser ablation; Properties and applications

TOTAL :45 PERIODS
OUTCOMES:
- The knowledge gained on polymer chemistry, thermodynamics, spectroscopy, phase rule and nano materials will provide a strong platform to understand the concepts on these subjects for further learning.

TEXT BOOKS:

REFERENCES:

GE6151 COMPUTER PROGRAMMING

OBJECTIVES:
The students should be made to:
- Learn the organization of a digital computer.
- Be exposed to the number systems.
- Learn to think logically and write pseudo code or draw flow charts for problems.
- Be familiar with the syntax of C.
- Be familiar with programming in C.
- Learn to use arrays, strings, functions, pointers, structures and unions in C.

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.

OUTCOMES:  
At the end of the course, the student should be able to:  
- Design C Programs for problems.
- Write and execute C programs for simple applications

TEXTBOOKS:  

REFERENCES:  

GE6152  ENGINEERING GRAPHICS  

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

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

UNIT I  PLANE CURVES AND FREE HAND SKETCHING  
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  5+ 9
Orthographic projection- principles-Principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT III PROJECTION OF SOLIDS  5+9
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  5+9
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  6+9
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 .

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

TOTAL: 75 PERIODS

OUTCOMES:
On Completion of the course the student will be able to:
- Perform free hand sketching of basic geometrical constructions and multiple views of objects.
- Do orthographic projection of lines and plane surfaces.
- Draw projections and solids and development of surfaces.
- Prepare isometric and perspective sections of simple solids.
- Demonstrate computer aided drafting

TEXT BOOK:

REFERENCES:
Publication of Bureau of Indian Standards:

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

GE6161

OBJECTIVES:
The student should be made to:
- Be familiar with the use of Office software.
- Be exposed to presentation and visualization tools.
- Be exposed to problem solving techniques and flow charts.
- Be familiar with programming in C.
- Learn to use Arrays, strings, functions, structures and unions.

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 – Includes Parameter Passing
9. Program using Recursive Function and conversion from given program to flow chart.
10. Program using structures and unions.

TOTAL : 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Apply good programming design methods for program development.
- Design and implement C programs for simple applications.
- Develop recursive programs.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:
Standalone desktops with C compiler 30 Nos.
(or)
Server with C compiler supporting 30 terminals or more.
OBJECTIVES:

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

**GROUP A (CIVIL & MECHANICAL)**

I  CIVIL ENGINEERING PRACTICE

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

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

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

II  MECHANICAL ENGINEERING PRACTICE

Welding:
(a) Preparation of arc welding of butt joints, lap joints and tee joints.
(b) Gas welding practice

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

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

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

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

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

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

TOTAL: 45 PERIODS

OUTCOMES:
• Ability to fabricate carpentry components and pipe connections including plumbing works.
• Ability to use welding equipments to join the structures.
• Ability to fabricate electrical and electronics circuits.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

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

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

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

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

**REFERENCES:**

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**GE6163 PHYSICS AND CHEMISTRY LABORATORY – I**

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

**LIST OF EXPERIMENTS**
(Any FIVE Experiments)
1. (a) Determination of Wavelength, and particle size using Laser
   (b) Determination of acceptance angle in an optical fiber.
2. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer.
3. Determination of wavelength of mercury spectrum – spectrometer grating
5. Determination of Young’s modulus by Non uniform bending method
6. Determination of specific resistance of a given coil of wire – Carey Foster’s Bridge

**OUTCOMES:**
The hands on exercises undergone by the students will help them to apply physics principles of optics and thermal physics to evaluate engineering properties of materials.
LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

1. Diode laser, lycopodium powder, glass plate, optical fiber.
2. Ultrasonic interferometer
3. Spectrometer, mercury lamp, grating
4. Lee’s Disc experimental set up
5. Traveling microscope, meter scale, knife edge, weights
6. Carey foster’s bridge set up
   (vernier Caliper, Screw gauge, reading lens are required for most of the experiments)

CHEMISTRY LABORATORY-I
LIST OF EXPERIMENTS
(Any FIVE Experiments)

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

1. Determination of DO content of water sample by Winkler’s method.
2. Determination of chloride content of water sample by argentometric method
3. Determination of strength of given hydrochloric acid using pH meter
4. Determination of strength of acids in a mixture using conductivity meter
5. Estimation of iron content of the water sample using spectrophotometer
   (1,10- phenanthroline / thiocyanate method)
6. Determination of molecular weight of polyvinylalcohol using Ostwald viscometer
7. Conductometric titration of strong acid vs strong base

TOTAL: 30 PERIODS

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

REFERENCES:

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

1. Iodine flask - 30 Nos
2. pH meter - 5 Nos
3. Conductivity meter - 5 Nos
4. Spectrophotometer - 5 Nos
5. Ostwald Viscometer - 10 Nos

Common Apparatus : Pipette, Burette, conical flask, porcelain tile, dropper (each 30 Nos.)
OBJECTIVES:

- To make learners acquire listening and speaking skills in both formal and informal contexts.
- To help them develop their reading skills by familiarizing them with different types of reading strategies.
- To equip them with writing skills needed for academic as well as workplace contexts.
- To make them acquire language skills at their own pace by using e-materials and language lab components.

UNIT I
9+3
Listening - Listening to informal conversations and participating; Speaking - Opening a conversation (greetings, comments on topics like 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 and 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
9+3
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 / her success, thanking one's friends / relatives); Grammar - modal verbs, Purpose expressions; Vocabulary - Phrasal verbs and their meanings, Using phrasal verbs in sentences; E-materials - Interactive exercises on Grammar and vocabulary, Extensive reading activity (reading stories / novels), Posting reviews in blogs - Language Lab - Dialogues (Fill up exercises), Recording students’ dialogues.

UNIT III
9+3
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 time limit - Skimming; Writing - Minutes of meeting – format and practice in the preparation of minutes - Writing summary after reading articles from journals - Format for 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 and vocabulary - Speed Reading practice exercises; Language Lab - Intonation practice using EFLU and RIE materials – Attending a meeting and writing minutes.

UNIT IV
9+3
Listening - Listening to a telephone conversation, Viewing model interviews (face-to-face, telephonic and video conferencing); Speaking - Role play practice in telephone skills - listening and responding, -asking questions, -note taking – passing on messages, Role play and mock interview for grasping 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 and Vocabulary - Different forms of résumés- Filling up a résumé / cover letter; Language Lab - Telephonic interview – recording the responses - e-résumé writing.

UNIT V

9+3
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 - Checklist - 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; Language Lab - Different models of group discussion.

TOTAL (L:45+T:15): 60 PERIODES

OUTCOMES:
Learners should be able to:

- Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, argue using appropriate communicative strategies.
- write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
- read different genres of texts, infer implied meanings and critically analyse and evaluate them for ideas as well as for method of presentation.
- listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.

TEXTBOOKS:

REFERENCES:

EXTENSIVE Reading (Not for Examination)

Websites
2. http://owl.english.purdue.edu
TEACHING METHODS:
- Lectures
- Activities conducted individually, in pairs and in groups like individual writing and presentations, group discussions, interviews, reporting, etc
- Long presentations using visual aids
- Listening and viewing activities with follow up activities like discussions, filling up worksheets, writing exercises (using language lab wherever necessary/possible) etc
- Projects like group reports, mock interviews etc using a combination of two or more of the language skills

EVALUATION PATTERN:
Internal assessment: 20%
- 3 tests of which two are pen and paper tests and the other is a combination of different modes of assessment like
  - Project
  - Assignment
  - Report
  - Creative writing, etc.

All the four skills are to be tested with equal weightage given to each.
- Speaking assessment: Individual presentations, Group discussions
- Reading assessment: Reading passages with comprehension questions graded following Bloom’s taxonomy
- Writing assessment: Writing essays, CVs, reports etc. Writing should include grammar and vocabulary.
- Listening/Viewing assessment: Lectures, dialogues, film clippings with questions on verbal as well as audio/visual content graded following Bloom’s taxonomy.

End Semester Examination: 80%

MA6251 MATHEMATICS – II

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 VECTOR CALCULUS
Gradient, divergence and curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green’s theorem in a plane, Gauss divergence theorem and Stokes’ theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelopipeds.
UNIT II  ORDINARY DIFFERENTIAL EQUATIONS  9+3
Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy’s and Legendre’s linear equations – Simultaneous first order linear equations with constant coefficients.

UNIT III  LAPLACE TRANSFORM  9+3

UNIT IV  ANALYTIC FUNCTIONS  9+3
Functions of a complex variable – Analytic functions: Necessary conditions – Cauchy-Riemann equations and sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping: w = z+k, kz, 1/z, z², e^z and bilinear transformation.

UNIT V  COMPLEX INTEGRATION  9+3
Complex integration – Statement and applications of Cauchy’s integral theorem and Cauchy’s integral formula – Taylor’s and Laurent’s series expansions – Singular points – Residues – Cauchy’s residue theorem – Evaluation of real definite integrals as contour integrals around unit circle and semi-circle (excluding poles on the real axis).

TOTAL (L:45+T:15): 60 PERIODS

OUTCOMES:
The subject helps the students to develop the fundamentals and basic concepts in vector calculus, ODE, Laplace transform and complex functions. Students will be able to solve problems related to engineering applications by using these techniques.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:

- To enrich the understanding of various types of materials and their applications in engineering and technology.

UNIT I  CONDUCTING MATERIALS


UNIT II  SEMICONDUCTING MATERIALS


UNIT III  MAGNETIC AND SUPERCONDUCTING MATERIALS


Superconductivity : properties – Type I and Type II superconductors – BCS theory of superconductivity(Qualitative) - High T_c superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.

UNIT IV  DIELECTRIC MATERIALS


UNIT V  ADVANCED ENGINEERING MATERIALS


OUTCOMES:

The students will have the knowledge on physics of materials and that knowledge will be used by them in different engineering and technology applications

TEXT BOOKS:


REFERENCES:

OBJECTIVES:

- To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
- Principles of electrochemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials.
- Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
- Preparation, properties and applications of engineering materials.
- Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.

UNIT I WATER TECHNOLOGY

Introduction to boiler feed water-requirements-formation of deposits in steam boilers and heat exchangers- disadvantages (wastage of fuels, decrease in efficiency, boiler explosion) prevention of scale formation-softening of hard water-external treatment zeolite and demineralization- internal treatment- boiler compounds (phosphate, calgon, carbonate, colloidal) - caustic embrittlement-boiler corrosion-priming and foaming- desalination of brackish water reverse osmosis.

UNIT II ELECTROCHEMISTRY AND CORROSION


UNIT III ENERGY SOURCES

Introduction- nuclear energy- nuclear fission- controlled nuclear fission- nuclear fusion- differences between nuclear fission and fusion- nuclear chain reactions- nuclear reactor power generator-classification of nuclear reactor- light water reactor- breeder reactor- solar energy conversion- solar cells- wind energy. Batteries and fuel cells:Types of batteries- alkaline battery- lead storage battery-nickel-cadmium battery- lithium battery- fuel cell H₂-O₂ fuel cell- applications.

UNIT IV ENGINEERING MATERIALS

Abrasives: definition, classification or types, grinding wheel, abrasive paper and cloth. Refractories: definition, characteristics, classification, properties refractoriness and RUL, dimensional stability, thermal spalling, thermal expansion, porosity; Manufacture of alumina, magnesite and silicon carbide, Portland cement- manufacture and properties setting and hardening of cement, special cement-waterproof and white cement- properties and uses. Glass- manufacture, types, properties and uses.

UNIT V FUELS AND COMBUSTION


TOTAL: 45 PERIODS
OUTCOMES:
The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.

TEXT BOOKS:

REFERENCES:

CS6201 DIGITAL PRINCIPLES AND SYSTEM DESIGN

OBJECTIVES:
The student should be made to:
- Learn the various number systems.
- Learn Boolean Algebra
- Understand the various logic gates.
- Be familiar with various combinational circuits.
- Be familiar with designing synchronous and asynchronous sequential circuits.
- Be exposed to designing using PLD

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  9
RAM and ROM – Memory Decoding – Error Detection and Correction – Programmable Logic Array –
Programmable Array Logic – Sequential Programmable Devices – Application Specific Integrated
Circuits.

OUTCOMES:
At the end of this course, the student will be able to:
- Perform arithmetic operations in any number system.
- Simplify the Boolean expression using K-Map and Tabulation techniques.
- Use boolean simplification techniques to design a combinational hardware circuit.
- Design and Analysis of a given digital circuit – combinational and sequential.
- Design using PLD.

TEXT BOOK:

REFERENCES:

CS6202  PROGRAMMING AND DATA STRUCTURES I  L T P C
3 0 0 3

OBJECTIVES:
The student should be made to:
- Be familiar with the basics of C programming language.
- Be exposed to the concepts of ADTs
- Learn linear data structures – list, stack, and queue.
- Be exposed to sorting, searching, hashing algorithms

UNIT I  C PROGRAMMING FUNDAMENTALS- A REVIEW  9
Conditional statements – Control statements – Functions – Arrays – Preprocessor - Pointers -
Variation in pointer declarations – Function Pointers – Function with Variable number of arguments

UNIT II  C PROGRAMMING ADVANCED FEATURES  9
Structures and Unions - File handling concepts – File read – write – binary and Stdio - File
Manipulations

UNIT III  LINEAR DATA STRUCTURES – LIST  9
Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation —
singly linked lists- circularly linked lists- doubly-linked lists – applications of lists –Polynomial
Manipulation – All operation (Insertion, Deletion, Merge, Traversal)
UNIT IV  LINEAR DATA STRUCTURES – STACKS, QUEUES

Stack ADT – Evaluating arithmetic expressions- other applications- Queue ADT – circular queue implementation – Double ended Queues – applications of queues

UNIT V  SORTING, SEARCHING AND HASH TECHNIQUES


TOTAL: 45 PERIODS

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

• Use the control structures of C appropriately for problems.
• Implement abstract data types for linear data structures.
• Apply the different linear data structures to problem solutions.
• Critically analyse the various algorithms.

TEXT BOOKS:

REFERENCES:

GE6262  PHYSICS AND CHEMISTRY LABORATORY – II

PHYSICS LABORATORY – II

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

(Any FIVE Experiments)
1. Determination of Young’s modulus by uniform bending method
2. Determination of band gap of a semiconductor
3. Determination of Coefficient of viscosity of a liquid –Poiseuille’s method
4. Determination of Dispersive power of a prism - Spectrometer
5. Determination of thickness of a thin wire – Air wedge method

OUTCOMES:
• The students will have the ability to test materials by using their knowledge of applied physics principles in optics and properties of matter.
LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

1. Traveling microscope, meter scale, Knife edge, weights
2. Band gap experimental set up
3. Burette, Capillary tube, rubber tube, stop clock, beaker and weighing balance
4. spectrometer, prism, sodium vapour lamp.
5. Air-wedge experimental set up.
6. Torsion pendulum set up.
   (vernier Caliper, Screw gauge, reading lens are required for most of the experiments)

CHEMISTRY LABORATORY - II
(Any FIVE Experiments)

OBJECTIVES:

- To make the student acquire practical skills in the wet chemical and instrumental methods for quantitative estimation of hardness, alkalinity, metal ion content, corrosion in metals and cement analysis.

1. Determination of alkalinity in water sample
2. Determination of total, temporary & permanent hardness of water by EDTA method
3. Estimation of copper content of the given solution by EDTA method
4. Estimation of iron content of the given solution using potentiometer
5. Estimation of sodium present in water using flame photometer
6. Corrosion experiment – weight loss method
7. Conductometric precipitation titration using BaCl₂ and Na₂SO₄

TOTAL: 30 PERIODS

OUTCOMES:
The students will be conversant with hands-on knowledge in the quantitative chemical analysis of water quality related parameters, corrosion measurement and cement analysis.

REFERENCES:

- Laboratory classes on alternate weeks for Physics and Chemistry.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

1. Potentiometer - 5 Nos
2. Flame photo meter - 5 Nos
3. Weighing Balance - 5 Nos
4. Conductivity meter - 5 Nos

Common Apparatus: Pipette, Burette, conical flask, percelain tile, dropper (30 Nos each)
OBJECTIVES:
The student should be made to:
- Understand the various logic gates.
- Be familiar with various combinational circuits.
- Understand the various components used in the design of digital computers.
- Be exposed to sequential circuits
- Learn to use HDL

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).

OUTCOMES:
At the end of this course, the student will be able to:
- Use boolean simplification techniques to design a combinational hardware circuit.
- Design and Implement combinational and sequential circuits.
- Analyze a given digital circuit – combinational and sequential,
- Design the different functional units in a digital computer system.
- Design and implement a simple digital system.

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 96

SOFTWARE:
1. HDL simulator.

OBJECTIVES:
The students should be made to:
- Be familiar with c programming
- Be exposed to implementing abstract data types
- Learn to use files
- Learn to implement sorting and searching algorithms.
1. C Programs using Conditional and Control Statements
2. C Programs using Arrays, Strings and Pointers and Functions
3. Representation of records using Structures in C – Creation of Linked List – Manipulation of records in a Linked List
4. File Handling in C – Sequential access – Random Access
5. Operations on a Stack and Queue – infix to postfix – simple expression evaluation using stacks - Linked Stack Implementation – Linked Queue Implementation
6. Implementation of Sorting algorithms
7. Implementation of Linear search and Binary Search.

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Design and implement C programs for implementing stacks, queues, linked lists.
- Apply good programming design methods for program development.
- Apply the different data structures for implementing solutions to practical problems.
- Develop searching and sorting programs.

LIST OF EQUIPMENTS FOR A BATCH OF 30 STUDENTS:
Standalone desktops with C compiler 30 Nos.
(or)
Server with C compiler supporting 30 terminals or more.

MA6351 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

OBJECTIVES:
- To introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems.
- To acquaint the student with Fourier transform techniques used in wide variety of situations.
- To introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z transform techniques for discrete time systems.

UNIT I PARTIAL DIFFERENTIAL EQUATIONS 9+3
Formation of partial differential equations – Singular integrals -- Solutions of standard types of first order partial differential equations - Lagrange’s linear equation -- Linear partial differential equations of second and higher order with constant coefficients of both homogeneous and non-homogeneous types.

UNIT II FOURIER SERIES 9+3

UNIT III APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS 9+3
Classification of PDE – Method of separation of variables - Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two dimensional equation of heat conduction (excluding insulated edges).
UNIT IV FOURIER TRANSFORMS 9+3

UNIT V Z-TRANSFORMS AND DIFFERENCE EQUATIONS 9+3

TOTAL (L:45+T:15): 60 PERIODS

OUTCOMES:
- The understanding of the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.

TEXT BOOKS:

REFERENCES:

CS6301 PROGRAMMING AND DATA STRUCTURES II L T P C 3 0 0 3

OBJECTIVES:
The student should be made to:
- Be familiar with the C++ concepts of abstraction, encapsulation, constructor, polymorphism, overloading and Inheritance.
- Learn advanced nonlinear data structures.
- Be exposed to graph algorithms
- Learn to apply Tree and Graph structures

UNIT I OBJECT ORIENTED PROGRAMMING FUNDAMENTALS 9
C++ Programming features - Data Abstraction - Encapsulation - class - object - constructors - static members – constant members – member functions – pointers – references - Role of this pointer – Storage classes – function as arguments.
UNIT II  OBJECT ORIENTED PROGRAMMING CONCEPTS  9
String Handling – Copy Constructor - Polymorphism – compile time and run time polymorphisms –
function overloading – operators overloading – dynamic memory allocation - Nested classes -
Inheritance – virtual functions.

UNIT III  C++ PROGRAMMING ADVANCED FEATURES  9
Abstract class – Exception handling - Standard libraries - Generic Programming - templates – class
template - function template – STL – containers – iterators – function adaptors – allocators -
Parameterizing the class - File handling concepts.

UNIT IV  ADVANCED NON-LINEAR DATA STRUCTURES  9

UNIT V  GRAPHS  9
Representation of Graphs – Breadth-first search – Depth-first search – Topological sort – Minimum

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Design problem solutions using Object Oriented Techniques.
- Apply the concepts of data abstraction, encapsulation and inheritance for problem solutions.
- Use the control structures of C++ appropriately.
- Critically analyse the various algorithms.
- Apply the different data structures to problem solutions.

TEXT BOOKS:

REFERENCES:
1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to

CS6302  DATABASE MANAGEMENT SYSTEMS  L T P C
3 0 0 3

OBJECTIVES:
- To expose the students to the fundamentals of Database Management Systems.
- To make the students understand the relational model.
- To familiarize the students with ER diagrams.
- To make the students understand Transaction Processing and Query
  Processing.
- To familiarize the students with the different types of databases.
- To make the students understand the Security Issues in Databases.
UNIT I  INTRODUCTION TO DBMS

UNIT II  SQL & QUERY OPTIMIZATION

UNIT III  TRANSACTION PROCESSING AND CONCURRENCY CONTROL

UNIT IV  TRENDS IN DATABASE TECHNOLOGY

UNIT V  ADVANCED TOPICS
DATABASE SECURITY: Data Classification-Threats and risks – Database access Control – Types of Privileges – Cryptography- Statistical Databases.- Distributed Databases-Architecture-Transaction Processing-Data Warehousing and Mining-Classification-Association rules-Clustering-Information Retrieval- Relevance ranking-Crawling and Indexing the Web- Object Oriented Databases-XML Databases.

OUTCOMES:
At the end of the course, the student should be able to:
- Design Databases for applications.
- Use the Relational model, ER diagrams.
- Apply concurrency control and recovery mechanisms for practical problems.
- Design the Query Processor and Transaction Processor.
- Apply security concepts to databases.

TEXT BOOK:

REFERENCES:

CS6303 COMPUTER ARCHITECTURE L T P C 3 0 0 3

OBJECTIVES:
- To make students understand the basic structure and operation of digital computer.
- To understand the hardware-software interface.
- To familiarize the students with arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations.
- To expose the students to the concept of pipelining.
- To familiarize the students with hierarchical memory system including cache memories and virtual memory.
- To expose the students with different ways of communicating with I/O devices and standard I/O interfaces.

UNIT I OVERVIEW & INSTRUCTIONS 9

UNIT II ARITHMETIC OPERATIONS 7
ALU - Addition and subtraction – Multiplication – Division – Floating Point operations – Subword parallelism.

UNIT III PROCESSOR AND CONTROL UNIT 11
Basic MIPS implementation – Building datapath – Control Implementation scheme – Pipelining – Pipelined datapath and control – Handling Data hazards & Control hazards – Exceptions.

UNIT IV PARALLELISM 9
Instruction-level-parallelism – Parallel processing challenges – Flynn’s classification – Hardware multithreading – Multicore processors

UNIT V MEMORY AND I/O SYSTEMS 9
Memory hierarchy - Memory technologies – Cache basics – Measuring and improving cache performance - Virtual memory, TLBs - Input/output system, programmed I/O, DMA and interrupts, I/O processors.

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Design arithmetic and logic unit.
- Design and analyze pipelined control units
- Evaluate performance of memory systems.
- Understand parallel processing architectures.

TEXT BOOK:
REFERENCES:

CS6304 ANALOG AND DIGITAL COMMUNICATION

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

UNIT I ANALOG COMMUNICATION

UNIT II DIGITAL COMMUNICATION

UNIT III DATA AND PULSE COMMUNICATION
Data Communication: History of Data Communication - Standards Organizations for Data Communication- Data Communication Circuits - Data Communication Codes - Error Detection and Correction Techniques - Data communication Hardware - serial and parallel interfaces.

UNIT IV SOURCE AND ERROR CONTROL CODING
Entropy, Source encoding theorem, Shannon fano coding, Huffman coding, mutual information, channel capacity, channel coding theorem, Error Control Coding, linear block codes, cyclic codes, convolution codes, viterbi decoding algorithm.

36
UNIT V  MULTI-USER RADIO COMMUNICATION
Advanced Mobile Phone System (AMPS) - Global System for Mobile Communications (GSM) - Code division multiple access (CDMA) – Cellular Concept and Frequency Reuse - Channel Assignment and Hand off - Overview of Multiple Access Schemes - Satellite Communication - Bluetooth.

TOTAL: 45 PERIODS

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

TEXT BOOK:

REFERENCES:

GE6351  ENVIRONMENTAL SCIENCE AND ENGINEERING  L T P C
3 0 0 3

OBJECTIVES:
To the study of nature and the facts about environment:
- To finding and implementing scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth’s interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.
UNIT I        ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY
Definition, scope and importance of Risk and hazards; Chemical hazards, Physical hazards, Biological hazards in the environment – concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers-Oxygen cycle and Nitrogen cycle – energy flow in the ecosystem – ecological succession processes – 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 (Atmospheric chemistry- Chemical composition of the atmosphere; Chemical and photochemical reactions in the atmosphere - formation of smog, PAN, acid rain, oxygen and ozone chemistry;- Mitigation procedures- Control of particulate and gaseous emission, Control of SO₂, NOₓ, CO and HC) (b) Water pollution : Physical and chemical properties of terrestrial and marine water and their environmental significance; Water quality parameters – physical, chemical and biological; absorption of heavy metals - Water treatment processes. (c) Soil pollution - soil waste management: causes, effects and control measures of municipal solid wastes – (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards–role of an individual in prevention of pollution – pollution case studies – 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 overutilization of surface and ground 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. Energy Conversion processes – Biogas – production and uses, anaerobic digestion; 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. Introduction to Environmental Biochemistry: Proteins –Biochemical degradation of pollutants, Bioconversion of pollutants.
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

OUTCOMES:
Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.

- Public awareness of environmental is at infant stage.
- Ignorance and incomplete knowledge has lead to misconceptions.
- Development and improvement in std. of living has lead to serious environmental disasters.

TEXT BOOKS:

REFERENCES:

IT6311 PROGRAMMING AND DATA STRUCTURES L T P C
LABORATORY II 0 0 3 2

OBJECTIVES:
The student should be made to:

- Be familiarized with good programming design methods, particularly Top- Down design.
- Getting exposure in implementing the different data structures using C++
- Appreciate recursive algorithms.

LIST OF EXPERIMENTS:
IMPLEMENTATION IN THE FOLLOWING TOPICS:
1. Constructors & Destructors, Copy Constructor.
2. Friend Function & Friend Class.
3. Inheritance.
4. Polymorphism & Function Overloading.
5. Virtual Functions.
6. Overload Unary & Binary Operators Both as Member Function & Non Member Function.
7. Class Templates & Function Templates.
8. Exception Handling Mechanism.
10. File Stream classes.
11. Applications of Stack and Queue
12. Binary Search Tree
13. Tree traversal Techniques
14. Minimum Spanning Trees
15. Shortest Path Algorithms

TOTAL: 45 PERIODS

REFERENCE:
spoken-tutorial.org.

OUTCOMES:
At the end of the course, the student should be able to:
- Design and implement C++ programs for manipulating stacks, queues, linked lists, trees, and graphs.
- Apply good programming design methods for program development.
- Apply the different data structures for implementing solutions to practical problems.
- Develop recursive programs using trees and graphs.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:
Standalone desktops with C++ compiler 30 Nos.
(or)
Server with C++ compiler supporting 30 terminals or more.

IT6312 DATABASE MANAGEMENT SYSTEMS LABORATORY

OBJECTIVES:
The student should be made to:
- Learn to create and use a database
- Be familiarized with a query language
- Have hands on experience on DDL Commands
- Have a good understanding of DML Commands and DCL commands
- Familiarize advanced SQL queries.
- Be Exposed to different applications

LIST OF EXPERIMENTS:
1. Creation of a database and writing SQL queries to retrieve information from the database.
2. Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.
3. Creation of Views, Synonyms, Sequence, Indexes, Save point.
4. Creating an Employee database to set various constraints.
5. Creating relationship between the databases.
7. Write a PL/SQL block to satisfy some conditions by accepting input from the user.
8. Write a PL/SQL block that handles all types of exceptions.
10. Creation of database triggers and functions
11. Mini project (Application Development using Oracle/ Mysql )
   a) Inventory Control System.
b) Material Requirement Processing.
c) Hospital Management System.
d) Railway Reservation System.
e) Personal Information System.
f) Web Based User Identification System.
g) Timetable Management System.
h) Hotel Management System

REFERENCE:
spoken-tutorial.org

TOTAL: 45 PERIODS

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

- Design and implement a database schema for a given problem-domain
- Populate and query a database
- Create and maintain tables using PL/SQL.
- Prepare reports.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

HARDWARE:
Standalone desktops 30 Nos.
(or)
Server supporting 30 terminals or more.

SOFTWARE:
Front end: VB/VC ++/JAVA or Equivalent
Back end: Oracle / SQL / MySQL/ PostGress / DB2 or Equivalent

IT6313 DIGITAL COMMUNICATION LABORATORY

L T P C
0 0 3 2

OBJECTIVES:
The purpose of this lab is to explore digital communications with a software radio to understand how each component works together. The lab will cover, analog to digital conversion, modulation, pulse shaping, and noise analysis.

LIST OF EXPERIMENTS

EXPERIMENTS IN THE FOLLOWING TOPICS:
1. Signal Sampling and reconstruction
2. Amplitude modulation and demodulation
3. Frequency modulation and demodulation
4. Pulse code modulation and demodulation.
5. Delta modulation, adaptive delta Modulation
6. Line Coding Schemes
7. BFSK modulation and Demodulation (Hardware(Kit based) & Simulation using MATLAB / SCILAB / Equivalent)
8. BPSK modulation and Demodulation (Hardware& Simulation using MATLAB/SCILAB/ Equivalent)
9. FSK, PSK and DPSK schemes (Simulation)
10. Error control coding schemes (Simulation)
11. Spread spectrum communication (Simulation)
12. Communication link simulation
13. TDM and FDM

TOTAL: 45 PERIODS

OUTCOME:
To develop necessary skill in designing, analyzing and constructing digital electronic circuits.

LAB FREQUIREMENT FOR A BATCH OF 30 STUDENTS, 3 STUDENTS / EXPERIMENT:
i) Kits for Signal Sampling, TDM, AM, FM, PCM, DM and Line Coding Schemes
ii) Software Defined Radio platform for link simulation studies
iii) MATLAB / SCILAB for simulation experiments
iv) PCs - 10 Nos
v) Signal generator / Function generators / Power Supply / CRO / Bread Board each -15 nos

MA6453 PROBABILITY AND QUEUING THEORY

OBJECTIVES:
To provide the required mathematical support in real life problems and develop probabilistic models which can be used in several areas of science and engineering.

UNIT I RANDOM VARIABLES 9+3
Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and Normal distributions.

UNIT II TWO-DIMENSIONAL RANDOM VARIABLES 9+3
Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables.

UNIT III RANDOM PROCESSES 9+3

UNIT IV QUEUEING MODELS 9+3
Markovian queues – Birth and Death processes – Single and multiple server queueing models – Little’s formula – Queues with finite waiting rooms – Queues with impatient customers: Balking and reneging.

UNIT V ADVANCED QUEUEING MODELS 9+3
Finite source models - M/G/1 queue – Pollaczek Khinchin formula – M/D/1 and M/Ek/1 as special cases – Series queues – Open Jackson networks.

TOTAL (L:45+T:15): 60 PERIODS

OUTCOMES:
• The students will have a fundamental knowledge of the probability concepts.
• Acquire skills in analyzing queueing models.
• It also helps to understand and characterize phenomenon which evolve with respect to time in a probabilistic manner.
TEXT BOOKS:

REFERENCES:

EC6504 MICROPROCESSOR AND MICROCONTROLLER

OBJECTIVES:
The student should be made to:
- Study the Architecture of 8086 microprocessor.
- Learn the design aspects of I/O and Memory Interfacing circuits.
- Study about communication and bus interfacing.
- Study the Architecture of 8051 microcontroller.

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

UNIT II 8086 SYSTEM BUS STRUCTURE

UNIT III I/O INTERFACING

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

OUTCOMES:
At the end of the course, the student should be able to:
- Design and implement programs on 8086 microprocessor.
- Design I/O circuits.
- Design Memory Interfacing circuits.
- Design and implement 8051 microcontroller based systems.

TEXT BOOKS:

REFERENCE:
1. Doughlas V.Hall, “Microprocessors and Interfacing, Programming and Hardware”, TMH,2012

CS6402  DESIGN AND ANALYSIS OF ALGORITHMS  L T P C
 OBJECTIVES:
The student should be made to:
- Learn the algorithm analysis techniques.
- Become familiar with the different algorithm design techniques.
- Understand the limitations of Algorithm power.

UNIT I  INTRODUCTION

UNIT II  BRUTE FORCE AND DIVIDE-AND-CONQUER

UNIT III  DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE

UNIT IV  ITERATIVE IMPROVEMENT
The Simplex MeFthod-The Maximum-Flow Problem – Maximm Matching in Bipartite Graphs- The Stable marriage Problem.
UNIT V  COPING WITH THE LIMITATIONS OF ALGORITHM POWER


TOTAL: 45 PERIODS

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

TEXT BOOK:

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

CS6401 OPERATING SYSTEMS

OBJECTIVES:
The student should be made to:
- Study the basic concepts and functions of operating systems.
- Understand the structure and functions of OS.
- Learn about Processes, Threads and Scheduling algorithms.
- Understand the principles of concurrency and Deadlocks.
- Learn various memory management schemes.
- Study I/O management and File systems.
- Learn the basics of Linux system and perform administrative tasks on Linux Servers.

UNIT I OPERATING SYSTEMS OVERVIEW

UNIT II PROCESS MANAGEMENT

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

UNIT IV I/O SYSTEMS

UNIT V CASE STUDY
Linux System- Basic Concepts; System Administration-Requirements for Linux System Administrator, Setting up a LINUX Multifunction Server, Domain Name System, Setting Up Local Network Services; Virtualization- Basic Concepts, Setting Up Xen,VMware on Linux Host and Adding Guest OS.

OUTCOMES:
At the end of the course, the student should be able to:
1. Design various Scheduling algorithms.
2. Apply the principles of concurrency.
3. Design deadlock, prevention and avoidance algorithms.
4. Compare and contrast various memory management schemes.
5. Design and Implement a prototype file systems.
6. Perform administrative tasks on Linux Servers.

TEXT BOOK:

REFERENCES:
5. http://nptel.ac.in/
OBJECTIVES:
The student should be made to:
- Understand the phases in a software project
- Understand fundamental concepts of requirements engineering and Analysis Modelling.
- Understand the major considerations for enterprise integration and deployment.
- Learn various testing and maintenance measures

UNIT I SOFTWARE PROCESS AND PROJECT MANAGEMENT

UNIT II REQUIREMENTS ANALYSIS AND SPECIFICATION

UNIT III SOFTWARE DESIGN

UNIT IV TESTING AND IMPLEMENTATION

UNIT V PROJECT MANAGEMENT

OUTCOMES:
At the end of the course, the student should be able to
- Identify the key activities in managing a software project.
- Compare different process models.
- Concepts of requirements engineering and Analysis Modeling.
- Apply systematic procedure for software design and deployment.
- Compare and contrast the various testing and maintenance

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

IT6411 MICROPROCESSOR AND MICROCONTROLLER LABORATORY

OBJECTIVES:
The student should be made to:
- Introduce ALP concepts and features
- Write ALP for arithmetic and logical operations in 8086 and 8051
- Differentiate Serial and Parallel Interface
- Interface different I/Os with Microprocessors
- Be familiar with MASM

LIST OF EXPERIMENTS:
8086 Programs using kits and MASM
1. Basic arithmetic and Logical operations
2. Move a data block without overlap
3. Code conversion, decimal arithmetic and Matrix operations.
4. Floating point operations, string manipulations, sorting and searching
5. Password checking, Print RAM size and system date
6. Counters and Time Delay

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

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

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

TOTAL: 45 PERIODS
LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:

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

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

IT6412 OPERATING SYSTEMS LABORATORY

OBJECTIVES:
The student should be made to:
- Learn shell programming and the use of filters in the UNIX environment.
- Be exposed to programming in C using system calls.
- Learn to use the file system related system calls.
- Be exposed to process creation and inter process communication.
- Be familiar with implementation of CPU Scheduling Algorithms, page replacement algorithms and Deadlock avoidance

LIST OF EXPERIMENTS:
2. Shell Programming.
3. Implement the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority
4. Implement all file allocation strategies
   a) Sequential b) Indexed c) Linked
5. Implement Semaphores
6. Implement all File Organization Techniques
   a) Single level directory b) Two level c) Hierarchical d) DAG
7. Implement Bankers Algorithm for Dead Lock Avoidance
8. Implement an Algorithm for Dead Lock Detection
9. Implement e all page replacement algorithms
   a) FIFO b) LRU c) LFU
10. Implement Shared memory and IPC
11. Implement Paging Technique of memory management.
12. Implement Threading & Synchronization Applications

TOTAL: 45 PERIODS

REFERENCE:
spoken-tutorial.org

OUTCOMES:
At the end of the course, the student should be able to
- Implement deadlock avoidance, and Detection Algorithms
- Compare the performance of various CPU Scheduling Algorithm
- Critically analyze the performance of the various page replacement algorithms
- Create processes and implement IPC
LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:
Standalone desktops with C / C++ / Java / Equivalent compiler 30 Nos.
(or)
Server with C / C++ / Java / Equivalent compiler supporting 30 terminals or more.

IT6413 SOFTWARE ENGINEERING LABORATORY

OBJECTIVES:
- To understand the software engineering methodologies for project development.
- To gain knowledge about open source tools for Computer Aided Software Engineering.
- To develop an efficient software using case tools.

SOFTWARE REQUIRED:
Open source Tools: StarUML / UMLGraph / Topcased
Prepare the following documents for each experiment and develop the software using software engineering methodology.

1. Problem Analysis and Project Planning - Thorough study of the problem – Identify Project scope, Objectives and Infrastructure.
2. Software Requirement Analysis - Describe the individual Phases/modules of the project and Identify deliverables.
3. Data Modelling - Use work products – data dictionary, use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.
4. Software Development and Debugging – implement the design by coding
5. Software Testing - Prepare test plan, perform validation testing, coverage analysis, memory leaks, develop test case hierarchy, Site check and site monitor.

Sample Experiments:
Academic domain
1. Course Registration System
2. Student marks analysing system

Railway domain
3. Online ticket reservation system
4. Platform assignment system for the trains in a railway station

Medicine domain
5. Expert system to prescribe the medicines for the given symptoms
6. Remote computer monitoring

Finance domain
7. ATM system
8. Stock maintenance

Human Resource management
9. Quiz System
10. E-mail Client system.

TOTAL: 45 PERIODS
OUTCOMES:
Upon Completion of the course, the students should be able to:
- Use open source case tools to develop software.
- Analyze and design software requirements in efficient manner.

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:
SOFTWARE:
Argo UML / StarUML / UMLGraph / Topcased or Equivalent.

HARDWARE:
Standalone desktops 30 Nos

CS6551 COMPUTER NETWORKS

OBJECTIVES:
The student should be made to:
- Understand the division of network functionalities into layers.
- Be familiar with the components required to build different types of networks
- Be exposed to the required functionality at each layer
- Learn the flow control and congestion control algorithms

UNIT I FUNDAMENTALS & LINK LAYER
Building a network – Requirements - Layering and protocols - Internet Architecture – Network software – Performance ; Link layer Services - Framing - Error Detection - Flow control

UNIT II MEDIA ACCESS & INTERNETWORKING
Media access control - Ethernet (802.3) - Wireless LANs – 802.11 – Bluetooth - Switching and bridging – Basic Internetworking (IP, CIDR, ARP, DHCP, ICMP )

UNIT III ROUTING
Routing (RIP, OSPF, metrics) – Switch basics – Global Internet (Areas, BGP, IPv6), Multicast – addresses – multicast routing (DVMRP, PIM)

UNIT IV TRANSPORT LAYER
Overview of Transport layer - UDP - Reliable byte stream (TCP) - Connection management - Flow control - Retransmission – TCP Congestion control - Congestion avoidance (DECbit, RED) – QoS – Application requirements

UNIT V APPLICATION LAYER
Traditional applications - Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web Services – DNS - SNMP

OUTCOMES:
At the end of the course, the student should be able to:
- Identify the components required to build different types of networks
- Choose the required functionality at each layer for given application
- Identify solution for each functionality at each layer
- Trace the flow of information from one node to another node in the network

TOTAL: 45 PERIODS
TEXT BOOK:

REFERENCES:

IT6501 GRAPHICS AND MULTIMEDIA  L T P C 3 0 0 3

OBJECTIVES:
The student should be made to:
- Develop an understanding and awareness of how issues such as content, information architecture, motion, sound, design, and technology merge to form effective and compelling interactive experiences for a wide range of audiences and end users.
- Be familiar with various software programs used in the creation and implementation of multimedia (interactive, motion/animation, presentation, etc.).
- Be aware of current issues relative between new emerging electronic technologies and graphic design (i.e. social, cultural, cognitive, etc). understand the relationship between critical analysis and the practical application of design.
- Appreciate the importance of technical ability and creativity within design practice.

UNIT I OUTPUT PRIMITIVES 9

UNIT II THREE-DIMENSIONAL CONCEPTS 9

UNIT III MULTIMEDIA SYSTEMS DESIGN 9

UNIT IV MULTIMEDIA FILE HANDLING 9
OUTCOMES:
Upon completion of the course, the student should be able to:
- Effectively and creatively solve a wide range of graphic design problems
- Form effective and compelling interactive experiences for a wide range of audiences.
- Use various software programs used in the creation and implementation of multi-media (interactive, motion/animation, presentation, etc.).
- Discuss issues related to emerging electronic technologies and graphic design

TEXT BOOKS:

REFERENCES:

OBJECTIVES:
The student should be made to:
- Learn the basics of OO analysis and design skills
- Learn the UML design diagrams
- Learn to map design to code
- Be exposed to the various testing techniques.

UNIT I  UML DIAGRAMS

UNIT II  DESIGN PATTERNS

UNIT III  CASE STUDY
Case study – the Next Gen POS system, Inception -Use case Modeling - Relating Use cases – include, extend and generalization - Elaboration - Domain Models - Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies - Aggregation and Composition
UNIT IV  APPLYING DESIGN PATTERNS  
System sequence diagrams - Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement - UML class diagrams - UML interaction diagrams - Applying GoF design patterns

UNIT V  CODING AND TESTING  

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
• Design and implement projects using OO concepts
• Use the UML analysis and design diagrams
• Apply appropriate design patterns
• Create code from design
• Compare and contrast various testing techniques

TEXT BOOK:

REFERENCES:

IT6502  DIGITAL SIGNAL PROCESSING  L T P C  3 1 0 4

OBJECTIVES:
• To introduce discrete Fourier transform and its applications.
• To teach the design of infinite and finite impulse response filters for filtering undesired signals.
• To introduce signal processing concepts in systems having more than one sampling frequency.

UNIT I  SIGNALS AND SYSTEMS  

UNIT II  FREQUENCY TRANSFORMATIONS  
UNIT III   IIR FILTER DESIGN
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
Structures of FIR – Linear phase FIR filter – Fourier Series - Filter design using windowing techniques (Rectangular Window, Hamming Window, Hanning Window), Frequency sampling techniques

UNIT V    FINITE WORD LENGTH EFFECTS IN DIGITAL FILTERS
Binary fixed point and floating point number representations – Comparison - Quantization noise – truncation and rounding – quantization noise power- input quantization error- coefficient quantization error – limit cycle oscillations-dead band- Overflow error-signal scaling.

TOTAL (L:45+T:15): 60 PERIODS

OUTCOMES:
Upon completion of the course, students will be able to
• Perform frequency transforms for the signals.
• Design IIR and FIR filters.
• Finite word length effects in digital filters

TEXT BOOK:

REFERENCES:

IT6503    WEB PROGRAMMING

OBJECTIVES:
The student should be made to:
• Understand the technologies used in Web Programming.
• Know the importance of object oriented aspects of Scripting.
• Understand creating database connectivity using JDBC.
• Learn the concepts of web based application using sockets.

UNIT I    SCRIPTING.
UNIT II JAVA

UNIT III JDBC
JDBC Overview – JDBC implementation – Connection class – Statements - Catching Database Results, handling database Queries. Networking– InetAddress class – URL class- TCP sockets - UDP sockets, Java Beans –RMI.

UNIT IV APPLETS

UNIT V XML AND WEB SERVICES

TOTAL (L:45+T:15): 60 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to
- Design web pages.
- Use technologies of Web Programming.
- Apply object oriented aspects to Scripting.
- Create databases with connectivity using JDBC.
- Build web based application using sockets.

TEXT BOOKS:
3. Michael Morrison XML Unleashed Tech media SAMS.

REFERENCES:

EC6801 WIRELESS COMMUNICATION L T P C
3 0 0 3

OBJECTIVES:
The student should be made to:
- Know the characteristic of wireless channel
- Learn the various cellular architectures
- Understand the concepts behind various digital signaling schemes for fading channels
- Be familiar the various multipath mitigation techniques
- Understand the various multiple antenna systems
UNIT I  WIRELESS CHANNELS  9
Large scale path loss – Path loss models: Free Space and Two-Ray models -Link Budget design –
Small scale fading- Parameters of mobile multipath channels – Time dispersion parameters-
Coherence bandwidth – Doppler spread & Coherence time, Fading due to Multipath time delay
spread – flat fading – frequency selective fading – Fading due to Doppler spread – fast fading – slow
fading.

UNIT II  CELLULAR ARCHITECTURE  9
Multiple Access techniques - FDMA, TDMA, CDMA – Capacity calculations–Cellular concept-
Frequency reuse - channel assignment- hand off- interference & system capacity- trunking & grade
of service – Coverage and capacity improvement.

UNIT III  DIGITAL SIGNALING FOR FADING CHANNELS  9
Structure of a wireless communication link, Principles of Offset-QPSK, p/4-DQPSK, Minimum Shift
Keying, Gaussian Minimum Shift Keying, Error performance in fading channels, OFDM principle –
Cyclic prefix, Windowing, PAPR.

UNIT IV  MULTIPATH MITIGATION TECHNIQUES  9
Equalisation – Adaptive equalization, Linear and Non-Linear equalization, Zero forcing and LMS
Algorithms. Diversity – Micro and Macrodiversity, Diversity combining techniques, Error probability in
fading channels with diversity reception, Rake receiver,

UNIT V  MULTIPLE ANTENNA TECHNIQUES  9
MIMO systems – spatial multiplexing -System model -Pre-coding - Beam forming - transmitter
diversity, receiver diversity- Channel state information-capacity in fading and non-fading channels.

TOTAL : 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
• Characterize wireless channels
• Design and implement various signaling schemes for fading channels
• Design a cellular system
• Compare multipath mitigation techniques and analyze their performance
• Design and implement systems with transmit/receive diversity and MIMO systems and analyze their performance

TEXTBOOKS:

REFERENCES:
OBJECTIVES:
The student should be made to:
- Learn socket programming.
- Be familiar with simulation tools.
- Have hands on experience on various networking protocols.

LIST OF EXPERIMENTS:
1. Implementation of Stop and Wait Protocol and Sliding Window Protocol.
2. Study of Socket Programming and Client – Server model
3. Write a code simulating ARP /RARP protocols.
4. Write a code simulating PING and TRACEROUTE commands
5. Create a socket for HTTP for web page upload and download.
6. Write a program to implement RPC (Remote Procedure Call)
7. Implementation of Subnetting
8. Applications using TCP Sockets like
   a. Echo client and echo server
   b. Chat
   c. File Transfer
9. Applications using TCP and UDP Sockets like
   d. DNS
   e. SNMP
   f. File Transfer
10. Study of Network simulator (NS).and Simulation of Congestion Control Algorithms using NS
11. Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer.
   i. Link State routing
   ii. Flooding
   iii. Distance vector

TOTAL: 45 PERIODS

REFERENCE:
spoken-tutorial.org

OUTCOMES:
At the end of the course, the student should be able to
- Use simulation tools
- Implement the various protocols.
- Analyse the performance of the protocols in different layers.
- Analyze various routing algorithms

LIST OF EQUIPMENTS FOR A BATCH OF 30 STUDENTS
SOFTWARE
- C / C++ / Java / Equivalent Compiler 30
- Network simulator like NS2/Glomosim/OPNET/ Equivalent

HARDWARE
  Standalone desktops 30 Nos
OBJECTIVES:
The student should be made to:

- Be familiar with Web page design using HTML / DHTML and style sheets
- Be exposed to creation of user interfaces using Java frames and applets.
- Learn to create dynamic web pages using server side scripting.
- Learn to write PHP database functions.
- Learn .Net framework and RMI

LIST OF EXPERIMENTS:
1. Write a html program for Creation of web site with forms, frames, links, tables etc
2. Design a web site using HTML and DHTML. Use Basic text Formatting, Images,
3. Create a script that asks the user for a name, then greets the user with "Hello" and
   the user name on the page
4. Create a script that collects numbers from a page and then adds them up and
   prints them to a blank field on the page.
5. Create a script that prompts the user for a number and then counts from 1 to that
   number displaying only the odd numbers.
6. Create a script that will check the field in Assignment 1 for data and alert the user
   if it is blank. This script should run from a button.
7. Using CSS for creating web sites
8. Creating simple application to access data base using JDBC Formatting HTML with CSS.
9. Program for manipulating Databases and SQL.
11. Write a web application that functions as a simple hand calculator, but also keeps
    a "paper trail" of all your previous work
12. Install Tomcat and use JSP and link it with any of the assignments above
13. Reading and Writing the files using .Net
14. Write a program to implement web service for calculator application
15. Implement RMI concept for building any remote method of your choice.

TOTAL: 45 PERIODS

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

- Design Web pages using HTML/DHTML and style sheets
- Design and Implement database applications.
- Create dynamic web pages using server side scripting.
- Write Client Server applications.

LAB REQUIREMENTS FOR A BATCH OF 30 STUDENTS:
SOFTWARE:
Java, Dream Weaver or Equivalent, MySQL or Equivalent, Apache Server

HARDWARE:
Standalone desktops 30 Nos
OBJECTIVES:
The student should be made to:
- Learn the basics of OO analysis and design skills.
- Be exposed to the UML design diagrams.
- Learn to map design to code.
- Be familiar with the various testing techniques

LIST OF EXPERIMENTS:
To develop a mini-project by following the 9 exercises listed below.
1. To develop a problem statement.
2. Identify Use Cases and develop the Use Case model.
3. Identify the conceptual classes and develop a domain model with UML Class diagram.
4. Using the identified scenarios, find the interaction between objects and represent them using UML Sequence diagrams.
5. Draw relevant state charts and activity diagrams.
6. Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
7. Develop and test the Technical services layer.
8. Develop and test the Domain objects layer.
9. Develop and test the User interface layer.

Suggested domains for Mini-Project:
1. Passport automation system.
2. Book bank
3. Exam Registration
4. Stock maintenance system.
5. Online course reservation system
6. E-ticketing
7. Software personnel management system
8. Credit card processing
9. e-book management system
10. Recruitment system
11. Foreign trading system
12. Conference Management System
13. BPO Management System
14. Library Management System
15. Student Information System

OUTCOMES:
At the end of the course, the student should be able to
- Design and implement projects using OO concepts.
- Use the UML analysis and design diagrams.
- Apply appropriate design patterns.
- Create code from design.
- Compare and contrast various testing techniques

LAB EQUIPMENTS FOR A BATCH OF 30 STUDENTS:
SUGGESTED SOFTWARE TOOLS:
Rational Suite (or) Argo UML (or) equivalent, Eclipse IDE and Junit
### SOFTWARE TOOLS
- 30 user License
- Rational Suite
- Open Source Alternatives: ArgoUML, Visual Paradigm
- Eclipse IDE and JUnit
- PCs

### CS6601 DISTRIBUTED SYSTEMS

<table>
<thead>
<tr>
<th>OBJECTIVES:</th>
<th>L T P C</th>
</tr>
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<tbody>
<tr>
<td>The student should be made to:</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>• Understand foundations of Distributed Systems</td>
<td></td>
</tr>
<tr>
<td>• Introduce the idea of peer to peer services and file system</td>
<td></td>
</tr>
<tr>
<td>• Understand in detail the system level and support required for distributed system</td>
<td></td>
</tr>
<tr>
<td>• Understand the issues involved in studying process and resource management</td>
<td></td>
</tr>
</tbody>
</table>

### UNIT I INTRODUCTION

### UNIT II COMMUNICATION IN DISTRIBUTED SYSTEM
System Model – Inter process Communication - the API for internet protocols – External data representation and Multicast communication. **Network virtualization:** Overlay networks. **Case study:** MPI Remote Method Invocation And Objects: Remote Invocation – Introduction - Request-reply protocols - Remote procedure call - Remote method invocation. **Case study:** Java RMI - Group communication - Publish-subscribe systems - Message queues - Shared memory approaches - Distributed objects - Case study: Enterprise Java Beans - from objects to components.

### UNIT III PEER TO PEER SERVICES AND FILE SYSTEM
Peer-to-peer Systems – Introduction - Napster and its legacy - Peer-to-peer – Middleware - Routing overlays. **Overlay case studies:** Pastry, Tapestry- Distributed File Systems –Introduction - File service architecture – Andrew File system. **File System:** Features-File model - File accessing models - File sharing semantics **Naming:** Identifiers, Addresses, Name Resolution – Name Space Implementation – Name Caches – LDAP.

### UNIT IV SYNCHRONIZATION AND REPLICATION

### UNIT V PROCESS & RESOURCE MANAGEMENT

**TOTAL: 45 PERIODS**
OUTCOMES:
At the end of the course, the student should be able to:
- Discuss trends in Distributed Systems.
- Apply network virtualization.
- Apply remote method invocation and objects.
- Design process and resource management systems.

TEXT BOOK:

REFERENCES:

IT6601  MOBILE COMPUTING  L  T  P  C  3 0 0 3

OBJECTIVES:
The student should be made to:
- Understand the basic concepts of mobile computing.
- Be familiar with the network protocol stack.
- Learn the basics of mobile telecommunication system.
- Be exposed to Ad-Hoc networks.
- Gain knowledge about different mobile platforms and application development.

UNIT I  INTRODUCTION

UNIT II  MOBILE INTERNET PROTOCOL AND TRANSPORT LAYER

UNIT III  MOBILE TELECOMMUNICATION SYSTEM
Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS).

UNIT IV  MOBILE AD-HOC NETWORKS
UNIT V  MOBILE PLATFORMS AND APPLICATIONS  


TOTAL: 45 PERIODS

OUTCOMES:  
At the end of the course, the student should be able to:
- Explain the basics of mobile telecommunication system
- Choose the required functionality at each layer for given application
- Identify solution for each functionality at each layer
- Use simulator tools and design Ad hoc networks
- Develop a mobile application.

TEXT BOOK:  

REFERENCES:  
8. Windows Phone Dev Center : http://developer.windowsphone.com

CS6659  ARTIFICIAL INTELLIGENCE  

OBJECTIVES:  
The student should be made to:
- Study the concepts of Artificial Intelligence.
- Learn the methods of solving problems using Artificial Intelligence.
- Introduce the concepts of Expert Systems and machine learning.

UNIT I  INTRODUCTION TO AI AND PRODUCTION SYSTEMS  
Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics -Specialized production system- Problem solving methods - Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing-Depth first and Breath first, Constraints satisfaction - Related algorithms, Measure of performance and analysis of search algorithms.
UNIT II REPRESENTATION OF KNOWLEDGE 9
Game playing - Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge.

UNIT III KNOWLEDGE INFERENCE 9
Knowledge representation -Production based system, Frame based system. Inference - Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning - Certainty factors, Bayesian Theory-Bayesian Network-Dempster - Shafer theory.

UNIT IV PLANNING AND MACHINE LEARNING 9

UNIT V EXPERT SYSTEMS 9

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Identify problems that are amenable to solution by AI methods.
- Identify appropriate AI methods to solve a given problem.
- Formalise a given problem in the language/framework of different AI methods.
- Implement basic AI algorithms.
- Design and carry out an empirical evaluation of different algorithms on a problem formalisation, and state the conclusions that the evaluation supports.

TEXT BOOKS:

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

CS6660 COMPILER DESIGN L T P C
3 0 0 3

OBJECTIVES:
The student should be made to:
- Learn the design principles of a Compiler.
- Learn the various parsing techniques and different levels of translation.
- Learn how to optimize and effectively generate machine codes.
UNIT I  INTRODUCTION TO COMPILERS
Translators-Compilation and Interpretation-Language processors -The Phases of Compiler-Errors Encountered in Different Phases-The Grouping of Phases-Compiler Construction Tools - Programming Language basics.

UNIT II  LEXICAL ANALYSIS
Need and Role of Lexical Analyzer-Lexical Errors-Expressing Tokens by Regular Expressions- Converting Regular Expression to DFA- Minimization of DFA-Language for Specifying Lexical Analyzers-LEX-Design of Lexical Analyzer for a sample Language.

UNIT III  SYNTAX ANALYSIS

UNIT IV  SYNTAX DIRECTED TRANSLATION & RUN TIME ENVIRONMENT
Syntax directed Definitions-Construction of Syntax Tree-Bottom-up Evaluation of S-Attribute Definitions- Design of predictive translator - Type Systems-Specification of a simple type checker-Equivalence of Type Expressions-Type Conversions.

RUN-TIME ENVIRONMENT:  Source Language Issues-Storage Organization-Storage Allocation- Parameter Passing-Symbol Tables-Dynamic Storage Allocation-Storage Allocation in FORTAN.

UNIT V  CODE OPTIMIZATION AND CODE GENERATION

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Design and implement a prototype compiler.
- Apply the various optimization techniques.
- Use the different compiler construction tools.

TEXTBOOK:

REFERENCES:
OBJECTIVES:
- Understand software architectural requirements and drivers
- Be exposed to architectural styles and views
- Be familiar with architectures for emerging technologies

UNIT I  INTRODUCTION AND ARCHITECTURAL DRIVERS

UNIT II  QUALITY ATTRIBUTE WORKSHOP
Quality Attribute Workshop – Documenting Quality Attributes – Six part scenarios – Case studies.

UNIT III  ARCHITECTURAL VIEWS

UNIT IV  ARCHITECTURAL STYLES
Introduction – Data flow styles – Call-return styles – Shared Information styles - Event styles – Case studies for each style.

UNIT V  DOCUMENTING THE ARCHITECTURE
Good practices – Documenting the Views using UML – Merits and Demerits of using visual languages – Need for formal languages – Architectural Description Languages – ACME – Case studies. Special topics: SOA and Web services – Cloud Computing – Adaptive structures

OUTCOMES:
Upon Completion of the course, the students will be able to
- Explain influence of software architecture on business and technical activities
- Identify key architectural structures
- Use styles and views to specify architecture
- Design document for a given architecture

TEXT BOOKS:

REFERENCES:
IT6611 MOBILE APPLICATION DEVELOPMENT LABORATORY

OBJECTIVES:
The student should be made to:
- Know the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
- Understand how to work with various mobile application development frameworks.
- Learn the basic and important design concepts and issues of development of mobile applications.
- Understand the capabilities and limitations of mobile devices.

LIST OF EXPERIMENTS
1. Develop an application that uses GUI components, Font and Colours
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of database.
6. Develop an application that makes use of RSS Feed.
7. Implement an application that implements Multi threading
8. Develop a native application that uses GPS location information.
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert upon receiving a message.
11. Write a mobile application that creates alarm clock

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Design and Implement various mobile applications using emulators.
- Deploy applications to hand-held devices

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

IT6612 COMPILER LABORATORY

OBJECTIVES:
The student should be made to:
- Be exposed to compiler writing tools.
- Learn to implement the different Phases of compiler
- Be familiar with control flow and data flow analysis
- Learn simple optimization techniques
LIST OF EXPERIMENTS:
1. Implementation of Symbol Table
2. Develop a lexical analyzer to recognize a few patterns in C.
   (Ex. identifiers, constants, comments, operators etc.)
3. Implementation of Lexical Analyzer using Lex Tool
4. Generate YACC specification for a few syntactic categories.
   a) Program to recognize a valid arithmetic expression that uses operator +, -, *, and /.
   b) Program to recognize a valid variable which starts with a letter followed by any number of letters or digits.
   d) Implementation of Calculator using LEX and YACC
5. Convert the BNF rules into Yacc form and write code to generate Abstract Syntax Tree.
6. Implement type checking
7. Implement control flow analysis and Data flow Analysis
8. Implement any one storage allocation strategies (Heap, Stack, Static)
9. Construction of DAG
10. Implement the back end of the compiler which takes the three address code and produces the 8086 assembly language instructions that can be assembled and run using a 8086 assembler. The target assembly instructions can be simple move, add, sub, jump. Also simple addressing modes are used.
11. Implementation of Simple Code Optimization Techniques (Constant Folding, etc.)

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to
- Implement the different Phases of compiler using tools
- Analyze the control flow and data flow of a typical program
- Optimize a given program
- Generate an assembly language program equivalent to a source language program

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:
Standalone desktops with C / C++ compiler and Compiler writing tools 30 Nos.
(or)
Server with C / C++ compiler and Compiler writing tools supporting 30 terminals or more.
LEX and YACC

GE6674 COMMUNICATION AND SOFT SKILLS- LABORATORY COURSE
L T P C
0 0 4 2

OBJECTIVES:
To enable learners to,
- Develop their communicative competence in English with specific reference to speaking and listening
- Enhance their ability to communicate effectively in interviews.
- Strengthen their prospects of success in competitive examinations.
UNIT I LISTENING AND SPEAKING SKILLS 12
Conversational skills (formal and informal)- group discussion- making effective presentations using computers, listening/watching interviews conversations, documentaries. Listening to lectures, discussions from TV/ Radio/ Podcast.

UNIT II READING AND WRITING SKILLS 12
Reading different genres of tests ranging from newspapers to creative writing. Writing job applications- cover letter- resume- emails- letters- memos- reports. Writing abstracts- summaries- interpreting visual texts.

UNIT III ENGLISH FOR NATIONAL AND INTERNATIONAL EXAMINATIONS AND PLACEMENTS 12
International English Language Testing System (IELTS) - Test of English as a Foreign Language (TOEFL) - Civil Service(Language related)- Verbal Ability.

UNIT IV INTERVIEW SKILLS 12
Different types of Interview format- answering questions- offering information- mock interviews-body language( paralinguistic features)- articulation of sounds- intonation.

UNIT V SOFT SKILLS 12
Motivation- emotional intelligence- Multiple intelligences- emotional intelligence- managing changes-time management-stress management-leadership straits-team work- career planning - intercultural communication- creative and critical thinking

TOTAL: 60 PERIODS

Teaching Methods:
1. To be totally learner-centric with minimum teacher intervention as the course revolves around practice.
2. Suitable audio/video samples from Podcast/YouTube to be used for illustrative purposes.
3. Portfolio approach for writing to be followed. Learners are to be encouraged to blog, tweet, text and email employing appropriate language.
4. GD/Interview/Role Play/Debate could be conducted off the laboratory (in a regular classroom) but learners are to be exposed to telephonic interview and video conferencing.
5. Learners are to be assigned to read/write/listen/view materials outside the classroom as well for graining proficiency and better participation in the class.

Lab Infrastructure:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Description of Equipment (minimum configuration)</th>
<th>Qty Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Server</td>
<td>1 No.</td>
</tr>
<tr>
<td></td>
<td>• PIV System</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 1 GB RAM / 40 GB HDD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• OS: Win 2000 server</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Audio card with headphones</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• JRE 1.3</td>
<td></td>
</tr>
</tbody>
</table>
### Client Systems
- PIII or above
- 256 or 512 MB RAM / 40 GB HDD
- OS: Win 2000
- Audio card with headphones
- JRE 1.3

### Equipment List
- Handicam: 1 No.
- Television 46": 1 No.
- Collar mike: 1 No.
- Cordless mike: 1 No.
- Audio Mixer: 1 No.
- DVD recorder/player: 1 No.
- LCD Projector with MP3/CD/DVD provision for Audio/video facility: 1 No.

### Evaluation:

**Internal: 20 marks**
- Record maintenance: Students should write a report on a regular basis on the activities conducted, focusing on the details such as the description of the activity, ideas emerged, learning outcomes and so on. At the end of the semester records can be evaluated out of 20 marks.

**External: 80 marks**
- Online Test: 35 marks
- Interview: 15 marks
- Presentation: 15 marks
- Group Discussion: 15 marks

### Note on Internal and External Evaluation:
1. Interview – mock interview can be conducted on one-on-one basis.
2. Speaking – example for role play:
   a. Marketing engineer convincing a customer to buy his product.
   b. Telephonic conversation- fixing an official appointment / placing an order / enquiring and so on.
3. Presentation – should be extempore on simple topics.
4. Discussion – topics of different kinds; general topics, and case studies.

### OUTCOMES:
At the end of the course, learners should be able to
- Take international examination such as IELTS and TOEFL
- Make presentations and Participate in Group Discussions.
- Successfully answer questions in interviews.

### REFERENCES:
2. Graded Examinations in Spoken English and Spoken English for Work downloadable materials from Trinity College, London.
4. Interactive Multimedia Programs on Managing Time and Stress.
IT6701 INFORMATION MANAGEMENT

OBJECTIVES:
- To expose students with the basics of managing the information
- To explore the various aspects of database design and modelling,
- To examine the basic issues in information governance and information integration
- To understand the overview of information architecture.

UNIT I DATABASE MODELLING, MANAGEMENT AND DEVELOPMENT
Database design and modelling - Business Rules and Relationship; Java database Connectivity (JDBC), Database connection Manager, Stored Procedures. Trends in Big Data systems including NoSQL - Hadoop HDFS, MapReduce, Hive, and enhancements.

UNIT II DATA SECURITY AND PRIVACY

UNIT III INFORMATION GOVERNANCE
Master Data Management (MDM) – Overview, Need for MDM, Privacy, regulatory requirements and compliance. Data Governance – Synchronization and data quality management.

UNIT IV INFORMATION ARCHITECTURE
Principles of Information architecture and framework, Organizing information, Navigation systems and Labelling systems, Conceptual design, Granularity of Content.

UNIT V INFORMATION LIFECYCLE MANAGEMENT
Data retention policies; Confidential and Sensitive data handling, lifecycle management costs. Archive data using Hadoop; Testing and delivering big data applications for performance and functionality; Challenges with data administration;

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course the students will be able to:
- Cover core relational database topics including logical and physical design and modeling
- Design and implement a complex information system that meets regulatory requirements; define and manage an organization's key master data entities
- Design, Create and maintain data warehouses.
- Learn recent advances in NOSQL, Big Data and related tools.
TEXT BOOKS:
1. Alex Berson, Larry Dubov MASTER DATA MANAGEMENT AND DATA GOVERNANCE, 2/E, Tata McGraw Hill, 2011
3. Information Architecture for the World Wide Web; Peter Morville, Louis Rosenfeld ; O'Reilly Media; 1998

REFERENCES:
4. Inside Cyber Warfare: Mapping the Cyber Underworld- Jeffrey Carr, O'Reilly Media; Second Edition 2011

CS6701 CRYPTOGRAPHY AND NETWORK SECURITY L T P C 3 0 0 3

OBJECTIVES:
The student should be made to:
- Understand OSI security architecture and classical encryption techniques.
- Acquire fundamental knowledge on the concepts of finite fields and number theory.
- Understand various block cipher and stream cipher models.
- Describe the principles of public key cryptosystems, hash functions and digital signature.

UNIT I  INTRODUCTION & NUMBER THEORY  10
Services, Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography).FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-Modular arithmetic-Euclid’s algorithm-Finite fields- Polynomial Arithmetic –Prime numbers-Fermat’s and Euler’s theorem-Testing for primality -The Chinese remainder theorem- Discrete logarithms.

UNIT II  BLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY  10

UNIT III  HASH FUNCTIONS AND DIGITAL SIGNATURES  8

UNIT IV  SECURITY PRACTICE & SYSTEM SECURITY  8
UNIT V       E-MAIL, IP & WEB SECURITY

E-mail Security: Security Services for E-mail - attacks possible through E-mail - establishing keys privacy-authentication of the source - Message Integrity - Non-repudiation - Pretty Good Privacy - S/MIME.


TOTAL: 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Compare various Cryptographic Techniques
- Design Secure applications
- Inject secure coding in the developed applications

TEXT BOOKS:

REFERENCES:

IT6702       DATA WAREHOUSING AND DATA MINING

OBJECTIVES:
The student should be made to:
- Be familiar with the concepts of data warehouse and data mining,
- Be acquainted with the tools and techniques used for Knowledge Discovery in Databases.

UNIT I       DATA WAREHOUSING
UNIT II  BUSINESS ANALYSIS

UNIT III  DATA MINING

UNIT IV  ASSOCIATION RULE MINING AND CLASSIFICATION
Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction.

UNIT V  CLUSTERING AND TRENDS IN DATA MINING

TOTAL: 45 PERIODS

OUTCOMES:
After completing this course, the student will be able to:
- Apply data mining techniques and methods to large data sets.
- Use data mining tools.
- Compare and contrast the various classifiers.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
The student should be made to:
- Understand how Grid computing helps in solving large scale scientific problems.
- Gain knowledge on the concept of virtualization that is fundamental to cloud computing.
- Learn how to program the grid and the cloud.
- Understand the security issues in the grid and the cloud environment.

UNIT I  INTRODUCTION

UNIT II  GRID SERVICES

UNIT III  VIRTUALIZATION
Cloud deployment models: public, private, hybrid, community – Categories of cloud computing: Everything as a service: Infrastructure, platform, software - Pros and Cons of cloud computing – Implementation levels of virtualization – virtualization structure – virtualization of CPU, Memory and I/O devices – virtual clusters and Resource Management – Virtualization for data center automation.

UNIT IV  PROGRAMMING MODEL

UNIT V  SECURITY
Trust models for Grid security environment – Authentication and Authorization methods – Grid security infrastructure – Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud, Key privacy issues in the cloud.

OUTCOMES:
At the end of the course, the student should be able to:
- Apply grid computing techniques to solve large scale scientific problems
- Apply the concept of virtualization
- Use the grid and cloud tool kits
- Apply the security models in the grid and the cloud environment

TEXT BOOK:
REFERENCES:
1. Jason Venner, “Pro Hadoop - Build Scalable, Distributed Applications in the Cloud”, A Press, 2009

IT6711 DATA MINING LABORATORY L T P C
0 0 3 2

OBJECTIVES:
The student should be made to:
- Be familiar with the algorithms of data mining,
- Be acquainted with the tools and techniques used for Knowledge Discovery in Databases.
- Be exposed to web mining and text mining

LIST OF EXPERIMENTS:
1. Creation of a Data Warehouse.
2. Apriori Algorithm.
3. FP-Growth Algorithm.
5. One Hierarchical clustering algorithm.
6. Bayesian Classification.
7. Decision Tree.
8. Support Vector Machines.
9. Applications of classification for web mining.
10. Case Study on Text Mining or any commercial application.

OUTCOMES:
After completing this course, the student will be able to:
- Apply data mining techniques and methods to large data sets.
- Use data mining tools.
- Compare and contrast the various classifiers.

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:
SOFTWARE:
WEKA, RapidMiner, DB Miner or Equivalent

HARDWARE
Standalone desktops 30 Nos
OBJECTIVES:
The student should be made to:
- Be exposed to the different cipher techniques
- Learn to implement the algorithms DES, RSA, MD5, SHA-1
- Learn to use tools like GnuPG, KF sensor, Net Strumbler

LIST OF EXPERIMENTS
1. Implement the following SUBSTITUTION & TRANSPOSITION TECHNIQUES concepts:
   a) Caesar Cipher
   b) Playfair Cipher
   c) Hill Cipher
   d) Vigenere Cipher
   e) Rail fence – row & Column Transformation
2. Implement the following algorithms
   a) DES
   b) RSA Algorithm
   c) Diffie-Hellman
   d) MD5
   e) SHA-1
3. Implement the SIGNATURE SCHEME - Digital Signature Standard
4. Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures (GnuPG).
5. Setup a honey pot and monitor the honeypot on network (KF Sensor)
6. Installation of rootkits and study about the variety of options
7. Perform wireless audit on an access point or a router and decrypt WEP and WPA (Net Stumbler)
8. Demonstrate intrusion detection system (ids) using any tool (snort or any other s/w)

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to
- Implement the cipher techniques
- Develop the various security algorithms
- Use different open source tools for network security and analysis

LAB EQUIPMENTS FOR A BATCH OF 30 STUDENTS:
SOFTWARE:
C / C++ / Java or equivalent compiler
GnuPG, KF Sensor or Equivalent, Snort, Net Stumbler or Equivalent

HARDWARE:
Standalone desktops - 30 Nos.
(or)
Server supporting 30 terminals or more.
OBJECTIVES:
The student should be made to:
- Be exposed to tool kits for grid and cloud environment.
- Be familiar with developing web services/Applications in grid framework
- Learn to run virtual machines of different configuration.
- Learn to use Hadoop

LIST OF EXPERIMENTS:
GRID COMPUTING LAB:
Use Globus Toolkit or equivalent and do the following:
1. Develop a new Web Service for Calculator.
2. Develop new OGSA-compliant Web Service.
4. Develop applications using Java or C/C++ Grid APIs
5. Develop secured applications using basic security mechanisms available in Globus Toolkit.
6. Develop a Grid portal, where user can submit a job and get the result. Implement it with and without GRAM concept.

CLOUD COMPUTING LAB:
Use Eucalyptus or Open Nebula or equivalent to set up the cloud and demonstrate.
1. Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.
2. Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.
3. Install a C compiler in the virtual machine and execute a sample program.
4. Show the virtual machine migration based on the certain condition from one node to the other.
5. Find procedure to install storage controller and interact with it.
6. Find procedure to set up the one node Hadoop cluster.
7. Mount the one node Hadoop cluster using FUSE.
8. Write a program to use the API's of Hadoop to interact with it.
9. Write a word count program to demonstrate the use of Map and Reduce tasks.

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to
- Use the grid and cloud tool kits.
- Design and implement applications on the Grid.
- Design and Implement applications on the Cloud.

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:
SOFTWARE:
Globus Toolkit or equivalent
Eucalyptus or Open Nebula or equivalent to

HARDWARE
Standalone desktops 30 Nos
OBJECTIVES:
The student should be made to:
- Learn XML fundamentals.
- Be exposed to build applications based on XML.
- Understand the key principles behind SOA.
- Be familiar with the web services technology elements for realizing SOA.
- Learn the various web service standards.

UNIT I INTRODUCTION TO XML

UNIT II BUILDING XML-BASED APPLICATIONS

UNIT III SERVICE ORIENTED ARCHITECTURE
Characteristics of SOA, Comparing SOA with Client-Server and Distributed architectures – Benefits of SOA -- Principles of Service orientation – Service layers.

UNIT IV WEB SERVICES

UNIT V BUILDING SOA-BASED APPLICATIONS

TOTAL: 45 PERIODS

OUTCOMES:
Upon successful completion of this course, students will be able to:
- Build applications based on XML.
- Develop web services using technology elements.
- Build SOA-based applications for intra-enterprise and inter-enterprise applications.

TEXTBOOKS:

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

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

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

OBJECTIVES:
The student should be made to:
- Be familiar with a commercial relational database system (Oracle) by writing SQL using the system.
- Be familiar with the relational database theory, and be able to write relational algebra expressions for queries.

UNIT I  PARALLEL AND DISTRIBUTED DATABASES
9

UNIT II  OBJECT AND OBJECT RELATIONAL DATABASES
9

UNIT III  XML DATABASES
9

UNIT IV  MOBILE DATABASES
9
UNIT V  INTELLIGENT DATABASES
Active databases – Deductive Databases – Knowledge bases – Multimedia Databases-
Multidimensional Data Structures – Image Databases – Text/Document Databases- Video Databases
– Audio Databases – Multimedia Database Design.

TOTAL: 45 PERIODS

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

• Apply query evaluation techniques and query optimization techniques.
• Develop transaction processing systems with concurrency control.
• Design and develop a database application system as part of a team.

REFERENCES:
2. C.J.Date, A.Kannan and S.Swamynathan,”An Introduction to Database Systems”, Eighth Edition,
Education/Addison Wesley, 2007.

CS6001  C# AND .NET PROGRAMMING  L T P C
3 0 0 3

OBJECTIVES:
The student should be made to:

• Understand the foundations of CLR execution
• Learn the technologies of the .NET framework
• Know the object oriented aspects of C#
• Be aware of application development in .NET
• Learn web based applications on .NET(ASP.NET)

UNIT I  INTRODUCTION TO C#
Introducing C#, Understanding .NET, overview of C#, Literals, Variables, Data Types, Operators,
checked and unchecked operators, Expressions, Branching, Looping, Methods, implicit and explicit
casting, Constant, Arrays, Array Class, Array List, String, String Builder, Structure, Enumerations,
boxing and unboxing.

UNIT II  OBJECT ORIENTED ASPECTS OF C#
Class, Objects, Constructors and its types, inheritance, properties, indexers, index overloading,
polymorphism, sealed class and methods, interface, abstract class, abstract and interface, operator
overloading, delegates, events, errors and exception, Threading.
UNIT III  APPLICATION DEVELOPMENT ON .NET  
Building windows application, Creating our own window forms with events and controls, menu creation, inheriting window forms, SDI and MDI application, Dialog Box(Modal and Modeless), accessing data with ADO.NET, DataSet, typed dataset, Data Adapter, updating database using stored procedures, SQL Server with ADO.NET, handling exceptions, validating controls, windows application configuration.

UNIT IV  WEB BASED APPLICATION DEVELOPMENT ON .NET  
Programming web application with web forms, ASP.NET introduction, working with XML and .NET, Creating Virtual Directory and Web Application, session management techniques, web.config, web services, passing datasets, returning datasets from web services, handling transaction, handling exceptions, returning exceptions from SQL Server.

UNIT V  CLR AND .NET FRAMEWORK  
Assemblies, Versioning, Attributes, reflection, viewing meta data, type discovery, reflection on type, marshalling, remoting, security in .NET

TOTAL: 45 PERIODS

OUTCOMES:
After completing this course, the student will be able to:
- List the major elements of the .NET framework
- Explain how C# fits into the .NET platform.
- Analyze the basic structure of a C# application
- Debug, compile, and run a simple application.
- Develop programs using C# on .NET
- Design and develop Web based applications on .NET
- Discuss CLR.

TEXT BOOKS:

REFERENCES:

IT6002  INFORMATION THEORY AND CODING TECHNIQUES
OBJECTIVES:
The student should be made to:
- Understand error–control coding.
- Understand encoding and decoding of digital data streams.
- Be familiar with the methods for the generation of these codes and their decoding techniques.
- Be aware of compression and decompression techniques.
- Learn the concepts of multimedia communication.
UNIT I INFORMATION ENTROPY FUNDAMENTALS 9

UNIT II DATA AND VOICE CODING 9

UNIT III ERROR CONTROL CODING 9

UNIT IV COMPRESSION TECHNIQUES 9

UNIT V AUDIO AND VIDEO CODING 9

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of the course, the student should be able to:
- Design an application with error–control.
- Use compression and decompression techniques.
- Apply the concepts of multimedia communication.

TEXT BOOKS:

REFERENCES:

GE6757 TOTAL QUALITY MANAGEMENT L T P C 3 0 0 3

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

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

UNIT III  
**TQM TOOLS AND TECHNIQUES I**  
The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types.

UNIT IV  
**TQM TOOLS AND TECHNIQUES II**  

UNIT V  
**QUALITY SYSTEMS**  

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

**TEXTBOOK:**  

**REFERENCES:**  

**CS6012**  
**SOFT COMPUTING**  
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**OBJECTIVES:**  
The student should be made to:  
- Learn the various soft computing frame works.  
- Be familiar with design of various neural networks.  
- Be exposed to fuzzy logic.  
- Learn genetic programming.  
- Be exposed to hybrid systems.
UNIT I  INTRODUCTION

UNIT II  NEURAL NETWORKS

UNIT III  FUZZY LOGIC

UNIT IV  GENETIC ALGORITHM

UNIT V  HYBRID SOFT COMPUTING TECHNIQUES & APPLICATIONS

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student should be able to:
• Apply various soft computing frame works.
• Design of various neural networks.
• Use fuzzy logic.
• Apply genetic programming.
• Discuss hybrid soft computing.

TEXT BOOKS:
REFERENCES:

GE6084 HUMAN RIGHTS

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

UNIT I

UNIT II

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

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

UNIT V

TOTAL : 45 PERIODS

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

REFERENCES:
OBJECTIVES:
The student should be made to:
- Understand error–control coding.
- Understand encoding and decoding of digital data streams.
- Be familiar with the methods for the generation of these codes and their decoding techniques.
- Be aware of compression and decompression techniques.
- Learn the concepts of multimedia communication.

UNIT I MULTIMEDIA COMPONENTS
Introduction - Multimedia skills - Multimedia components and their characteristics - Text, sound, images, graphics, animation, video, hardware.

UNIT II AUDIO AND VIDEO COMPRESSION

UNIT III TEXT AND IMAGE COMPRESSION

UNIT IV VOIP TECHNOLOGY
Basics of IP transport, VoIP challenges, H.323/ SIP –Network Architecture, Protocols, Call establishment and release, VoIP and SS7, Quality of Service- CODEC Methods- VOIP applicability.

UNIT V MULTIMEDIA NETWORKING
Multimedia networking -Applications-streamed stored and audio-making the best Effort service-protocols for real time interactive Applications-distributing multimedia-beyond best effort service-secluding and policing Mechanisms-integrated services-differentiated Services-RSVP.

OUTCOMES:
Upon Completion of the course, the students will be able to
- Design an application with error–control.
- Use compression and decompression techniques.
- Apply the concepts of multimedia communication.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
The student should be made to:
- Expose the criteria for test cases.
- Learn the design of test cases.
- Be familiar with test management and test automation techniques.
- Be exposed to test metrics and measurements.

UNIT I  INTRODUCTION

UNIT II  TEST CASE DESIGN

UNIT III  LEVELS OF TESTING

UNIT IV  TEST AMANAGEMENT

UNIT V  TEST AUTOMATION

TOTAL: 45 PERIODS

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

REFERENCES:

IT6005 DIGITAL IMAGE PROCESSING L T P C 3 0 0 3

OBJECTIVES:
The student should be made to:
- Learn digital image fundamentals
- Be exposed to simple image processing techniques
- Be familiar with image compression and segmentation techniques
- Learn to represent image in form of features

UNIT I DIGITAL IMAGE FUNDAMENTALS 8

UNIT II IMAGE ENHANCEMENT 10

UNIT III IMAGE RESTORATION AND SEGMENTATION 9

UNIT IV WAVELETS AND IMAGE COMPRESSION 9

UNIT V IMAGE REPRESENTATION AND RECOGNITION 9

TOTAL: 45 PERIODS
OUTCOMES:
Upon successful completion of this course, students will be able to:
- Discuss digital image fundamentals
- Apply image enhancement and restoration techniques
- Use image compression and segmentation Techniques
- Represent features of images

TEXT BOOK:

REFERENCES:

CS6003 AD HOC AND SENSOR NETWORKS L T P C 3 0 0 3

OBJECTIVES:
The student should be made to:
- Understand the design issues in ad hoc and sensor networks.
- Learn the different types of MAC protocols.
- Be familiar with different types of adhoc routing protocols.
- Be expose to the TCP issues in adhoc networks.
- Learn the architecture and protocols of wireless sensor networks..

UNIT I INTRODUCTION 9

UNIT II MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS 9
Issues in designing a MAC Protocol- Classification of MAC Protocols- Contention based protocols- Contention based protocols with Reservation Mechanisms- Contention based protocols with Scheduling Mechanisms – Multi channel MAC-IEEE 802.11

UNIT III ROUTING PROTOCOLS AND TRANSPORT LAYER IN AD HOC WIRELESS NETWORKS 9
Issues in designing a routing and Transport Layer protocol for Ad hoc networks- proactive routing, reactive routing (on-demand), hybrid routing- Classification of Transport Layer solutions-TCP over Ad hoc wireless Networks.
UNIT IV   WIRELESS SENSOR NETWORKS (WSNS) AND MAC PROTOCOLS  
single node architecture: hardware and software components of a sensor node - WSN Network architecture: typical network architectures-data relaying and aggregation strategies -MAC layer protocols: self-organizing, Hybrid TDMA/FDMA and CSMA based MAC- IEEE 802.15.4.  

UNIT V   WSN ROUTING, LOCALIZATION & QOS  

TOTAL: 45 PERIODS  

OUTCOMES: 
Upon completion of the course, the student should be able to:  
- Explain the concepts, network architectures and applications of ad hoc and wireless sensor networks.  
- Analyze the protocol design issues of ad hoc and sensor networks.  
- Design routing protocols for ad hoc and wireless sensor networks with respect to some protocol design issues.  
- Evaluate the QoS related performance measurements of ad hoc and sensor networks.  

TEXT BOOK:  

REFERENCES:  

IT6006   DATA ANALYTICS  

OBJECTIVES:  
The Student should be made to:  
- Be exposed to big data  
- Learn the different ways of Data Analysis  
- Be familiar with data streams  
- Learn the mining and clustering  
- Be familiar with the visualization  

UNIT I   INTRODUCTION TO BIG DATA  
UNIT II DATA ANALYSIS

UNIT III MINING DATA STREAMS

UNIT IV FREQUENT ITEMSETS AND CLUSTERING

UNIT V FRAMEWORKS AND VISUALIZATION
MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications:

OUTCOMES:
The student should be made to:
- Apply the statistical analysis methods.
- Compare and contrast various soft computing frameworks.
- Design distributed file systems.
- Apply Stream data model.
- Use Visualisation techniques

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
The student should be made to:
- Be exposed to the context and operation of free and open source software (FOSS) communities and associated software projects.
- Be familiar with participating in a FOSS project
- Learn scripting language like Python or Perl
- Learn programming language like Ruby
- Learn some important FOSS tools and techniques

UNIT I  PHILOSOPHY

UNIT II  LINUX

UNIT III  PROGRAMMING LANGUAGES
Programming using languages like Python or Perl or Ruby

UNIT IV  PROGRAMMING TOOLS AND TECHNIQUES
Usage of design Tools like Argo UML or equivalent, Version Control Systems like Git or equivalent, – Bug Tracking Systems- Package Management Systems

UNIT V  FOSS CASE STUDIES
Open Source Software Development - Case Study – Libreoffice -Samba

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student should be able to:
- Install and run open-source operating systems.
- Gather information about Free and Open Source Software projects from software releases and from sites on the internet.
- Build and modify one or more Free and Open Source Software packages.
- Use a version control system.
- Contribute software to and interact with Free and Open Source Software development projects.

TEXT BOOK:

REFERENCES:
OBJECTIVES:
The student should be made to:
- Learn the basics of socket programming using TCP Sockets.
- Learn about Socket Options.
- Learn to develop Macros for including Objects In MIB Structure.
- Understand SNMPv1, v2 and v3 protocols & practical issues.

UNIT I  SOCKETS AND APPLICATION DEVELOPMENT
Introduction to Socket Programming - System Calls - Address conversion functions - POSIX Signal Handling - Server with multiple clients - Boundary conditions - Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown - I/O Multiplexing - I/O Models -TCP echo client/server with I/O Multiplexing

UNIT II  SOCKET OPTIONS
Socket options - getsockopt and setsockopt functions - Generic socket options - IP socket options - ICMP socket options - TCP socket options - Multiplexing TCP and UDP sockets - SCTP Sockets - SCTP Client/server - Streaming Example - Domain name system - gethostbyname, gethostbyaddr, getservbyname and getservbyport functions - Protocol Independent functions in TCP Client/Server Scenario

UNIT III  ADVANCED SOCKETS
IPv4 and IPv6 interoperability - Threaded servers - Thread creation and termination - TCP echo server using threads - Mutex - Condition variables - Raw sockets - Raw socket creation - Raw socket output - Raw socket input - ping program - traceroute program

UNIT IV  SIMPLE NETWORK MANAGEMENT

UNIT V  SNMP V2, V3 AND RMON
Introduction to SNMPv2 - SMI for SNMPv2 - Protocol - SNMPv3 - Architecture and applications - Security and access control model - Overview of RMON.

OUTCOMES:
Upon completion of the course, the student should be able to:
- Develop programs using TCP Sockets.
- Use Socket Options.
- Develop Macros for including Objects In MIB Structure.
- Use SNMPv1, v2 and v3 protocols.

TEXT BOOKS:

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

UNIT I  HUMAN VALUES  10
Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for
others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation –
Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and
meditation for professional excellence and stress management.

UNIT II  ENGINEERING ETHICS  9
Autonomy – Kohlberg’s theory – Gilligan’s theory – Consensus and Controversy – Models of
professional roles – Theories about right action – Self-interest – Customs and Religion – Uses of
Ethical Theories

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

UNIT IV  SAFETY, RESPONSIBILITIES AND RIGHTS  9
Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk -
Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational

UNIT V  GLOBAL ISSUES  8
Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors –
Moral Leadership –Code of Conduct – Corporate Social Responsibility

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

TEXTBOOKS:
   Delhi, 2004.

REFERENCES:
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, “Engineering Ethics – Concepts and
   Cases”, Cengage Learning, 2009
5. Laura P. Hartman and Joe Desjardins, “Business Ethics: Decision Making for Personal Integrity
OBJECTIVES:
The student should be made to:
- Understand various Computing models like Finite State Machine, Pushdown Automata, and Turing Machine.
- Be aware of Decidability and Un-decidability of various problems.
- Learn types of grammars

UNIT I FINITE AUTOMATA

UNIT II GRAMMARS

UNIT III PUSHDOWN AUTOMATA

UNIT IV TURING MACHINES
Definitions of Turing machines – Models – Computable languages and functions –Techniques for Turing machine construction – Multi head and Multi tape Turing Machines - The Halting problem – Partial Solvability – Problems about Turing machine- Chomskian hierarchy of languages.

UNIT V UNSOLVABLE PROBLEMS AND COMPUTABLE FUNCTIONS
Unsolvable Problems and Computable Functions – Primitive recursive functions – Recursive and recursively enumerable languages – Universal Turing machine. MEASURING AND CLASSIFYING COMPLEXITY: Tractable and Intractable problems- Tractable and possibly intractable problems - P and NP completeness - Polynomial time reductions.

OUTCOMES:
At the end of the course, the student should be able to:
- Design Finite State Machine, Pushdown Automata, and Turing Machine.
- Explain the Decidability or Undecidability of various problems
TEXT BOOKS:

REFERENCES:

IT6009 WEB ENGINEERING

OBJECTIVES:
The student should be made to:
- Understand the characteristics of web applications
- Learn to Model web applications
- Be aware of Systematic methods
- Be familiar with the testing techniques for web applications

UNIT I INTRODUCTION TO WEB ENGINEERING AND REQUIREMENTS ENGINEERING

UNIT II WEB APPLICATION ARCHITECTURES & MODELLING WEB APPLICATIONS

UNIT III WEB APPLICATION DESIGN
UNIT IV TESTING WEB APPLICATIONS

UNIT V WEB PROJECT MANAGEMENT
Understanding Scope, Refining Framework Activities, Building a Web Team, Managing Risk, Developing a Schedule, Managing Quality, Managing Change, Tracking the Project. Introduction to node JS - web sockets.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student should be able to:
- Apply the characteristics of web applications.
- Model web applications.
- Design web applications.
- Test web applications.

TEXT BOOKS:

REFERENCES:

GE6083 DISASTER MANAGEMENT L T P C
3 0 0 3

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

UNIT I INTRODUCTION TO DISASTERS 9
Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don’ts during various types of Disasters.
UNIT II  APPROACHES TO DISASTER RISK REDUCTION (DRR)  9
Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake-holders- Institutional Processes and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT III  INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT  9
Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT IV  DISASTER RISK MANAGEMENT IN INDIA  9
Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

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

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

TOTAL: 45 PERIODS

TEXTBOOK:

REFERENCES
1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
OBJECTIVES:
The student should be made to:
- Exposed to the need for Bioinformatics technologies.
- Be familiar with the modeling techniques.
- Learn microarray analysis.
- Exposed to Pattern Matching and Visualization.

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
Bioinformatics data – Data warehousing architecture – data quality – Biomedical data analysis – DNA data analysis – Protein data analysis – Machine learning – Neural network architecture and applications in bioinformatics.

UNIT III  MODELING FOR BIOINFORMATICS

UNIT IV  PATTERN MATCHING AND VISUALIZATION

UNIT V  MICROARRAY ANALYSIS

TOTAL: 45 PERIODS

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

TEXT BOOK:

REFERENCES:
OBJECTIONS:
The student should be made to:
- Learn the security issues network layer and transport layer.
- Be exposed to security issues of the application layer.
- Learn computer forensics.
- Be familiar with forensics tools.
- Learn to analyze and validate forensics data.

UNIT I  NETWORK LAYER SECURITY & TRANSPORT LAYER SECURITY

UNIT II  E-MAIL SECURITY & FIREWALLS
PGP - S/MIME - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions.

UNIT III  INTRODUCTION TO COMPUTER FORENSICS

UNIT IV  EVIDENCE COLLECTION AND FORENSICS TOOLS

UNIT V  ANALYSIS AND VALIDATION

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student should be able to:
- Discuss the security issues network layer and transport layer.
- Apply security principles in the application layer.
- Explain computer forensics.
- Use forensics tools.
- Analyze and validate forensics data.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
The student should be made to:
- Be familiar with the most fundamental Graph Theory topics and results.
- Be exposed to the techniques of proofs and analysis.

UNIT I  INTRODUCTION

UNIT II  TREES, CONNECTIVITY & PLANARITY

UNIT III  MATRICES, COLOURING AND DIRECTED GRAPH

UNIT IV  PERMUTATIONS & COMBINATIONS

UNIT V  GENERATING FUNCTIONS

OUTCOMES:
Upon Completion of the course, the students should be able to:
- Write precise and accurate mathematical definitions of objects in graph theory.
- Use mathematical definitions to identify and construct examples and to distinguish examples from non-examples.
- Validate and critically assess a mathematical proof.
- Use a combination of theoretical knowledge and independent mathematical thinking in creative investigation of questions in graph theory.
- Reason from definitions to construct mathematical proofs.

TEXT BOOKS:
REFERENCES:

CS6010 SOCIAL NETWORK ANALYSIS L T P C
3 0 0 3

OBJECTIVES:
The student should be made to:
- Understand the concept of semantic web and related applications.
- Learn knowledge representation using ontology.
- Understand human behaviour in social web and related communities
- Learn visualization of social networks.

UNIT I INTRODUCTION

UNIT II MODELLING, AGGREGATING AND KNOWLEDGE REPRESENTATION

UNIT III EXTRACTION AND MINING COMMUNITIES IN WEB SOCIAL NETWORKS

UNIT IV PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES
UNIT V  VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS


TOTAL: 45 PERIODS

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

TEXT BOOKS:

REFERENCES:

IT6010  BUSINESS INTELLIGENCE

OBJECTIVES:
The student should be made to:
- Be exposed with the basic rudiments of business intelligence system
- understand the modeling aspects behind Business Intelligence
- understand of the business intelligence life cycle and the techniques used in it
- Be exposed with different data analysis tools and techniques

UNIT I  BUSINESS INTELLIGENCE

UNIT II  KNOWLEDGE DELIVERY
The business intelligence user types, Standard reports, Interactive Analysis and Ad Hoc Querying, Parameterized Reports and Self-Service Reporting, dimensional analysis, Alerts/Notifications, Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards, Geographic Visualization, Integrated Analytics, Considerations: Optimizing the Presentation for the Right Message.
UNIT III  EFFICIENCY
Efficiency measures – The CCR model: Definition of target objectives- Peer groups – Identification of
good operating practices; cross efficiency analysis – virtual inputs and outputs – Other models.
Pattern matching – cluster analysis, outlier analysis

UNIT IV  BUSINESS INTELLIGENCE APPLICATIONS
Marketing models – Logistic and Production models – Case studies.

UNIT V  FUTURE OF BUSINESS INTELLIGENCE
Future of business intelligence – Emerging Technologies, Machine Learning, Predicting the Future, BI

OUTCOMES:
At the end of the course the students will be able to
• Explain the fundamentals of business intelligence.
• Link data mining with business intelligence.
• Apply various modeling techniques.
• Explain the data analysis and knowledge delivery stages.
• Apply business intelligence methods to various situations.
• Decide on appropriate technique.

TEXT BOOK:
1. Efraim Turban, Ramesh Sharda, Dursun Delen, “Decision Support and Business Intelligence

REFERENCES:
2. Larissa T. Moss, S. Atre, “Business Intelligence Roadmap: The Complete Project Lifecycle of
3. Carlo Vercellis, “Business Intelligence: Data Mining and Optimization for Decision Making”, Wiley
5. Cindi Howson, “Successful Business Intelligence: Secrets to Making BI a Killer App”, McGraw-

CS6013  FOUNDATION SKILLS IN INTEGRATED PRODUCT DEVELOPMENT

OBJECTIVE:
This program can be offered with all Undergraduate programs/courses for all engineering
streams. The FSIPD program aims to improve student's awareness and understanding of the basic
concepts involved in Integrated product Development (IPD) by providing exposure to the key
product development concepts. Students, who complete this program, will stand a better
chance to be considered for jobs in the Engineering industry.

COURSE OBJECTIVES:
After completing this program, the student will be able to obtain the technical skills needed to
effectively play the entry level design engineer role in an engineering organization.
The student will be able to:
- Understand the global trends and development methodologies of various types of products and services
- Conceptualize, prototype and develop product management plan for a new product based on the type of the new product and development methodology integrating the hardware, software, controls, electronics and mechanical systems
- Understand requirement engineering and know how to collect, analyze and arrive at requirements for new product development and convert them into design specification
- Understand system modeling for system, sub-system and their interfaces and arrive at the optimum system specification and characteristics
- Gain knowledge of the Innovation & Product Development process in the Business Context

UNIT I  FUNDAMENTALS OF PRODUCT DEVELOPMENT  9

UNIT II  REQUIREMENTS AND SYSTEM DESIGN  9

UNIT III  DESIGN AND TESTING  9

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

UNIT V  BUSINESS DYNAMICS ENGINEERING SERVICES INDUSTRY  9

TOTAL: 45 PERIODS
COURSE OUTCOMES:
The students will be able to
- Define, formulate and analyze a problem
- Solve specific problems independently or as part of a team
- Develop documentation, test specifications and coordinate with various teams to validate and sustain up to the EoL (End of Life) support activities for engineering customer
- Work independently as well as in teams
- Manage a project from start to finish

COURSE MATERIAL AND PEDAGOGY:
- NASSCOM has agreed to prepare / revise the course materials [selected teachers Anna University from major disciplines will be included in the process] as PPT slides for all the UNITS. The PPTs can be printed and given to each student if necessary at a Nominal Fee. This is the best possible material for this special course.
- NASSCOM will train the teachers of Anna University to enable them to teach this course. A training programme for nearly 3500 teachers needs to be organized. The team is exploring use of technology including the EDUSAT facility at Anna University.
- The course is to be offered as an elective to all UG Students both in the Constituent Colleges and Affiliated colleges of Anna University.

TEXT BOOKS [INDIAN ECONOMY EDITIONS]:

REFERENCES:

IT6011 KNOWLEDGE MANAGEMENT L T P C 3 0 0 3

OBJECTIVES:
The student should be made to:
- Learn the Evolution of Knowledge management.
- Be familiar with tools.
- Be exposed to Applications.
- Be familiar with some case studies.
UNIT I  INTRODUCTION
Introduction: An Introduction to Knowledge Management - The foundations of knowledge management- including cultural issues- technology applications organizational concepts and processes- management aspects- and decision support systems. The Evolution of Knowledge management: From Information Management to Knowledge Management - Key Challenges Facing the Evolution of Knowledge Management - Ethics for Knowledge Management.

UNIT II  CREATING THE CULTURE OF LEARNING AND KNOWLEDGE SHARING

UNIT III  KNOWLEDGE MANAGEMENT-THE TOOLS
Telecommunications and Networks in Knowledge Management - Internet Search Engines and Knowledge Management - Information Technology in Support of Knowledge Management - Knowledge Management and Vocabulary Control - Information Mapping in Information Retrieval - Information Coding in the Internet Environment - Repackaging Information.

UNIT IV  KNOWLEDGEMANAGEMENT-APPLICATION
Components of a Knowledge Strategy - Case Studies (From Library to Knowledge Center, Knowledge Management in the Health Sciences, Knowledge Management in Developing Countries).

UNIT V  FUTURE TRENDS AND CASE STUDIES
Advanced topics and case studies in knowledge management - Development of a knowledge management map/plan that is integrated with an organization's strategic and business plan - A case study on Corporate Memories for supporting various aspects in the process life -cycles of an organization.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student should be able to:
- Use the knowledge management tools.
- Develop knowledge management Applications.
- Design and develop enterprise applications.

TEXT BOOK:

REFERENCE:
OBJECTIVES:
The student should be made to:

- Understand the IP addressing schemes.
- Understand the fundamentals of network design and implementation
- Understand the design and implementation of TCP/IP networks
- Understand on network management issues
- Learn to design and implement network applications.

UNIT I INTRODUCTION

UNIT II TCP

UNIT III IP IMPLEMENTATION
IP global software organization – routing table – routing algorithms – fragmentation and reassembly – error processing (ICMP) – Multicast Processing (IGMP).

UNIT IV TCP IMPLEMENTATION I
Data structure and input processing – transmission control blocks – segment format – comparision– finite state machine implementation – Output processing – mutual exclusion – computing the TCP Data length.

UNIT V TCP IMPLEMENTATION II

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

- Design and implement TCP/IP networks.
- Explain network management issues.
- Design and implement network applications.
- Develop data structures for basic protocol functions of TCP/IP.
- Apply the members in the respective structures.
- Design and implement data structures for maintaining multiple local and global timers.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
OBJECTIVES:
The student should be made to:
- Learn the foundations of Human Computer Interaction
- Be familiar with the design technologies for individuals and persons with disabilities
- Be aware of mobile HCI
- Learn the guidelines for user interface.

UNIT I FOUNDATIONS OF HCI

UNIT II DESIGN & SOFTWARE PROCESS

UNIT III MODELS AND THEORIES
Cognitive models –Socio-Organizational issues and stake holder requirements –Communication and collaboration models-Hypertext, Multimedia and WWW.

UNIT IV MOBILE HCI

UNIT V WEB INTERFACE DESIGN

OUTCOMES:
Upon completion of the course, the student should be able to:
- Design effective dialog for HCI.
- Design effective HCI for individuals and persons with disabilities.
- Assess the importance of user feedback.
- Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.
- Develop meaningful user interface.

TEXT BOOKS:
OBJECTIVES:
The student should be made to:
- Understand the basic tenets of software quality and quality factors.
- Be exposed to the Software Quality Assurance (SQA) architecture and the details of SQA components.
- Understand of how the SQA components can be integrated into the project life cycle.
- Be familiar with the software quality infrastructure.
- Be exposed to the management components of software quality.

UNIT I INTRODUCTION TO SOFTWARE QUALITY & ARCHITECTURE 9

UNIT II SQA COMPONENTS AND PROJECT LIFE CYCLE 9

UNIT III SOFTWARE QUALITY INFRASTRUCTURE 9
Procedures and work instructions - Templates - Checklists – 3S developmenting - Staff training and certification Corrective and preventive actions – Configuration management – Software change control – Configuration management audit -Documentation control – Storage and retrieval.

UNIT IV SOFTWARE QUALITY MANAGEMENT & METRICS 9

UNIT V STANDARDS, CERTIFICATIONS & ASSESSMENTS 9

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course the students will be able to:
- Utilize the concepts in software development life cycle.
- Demonstrate their capability to adopt quality standards.
- Assess the quality of software product.
- Apply the concepts in preparing the quality plan & documents.
TEXT BOOK:

REFERENCES:

MG6088 SOFTWARE PROJECT MANAGEMENT L T P C 3 0 0 3

OBJECTIVES:
- To outline the need for Software Project Management
- To highlight different techniques for software cost estimation and activity planning.

UNIT I PROJECT EVALUATION AND PROJECT PLANNING 9

UNIT II PROJECT LIFE CYCLE AND EFFORT ESTIMATION 9

UNIT III ACTIVITY PLANNING AND RISK MANAGEMENT 9

UNIT IV PROJECT MANAGEMENT AND CONTROL 9

UNIT V STAFFING IN SOFTWARE PROJECTS 9

TOTAL: 45 PERIODS

OUTCOMES:
- At the end of the course the students will be able to practice Project Management principles while developing a software.
TEXTBOOK:

REFERENCES: