### ANNA UNIVERSITY, CHENNAI
### AFFILIATED INSTITUTIONS
### R-2013
### B.E. COMPUTER AND COMMUNICATION ENGINEERING
### I TO VIII SEMESTER CURRICULUM AND SYLLABUS

#### SEMESTER I

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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

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

UNIT II

Listening - Listening and responding to video lectures / talks; Speaking - Describing a simple process (filling a form, etc.) - Asking 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 - Reading exercises with sample telephone conversations / lectures – Picture-based activities.

UNIT III

Listening - Listening to specific task - focused audio tracks; Speaking - Role-play – Simulation - Group interaction - Speaking in formal situations (teachers, officials, foreigners); Reading - Reading and interpreting visual material; Writing - Jumbled sentences - Coherence and cohesion in writing - Channel conversion (flowchart into process) - Types of paragraph (cause 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 IV

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

Listening - Listening to different accents, Listening to Speeches/Presentations, Listening to broadcast 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

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

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 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 9
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

UNIT V   PHOTONICS AND FIBRE OPTICS

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. Searls and Zemansky. University Physics, 2009

CY6151   ENGINEERING CHEMISTRY - I   L T P C
            3 0 0 3

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
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
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 isocho(re) problems.

UNIT III PHOTOCHEMISTRY AND SPECTROSCOPY

UNIT IV PHASE RULE AND ALLOYS

UNIT V NANO CHEMISTRY
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            L  T  P  C
                                        3  0  0  3

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 exposed to 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          8

UNIT II  C PROGRAMMING BASICS  10

UNIT III ARRAYS AND STRINGS   9

UNIT IV  FUNCTIONS AND POINTERS 9

UNIT V   STRUCTURES AND UNIONS 9
Introduction – need for structure data type – structure definition – Structure declaration – Structure within a structure - Union - Programs using structures and Unions – Storage classes, Pre-processor directives.

TOTAL: 45 PERIODS

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 ENGGINEERING GRAPHICS L T P C
2 0 3 4

OBJECTIVES:
- To develop in students, graphic skills for communication of concepts, ideas and design of Engineering products
- 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 5+9
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  
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.
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.

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
IV  ELECTRONICS ENGINEERING PRACTICE  13

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.

REFERENCES:

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

GE6163
PHYSICS AND CHEMISTRY LABORATORY – I

PHYSICS 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

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.

LIST OF EXPERIMENTS
(Any FIVE Experiments)

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).
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, percelain tile, dropper (each 30 Nos.)

HS6251 TECHNICAL ENGLISH II

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
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
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
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
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
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 PERIODS

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.

TEXT BOOKS:
1. Department of English, Anna University. Mindscapes: English for Technologists and Engineers.
   Orient Blackswan, Chennai. 2012
   Orient Blackswan, Chennai. 2011

REFERENCES:
   Delhi. 2008
4. Sharma, Sangeetha & Binod Mishra. Communication Skills for Engineers and Scientists. PHI
   Learning, New Delhi. 2009
   USA. 2007

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 the 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 9+3
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 paralleloipeds.

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
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: \(w = z+k, kz, 1/z, z^2, e^z\) and bilinear transformation.

UNIT V  COMPLEX INTEGRATION
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).

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:

PH6251  ENGINEERING PHYSICS – II

OBJECTIVE:
- 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 Tc superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.

UNIT IV DIELECTRIC MATERIALS


UNIT V ADVANCED ENGINEERING MATERIALS


TOTAL:45 PERIODS

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:

CY6251 ENGINEERING CHEMISTRY-II

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

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:
CS6202 PROGRAMMING AND DATA STRUCTURES - I

OBJECTIVES:
- To introduce the basics of C programming language
- To introduce the concepts of ADTs
- To introduce the concepts of Hashing and Sorting

UNIT I C PROGRAMMING FUNDAMENTALS - A REVIEW
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
Structures and Unions - File handling concepts – File read – write – binary and Stdio - File Manipulations

UNIT III LINEAR DATA STRUCTURES – LIST
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

EXT BOOKS:

REFERENCES:

EC6202 ELECTRONIC DEVICES AND CIRCUITS

OBJECTIVES:
The student should be made to:
- Be familiar with the structure of basic electronic devices.
- Be exposed to the operation and applications of electronic devices

UNIT I PN JUNCTION DEVICES
PN junction diode –structure, operation and V-I characteristics, diffusion and transient capacitance - Rectifiers – Half Wave and Full Wave Rectifier, Display devices- LED, Laser diodes, Zener diode- characteristics-Zener Reverse characteristics – Zener as regulator
UNIT II TRANSISTORS
BJT, JFET, MOSFET - structure, Operation, characteristics and Biasing UJT, Thyristor and IGBT - Structure and characteristics.

UNIT III AMPLIFIERS
BJT small signal model – Analysis of CE, CB, CC amplifiers - Gain and frequency response – MOSFET small signal model – Analysis of CS and Source follower – Gain and frequency response – High frequency analysis.

UNIT IV MULTISTAGE AMPLIFIERS AND DIFFERENTIAL AMPLIFIER
BIMOS cascade amplifier, Differential amplifier – Common mode and Difference mode analysis – FET input stages – Single tuned amplifiers – Gain and frequency response – Neutralization methods, power amplifiers – Types (Qualitative analysis).

UNIT V FEEDBACK AMPLIFIERS AND OSCILLATORS

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

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

- Explain the structure of basic electronic devices.
- Design applications using basic electronic devices

TEXT BOOKS:

REFERENCES:
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. 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
6. Determination of Rigidity modulus – Torsion pendulum

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

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.

LIST OF EXPERIMENTS
(Any FIVE Experiments)
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 BaCl\textsubscript{2} and Na\textsubscript{2}SO\textsubscript{4}

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 EXPERIMENTS

2. Design RL and RC circuits
3. Learn the characteristics of basic electronic devices

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, porcelain tile, dropper (30 Nos each)

EC6211 CIRCUITS AND DEVICES LABORATORY

OBJECTIVES:
The student should be made to:
• Be exposed to the characteristics of basic electronic devices
• Be exposed to RL and RC circuits
• Be familiar with Thevinin & Norton theorem KVL & KCL, and Super Position Theorems

LIST OF EXPERIMENTS
1. Characteristics of PN Junction Diode
2. Zener diode Characteristics & Regulator using Zener diode
3. Common Emitter input-output Characteristics
4. Common Base input-output Characteristics
5. FET Characteristics
6. SCR Characteristics
7. Clipper and Clamper & FWR
8. Verifications Of Thevinin & Norton theorem
9. Verifications Of KVL & KCL
10. Verifications Of Super Position Theorem
11. verifications of maximum power transfer & reciprocity theorem
12. Determination Of Resonance Frequency of Series & Parallel RLC Circuits
13. Transient analysis of RL and RC circuits

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
• Learn the characteristics of basic electronic devices
• Design RL and RC circuits
• Verify Thevinin & Norton theorem KVL & KCL, and Super Position Theorems
LABORATORY REQUIREMENTS

1. BC 107, BC 148, 2N2646, BFW10 - 25 each
2. 1N4007, Zener diodes - 25 each
3. Resistors, Capacitors, Inductors - sufficient quantities
4. Bread Boards - 15 Nos
5. CRO (30MHz) – 10 Nos.
6. Function Generators (3MHz) – 10 Nos.
7. Dual Regulated Power Supplies (0 – 30V) – 10 Nos.

CS6212 PROGRAMMING AND DATA STRUCTURES LABORATORY I

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 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 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

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:

CO6301  DIGITAL ELECTRONICS AND COMPUTER ARCHITECTURE  L T P C
3 1 0 4

OBJECTIVES:
The student should be made to:
• Learn the various number systems.
• Understand the various logic gates.
• Be familiar with various combinational circuits.
• Understand the various components used in the design of digital computers.
• Understand arithmetic algorithms.
UNIT I  DIGITAL FUNDAMENTALS  9
Number systems and conversions – Boolean algebra and simplification – Minimization of Boolean functions – Karnaugh map – Logic gates – NAND-NOR implementation.

UNIT II  COMBINATIONAL AND SEQUENTIAL CIRCUITS  9

UNIT III  BASIC STRUCTURE OF COMPUTERS  9
Functional units – Basic operational concepts – Instruction set architecture – Hardware/Software Interface – Addressing modes – RISC – CISC - Performance metrics - ALU design – multiplier and divider circuits.

UNIT IV  PROCESSOR DESIGN  9

UNIT V  MEMORY AND I/O SYSTEMS  9

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

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.
• Analyze a given digital circuit – combinational and sequential.
• Identify different functional units in a digital computer system.
• Trace execution of instruction sequence in a processor.
• Explain the implementation of each functional unit.

TEXT BOOKS:

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

UNIT I  ANALOG COMMUNICATION 9

UNIT II  DIGITAL COMMUNICATION 9

UNIT III  DATA AND PULSE COMMUNICATION 9

UNIT IV  SOURCE AND ERROR CONTROL CODING 9
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

UNIT V  MULTI-USER RADIO COMMUNICATION 9
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:

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 expose the students to SQL.
- To make the students to understand the fundamentals of 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 10

UNIT II SQL & QUERY OPTIMIZATION 8

UNIT III TRANSACTION PROCESSING AND CONCURRENCY CONTROL 8

UNIT IV TRENDS IN DATABASE TECHNOLOGY 10
UNIT V ADVANCED TOPICS


TOTAL: 45 PERIODS

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:

CS6402 DESIGN AND ANALYSIS OF ALGORITHMS L T P C
3 0 0 3

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  9

UNIT III  DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE  9

UNIT IV  ITERATIVE IMPROVEMENT  9

UNIT V  COPING WITH THE LIMITATIONS OF ALGORITHM POWER  9

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:

4. http://nptel.ac.in/
UNIT I
OBJECT ORIENTED PROGRAMMING FUNDAMENTALS
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
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

UNIT IV
ADVANCED NON-LINEAR DATA STRUCTURES

UNIT V
GRAPHS

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:
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.

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 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

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.

REFERENCE:
spoken-tutorial.org

LIST OF EQUIPMENTS 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
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

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.

REFERENCE:
spoken-tutorial.org.

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 the necessary basic concepts in probability and random processes for applications such as random signals, linear systems etc. in communications engineering.

UNIT I  RANDOM VARIABLES  9+3
Discrete and Continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, 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
Classification – Stationary process – Markov process - Poisson process – Random telegraph process.

UNIT IV  CORRELATION AND SPECTRAL DENSITIES  9+3

UNIT V  LINEAR SYSTEMS WITH RANDOM INPUTS  9+3
Linear time invariant system – System transfer function – Linear systems with random inputs – Auto-correlation and Cross-correlation functions of input and output.

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

OUTCOMES:
- The students will have an exposure of various distribution functions and help in acquiring skills in handling situations involving more than one variable.
- Able to analyze the response of random inputs to linear time invariant systems.

TEXT BOOKS:

REFERENCES:
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  9
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  9
Media access control - Ethernet (802.3) - Wireless LANs – 802.11 – Bluetooth - Switching and bridging – Basic Internetworking (IP, CIDR, ARP, DHCP,ICMP )

UNIT III  ROUTING  9
Routing (RIP, OSPF, metrics) – Switch basics – Global Internet (Areas, BGP, IPv6), Multicast – addresses – multicast routing (DVMRP, PIM)

UNIT IV  TRANSPORT LAYER  9
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  9
Traditional applications -Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web Services – DNS - SNMP

TOTAL: 45 PERIODS

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

TEXT BOOK:

REFERENCES:
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:

- Design various Scheduling algorithms
- Apply the principles of concurrency
- Design deadlock, prevention and avoidance algorithms.
- Compare and contrast various memory management schemes
- Design and Implement a prototype file systems
- Perform administrative tasks on Linux Servers

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

EC6303 SIGNALS AND SYSTEMS L T P C
3 1 0 4

OBJECTIVES:
- To understand the basic properties of signal & systems and the various methods of classification
- To learn Laplace Transform & Fourier transform and their properties
- To know Z transform & DTFT and their properties
- To characterize LTI systems in the Time domain and various Transform domains

UNIT I CLASSIFICATION OF SIGNALS AND SYSTEMS
Continuous time signals (CT signals) - Discrete time signals (DT signals) - Step, Ramp, Pulse, Impulse, Sinusoidal, Exponential, Classification of CT and DT signals - Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals - CT systems and DT systems- Classification of systems – Static & Dynamic, Linear & Nonlinear, Time-variant & Time-invariant, Causal & Noncausal, Stable & Unstable.

UNIT II ANALYSIS OF CONTINUOUS TIME SIGNALS
Fourier series analysis-spectrum of Continuous Time (CT) signals- Fourier and Laplace Transforms in CT Signal Analysis - Properties.

UNIT III LINEAR TIME INVARIANT- CONTINUOUS TIME SYSTEMS
Differential Equation-Block diagram representation-impulse response, convolution integrals-Fourier and Laplace transforms in Analysis of CT systems

UNIT IV ANALYSIS OF DISCRETE TIME SIGNALS
Baseband Sampling - DTFT – Properties of DTFT - Z Transform – Properties of Z Transform

UNIT V LINEAR TIME INVARIANT-DISCRETE TIME SYSTEMS
Difference Equations-Block diagram representation-Impulse response - Convolution sum- Discrete Fourier and Z Transform Analysis of Recursive & Non-Recursive systems

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

OUTCOMES:
Upon the completion of the course, students will be able to:
- Analyze the properties of signals & systems
- Apply Laplace transform, Fourier transform, Z transform and DTFT in signal analysis
- Analyze continuous time LTI systems using Fourier and Laplace Transforms
- Analyze discrete time LTI systems using Z transform and DTFT
TEXT BOOK:

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

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  12
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  10
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

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 :
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

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

REFERENCE:
spoken-tutorial.org.

LIST OF EQUIPMENT 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:
- 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

TOTAL: 45 PERIODS

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

LIST OF 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
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 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

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

REFERENCE:
spoken-tutorial.org

LIST OF 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.
OBJECTIVES:
- To extend student’s Logical and Mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.

UNIT I LOGIC AND PROOFS 9+3

UNIT II COMBINATORICS 9+3

UNIT III GRAPHS 9+3
Graphs and graph models – Graph terminology and special types of graphs – Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamilton paths.

UNIT IV ALGEBRAIC STRUCTURES 9+3

UNIT V LATTICES AND BOOLEAN ALGEBRA 9+3

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

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

TEXT BOOKS:

REFERENCES:
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

UNIT II  CELLULAR ARCHITECTURE
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
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
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
MIMO systems – spatial multiplexing -System model -Pre-coding - Beam forming - transmitter diversity, receiver diversity- Channel state information-capacity in fading and non-fading channels.

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:

CO6501 JAVA AND INTERNET PROGRAMMING L T P C
4 0 0 4

OBJECTIVES:
The student should be made to:
- Learn Java Programming.
- Understand different Internet Technologies.
- Be familiar with client – side programming and server – side programming.
- Learn to develop web applications.

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

UNIT II INTERNET BASICS AND JAVA NETWORK PROGRAMMING

UNIT III CLIENT-SIDE PROGRAMMING

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

UNIT V WEB APPLICATION DEVELOPMENT

TOTAL: 60 PERIODS
OUTCOMES:
At the end of the course, the student should be able to:
• Implement Java programs.
• Create a basic website using HTML and Cascading Style Sheets.
• Design and implement dynamic web page with validation using JavaScript objects and by applying different event handling mechanisms.
• Design rich client presentation using AJAX.
• Design and implement simple web page in PHP, and to present data in XML format.
• Design and implement server side programs using Servlets and JSP.

TEXT BOOKS:

REFERENCES:

IT6502 DIGITAL SIGNAL PROCESSING

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.

56
UNIT IV  FIR FILTER DESIGN  9
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  9
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:

CS6403  SOFTWARE ENGINEERING  L T P C
3 0 0 3

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  9

UNIT II  REQUIREMENTS ANALYSIS AND SPECIFICATION  9
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 BOOK:

REFERENCES:

CO6502 TELECOMMUNICATION SWITCHING AND NETWORKS

OBJECTIVES:
• To introduce digital multiplexing and digital hierarchy namely SONET / SDH.
• To introduce the concepts of space switching, time switching and combination switching.
• To introduce a mathematical model for the analysis of telecommunication traffic.
• To introduce the need for network synchronization and study synchronization issues.
• To study the enhanced local loop systems in digital environment.
• To introduce ISDN, DSL / ADSL, and fiber optic systems in subscriber loop.
• To introduce statistical modeling of telephone traffic.
UNIT I MULTIPLEXING 9

UNIT II DIGITAL SWITCHING 9
Switching Functions, Space Division Switching, Time Division Switching, two-dimensional Switching: STS Switching, TST Switching, No.4 ESS Toll Switch, Digital Cross-Connect Systems, Digital Switching in an Analog Environment. Elements of SSN07 signaling.

UNIT III NETWORK SYNCHRONIZATION CONTROL AND MANAGEMENT 9

UNIT IV DIGITAL SUBSCRIBER ACCESS 9

UNIT V TRAFFIC ANALYSIS 9

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to
- Have knowledge about the network control and management issues.
- Solve mathematically the telecommunication related problems.
- Have knowledge about the blocking system characteristics and queuing system characteristics.

TEXT BOOK:

REFERENCES:
OBJECTIVES:
The student should be made to:
- To implement Linear and Circular Convolution
- To implement FIR and IIR filters
- To study the architecture of DSP processor
- To demonstrate Finite word length effect

LIST OF EXPERIMENTS:
MATLAB / EQUIVALENT SOFTWARE PACKAGE
1. Generation of sequences (functional & random) & correlation
2. Linear and Circular Convolutions
3. Spectrum Analysis using DFT
4. FIR filter design
5. IIR filter design
6. Multirate Filters
7. Equalization

DSP PROCESSOR BASED IMPLEMENTATION
8. Study of architecture of Digital Signal Processor
9. MAC operation using various addressing modes
10. Linear Convolution
11. Circular Convolution
12. FFT Implementation
13. Waveform generation
14. IIR and FIR Implementation
15. Finite Word Length Effect

TOTAL: 45 PERIODS

OUTCOMES:
Students will be able to
- Carry out simulation of DSP systems
- Demonstrate their abilities towards DSP processor based implementation of DSP systems
- Analyze Finite word length effect on DSP systems
- Demonstrate the applications of FFT to DSP
- Implement adaptive filters for various applications of DSP

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS (2 students per system)

PCs with Fixed / Floating point DSP Processors (Kit / Add-on Cards) 15 Units

List of software required:
MATLAB with Simulink and Signal Processing Tool Box or Equivalent Software in desktop systems -15 Nos
Signal Generators (1MHz) – 15 Nos
CRO (20MHz) -15 Nos
OBJECTIVES:
- Understand how to effectively develop and implement Internet applications.
- Introduce the Java programming language, its syntax, structures and libraries.
- Writing robust, object-oriented console and Graphical User Interface (GUI) applications in Java and familiarity with the Java object-class hierarchy.

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

TOTAL: 45 PERIODS

OUTCOMES:
After completion of the course, the students should be able to:
- To create a static and dynamic web page using HTML, CSS, and Scripting Languages.
- To develop server side program and webpage.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

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

SOFTWARE:
Java, Net Beans, Dream Weaver / Flex / Silver Light / Eclipse or Equivalent, MySQL / Oracle / SQL / PostGress / DB2 or Equivalent / Apache Server / TOMCAT / XAMPP / WAMP.
OBJECTIVES:
- To give insight of the radiation phenomena.
- To give a thorough understanding of the radiation characteristics of different types of antennas.
- To create awareness about the different types of propagation of radio waves at different frequencies.

UNIT I FUNDAMENTALS OF RADIATION

UNIT II APERTURE AND SLOT ANTENNAS

UNIT III ANTENNA ARRAYS
N element linear array, Pattern multiplication, Broadside and End fire array – Concept of Phased arrays, Adaptive array, Basic principle of antenna Synthesis-Binomial array.

UNIT IV SPECIAL ANTENNAS

UNIT V PROPAGATION OF RADIO WAVES
Modes of propagation, Structure of atmosphere, Ground wave propagation, Tropospheric propagation, Duct propagation, Troposcatter propagation, Flat earth and Curved earth concept Sky wave propagation – Virtual height, critical frequency, Maximum usable frequency – Skip distance, Fading, Multi hop propagation.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, students will be able to
- Explain the various types of antennas and wave propagation.
- Write about the radiation from a current element.
- Analyze the antenna arrays, aperture antennas and special antennas such as frequency independent and broad band.

TEXT BOOK:

REFERENCES:
OBJECTIVES:
At the end of the course, the student should be able to:
- Learn the basics of wireless networks and its standards.
- Be familiar with the design issues associated with mobile communication systems.
- Be exposed to the working principles of wireless application protocols.
- Learn the emerging trends on development of various mobile applications.

UNIT I  WIRELESS COMMUNICATION  9
Introduction to wireless communication systems – Cellular Frequency Management and Channel Assignment- mobile antennas- types of handoff and their characteristics, dropped call rates & their evaluation –MAC – SDMA – FDMA –TDMA – CDMA.

UNIT II  WIRELESS NETWORKS  9

UNIT III  MOBILE COMMUNICATION SYSTEMS  9

UNIT IV  MOBILE NETWORK AND TRANSPORT LAYERS  9

UNIT V  APPLICATION LAYER  9

OUTCOMES:
Upon completion of the course, the student should be able to:
- Explain the basics of wireless networks and its standards.
- Design mobile communication systems.
- Analyse the various protocols.
- Build wireless mobile applications.

TEXT BOOKS:

REFERENCES:

CS6502 OBJECT ORIENTED ANALYSIS AND DESIGN

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:

MG6851 PRINCIPLES OF MANAGEMENT

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

UNIT I INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS

UNIT II PLANNING

UNIT III ORGANISING

UNIT IV DIRECTING

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

TOTAL: 45 PERIODS
OUTCOMES:
- Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management

TEXTBOOKS:

REFERENCES:

CO6611 CASE TOOLS LABORATORY

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

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

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

Suggested Software Tools:
Rational Suite (or) Argo UML (or) equivalent, Eclipse IDE and Junit

<table>
<thead>
<tr>
<th>S.No</th>
<th>Description of Equipment</th>
<th>Quantity Required</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Software Tools</td>
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<tr>
<td></td>
<td>Rational Suite</td>
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<tr>
<td></td>
<td>Open Source Alternatives:</td>
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<tr>
<td></td>
<td>ArgoUML, Visual Paradigm</td>
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<tr>
<td></td>
<td>Eclipse IDE and JUnit</td>
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</tr>
<tr>
<td>2</td>
<td>PCs</td>
<td>30</td>
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</table>

CO6612    MOBILE APPLICATION DEVELOPMENT LABORATORY L T P C  
0 0 3 2

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.

GE6674 COMMUNICATION AND SOFT SKILLS- LABORATORY COURSE

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
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
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
International English Language Testing System (IELTS) - Test of English as a Foreign Language (TOEFL) - Civil Service(Language related)- Verbal Ability.

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

UNIT V SOFT SKILLS
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
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>
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<tbody>
<tr>
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<td>Server</td>
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<tr>
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<td>• PIV System</td>
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<td></td>
<td>• 1 GB RAM / 40 GB HDD</td>
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<tr>
<td></td>
<td>• OS: Win 2000 server</td>
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<td></td>
<td>• Audio card with headphones</td>
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<td>• JRE 1.3</td>
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<td>2</td>
<td>Client Systems</td>
<td>60 Nos.</td>
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<td>• PIII or above</td>
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<td></td>
<td>• 256 or 512 MB RAM / 40 GB HDD</td>
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<td>• OS: Win 2000</td>
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<tr>
<td>3</td>
<td>Handicam</td>
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<tr>
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<tr>
<td>5</td>
<td>Collar mike</td>
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</tr>
<tr>
<td>6</td>
<td>Cordless mike</td>
<td>1 No.</td>
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<tr>
<td>7</td>
<td>Audio Mixer</td>
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</tr>
<tr>
<td>8</td>
<td>DVD recorder/player</td>
<td>1 No.</td>
</tr>
<tr>
<td>9</td>
<td>LCD Projector with MP3/CD/DVD provision for Audio/video facility</td>
<td>1 No.</td>
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</tbody>
</table>

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.

Web Sources:
http://www.slideshare.net/rohitjsh/presentation-on-group-discussion
http://www.washington.edu/doit/TeamN/presentation_tips.html
http://www.oxforddictionaries.com/words/writing-job-applications
http://www.kent.ac.uk/careers/cv/coveringletters.htm
http://www.mindtools.com/pages/article/newCDV_34.htm

CO6701

OBJECTIVES:
The student should be made to:
- Be familiar with the principle of light propagation through optical fibers
- Understand signal distortion mechanisms in the fiber
- Be familiar with optical transmitters and receivers for fiber/free space links
- Learn optical network concepts and components involved.
UNIT I  OPTICAL FIBERS
Introduction, light propagation in optical fibers, ray and mode theory of light, optical fiber structure and parameters, fiber materials, fiber fabrication techniques, optical signal attenuation mechanisms, merits and demerits of guided and unguided optical signal transmissions.

UNIT II  TRANSMISSION CHARACTERISTICS

UNIT III  OPTICAL TRANSMITTERS
Materials for optical sources, light-emitting diodes, semiconductor laser diodes, longitudinal modes, gain and index-guiding, power-current characteristics, spectral behaviour, longitudinal mode control and tunability, noise, direct and external modulation, Laser sources and transmitters for free space communication.

UNIT IV  OPTICAL RECEIVERS
Principles of optical detection, spectral responsivity, PIN, APD, preamplifier types, receiver noises, Signal to Noise Ratio (SNR) and Bit Error Rate (BER), Principles of coherent detection, link power and risetime budget.

UNIT V  OPTICAL NETWORKING PRINCIPLES AND COMPONENTS

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student should be able to:
• Explain the principle of light propagation through optical fibers
• Discuss signal distortion mechanisms in the fiber
• Compare and contrast optical transmitters and receivers for fiber /free space links
• Explain the optical network concepts and components

TEXT BOOKS:

REFERENCES:
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  9

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:

CS6703 GRID AND CLOUD COMPUTING

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

CS6003 AD HOC AND SENSOR NETWORKS

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 ad hoc routing protocols.
• Be expose to the TCP issues in ad hoc networks.
• Learn the architecture and protocols of wireless sensor networks.

UNIT I INTRODUCTION
UNIT II  MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS
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 :
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 adhoc 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:
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

LIST OF EQUIPMENT 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 wordcount 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.

LIST OF  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 the architecture and programming of ARM processor.
- Be familiar with the embedded computing platform design and analysis.
- Be exposed to the basic concepts of real time Operating system.
- Learn the system design techniques and networks for embedded systems.

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

UNIT II  EMBEDDED COMPUTING PLATFORM DESIGN
The CPU Bus-Memory devices and systems–Designing with computing platforms – consumer electronics architecture – platform-level performance analysis - Components for embedded programs- Models of programs- Assembly, linking and loading – compilation techniques- Program level performance analysis – Software performance optimization – Program level energy and power analysis and optimization – Analysis and optimization of program size- Program validation and testing.

UNIT III  PROCESSES AND OPERATING SYSTEMS
Introduction – Multiple tasks and multiple processes – Multirate systems- Preemptive real-time operating systems- Priority based scheduling- Interprocess communication mechanisms – Evaluating operating system performance- power optimization strategies for processes – Example Real time operating systems-POSIX-Windows CE.

UNIT V  SYSTEM DESIGN TECHNIQUES AND NETWORKS
Design methodologies- Design flows - Requirement Analysis – Specifications-System analysis and architecture design – Quality Assurance techniques- Distributed embedded systems – MPSoCs and shared memory multiprocessors.

UNIT V  CASE STUDY
Data compressor - Alarm Clock - Audio player - Software modem-Digital still camera - Telephone answering machine-Engine control unit – Video accelerator.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, students will be able to:
- Describe the architecture and programming of ARM processor.
- Outline the concepts of embedded systems
- Explain the basic concepts of real time Operating system design.
- Use the system design techniques to develop software for embedded systems
- Differentiate between the general purpose operating system and the real time operating system
- Model real-time applications using embedded-system concepts

TEXT BOOK:
REFERENCES:

CO6811 PROJECT WORK

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.

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
Data warehousing Components — Building a Data warehouse — Mapping the Data Warehouse to a Multiprocessor Architecture — DBMS Schemas for Decision Support — Data Extraction, Cleanup, and Transformation Tools — Metadata.
UNIT II  BUSINESS ANALYSIS

UNIT III  DATA MINING

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

UNIT V  CLUSTERING AND TRENDS IN DATA MINING

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 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, Data Set, 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

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:

CS6002 NETWORK ANALYSIS AND MANAGEMENT L T P C 3 0 0 3

OBJECTIVES:
The student should be made to:
- Learn network devices functions and configurations hub, switch, tap and routers.
- Be familiar with network Security Devices.
- Be exposed to network services.
- Understand and analyze application performance
- Learn to analyze network traffic and protocols
- Be aware of network-troubleshooting concepts.
- Understand network security concepts

UNIT I A SYSTEM APPROACH TO NETWORK DESIGN AND REQUIREMENT ANALYSIS 9

UNIT II FLOW ANALYSIS: CONCEPTS, GUIDELINES AND PRACTICE 9

UNIT III LOGICAL DESIGN: CHOICES, INTERCONNECTION MECHANISMS, NETWORK MANAGEMENT AND SECURITY 9

UNIT IV NETWORK DESIGN: PHYSICAL, ADDRESSING AND ROUTING 9
Introduction- Evaluating cable plant design options – Network equipment placement- diagramming the physical design- diagramming the worksheet –case study. Introduction to Addressing and routing-establishing routing flow in the design environments- manipulating routing flows- developing addressing strategies- developing a routing strategy- case study.
UNIT V  NETWORK MANAGEMENT AND SNMP PROTOCOL MODEL
Network and System management, Network management system platform; Current SNMP Broadband and TMN management, Network management standards. SNMPV1, SNMPV2 system architecture, SNMPV2, structure of management information. SNMPV2 – MIB – SNMPV2 protocol, SNMPV3-Architecture, Application, MIB, security user based security model, access control RMON.

TOTAL:45 PERIODS

OUTCOMES:
At the end of this course the students should be able to:
• Explain the key concepts and algorithms in complex network analysis.
• Apply a range of techniques for characterizing network structure.
• Discuss methodologies for analyzing networks of different fields.
• Demonstrate knowledge of recent research in the area and exhibit technical writing and
• presentation skills.

TEXT BOOKS:

REFERENCES:
UNIT IV  ADAPTIVE FILTERS  9

UNIT V  WAVELET TRANSFORM  9
Multiresolution analysis, Continuous and discrete wavelet transform, Short Time Fourier Transform, Application of wavelet transform, Cepstrum and Homomorphic filtering.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, students will be able to:
• Explain the parametric methods for power spectrum estimation.
• Discuss adaptive filtering techniques using LMS algorithm and the applications of adaptive filtering.
• Analyze the wavelet transforms.

TEXTBOOKS:

REFERENCE:

CS6659  ARTIFICIAL INTELLIGENCE  L T P C  3 0 0 3

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  9
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  

UNIT V  EXPERT SYSTEMS  

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/

EC6013  ADVANCED MICROPROCESSORS AND MICROCONTROLLERS  

OBJECTIVES:
- To expose the students to the fundamentals of microprocessor architecture.
- To introduce the advanced features in microprocessors and microcontrollers.
- To enable the students to understand various microcontroller architectures.

UNIT I  HIGH PERFORMANCE CISC ARCHITECTURE – PENTIUM  

UNIT II  HIGH PERFORMANCE RISC ARCHITECTURE – ARM  
UNIT III  ARM APPLICATION DEVELOPMENT  9
Introduction to DSP on ARM –FIR filter – IIR filter – Discrete fourier transform – Exception handling –
Interrupts – Interrupt handling schemes- Firmware and bootloader – Embedded Operating systems –
Integrated Development Environment- STDIO Libraries – Peripheral Interface – Application of ARM
Processor - Caches – Memory protection Units – Memory Management units – Future ARM
Technologies.

UNIT IV  MOTOROLA 68HC11 MICROCONTROLLERS  9
Instruction set addressing modes – operating modes- Interrupt system- RTC-Serial Communication
Interface – A/D Converter PWM and UART.

UNIT V  PIC MICROCONTROLLER  9
and introduction to C-Compilers.

TOTAL: 45 PERIODS

OUTCOMES:
• The student will be able to work with suitable microprocessor / microcontroller for a specific real
  world application.

TEXT BOOK:
1. Andrew N.Sloss, Dominic Symes and Chris Wright “ ARM System Developer’s Guide : Designing

REFERENCES:
    Readings: Web links www.ocw.nit.edu  www.arm.com

CS6012  SOFT COMPUTING  L T P C
3 0 0 3

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:

CS6013 FOUNDATION SKILLS IN INTEGRATED PRODUCT DEVELOPMENT L T P C

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 in to 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
Conceptualization - Industrial Design and User Interface Design - Introduction to Concept
generation Techniques – Challenges in Integration of Engineering Disciplines - Concept Screening
& Evaluation - Detailed Design - Component Design and Verification – Mechanical,
Electronics and Software Subsystems - High Level Design/Low Level Design of S/W Program -
Types of Prototypes, S/W Testing- Hardware Schematic, Component design, Layout and Hardware
Testing – Prototyping - Introduction to Rapid Prototyping and Rapid Manufacturing - System
Integration, Testing, Certification and Documentation

UNIT IV  SUSTAINANCE ENGINEERING AND END-OF-LIFE (EOL) SUPPORT
Introduction to Product verification processes and stages - Introduction to Product validation
processes and stages - Product Testing standards and Certification - Product Documentation -
Sustenance - Maintenance and Repair – Enhancements - Product EoL - Obsolescence
Management - Configuration Management - EoL Disposal

UNIT V  BUSINESS DYNAMICS ENGINEERING SERVICES INDUSTRY
The Industry - Engineering Services Industry - Product development in Industry versus Academia -
The IPD Essentials - Introduction to vertical specific product development processes -
Manufacturing/Purchase and Assembly of Systems - Integration of Mechanical, Embedded and
S/W systems – Product development Trade-offs - Intellectual Property Rights and Confidentiality -
Security and configuration management.

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:

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
Boundary representation – Chain Code – Polygonal approximation, signature, boundary segments – Boundary description – Shape number – Fourier Descriptor, moments- Regional Descriptors – Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching

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:

IT6007 FREE AND OPEN SOURCE SOFTWARE

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
- Notion of Community--Guidelines for effectively working with FOSS community--,

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

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:

IT6012  TCP/IP DESIGN AND IMPLEMENTATION  
L T P C  
3 0 0 3

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 — comparison — finite state machine implementation — Output processing — mutual exclusion — computing the TCP Data length.

UNIT V  TCP IMPLEMENTATION II
Timers — events and messages — timer process — deleting and inserting timer event-flow control and adaptive retransmission — congestion avoidance and control — urgent data processing and push function.

TOTAL: 45 PERIODS

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

TEXT BOOKS:

REFERENCES:

CO6001  NETWORK PROTOCOLS

OBJECTIVES:
The student should be made to:
- Understand the existing network architecture models and analyze the their performance
- Understand the high speed network protocols and design issues.
- Learn Network Security Technologies and Protocols
- Study various protocols in wireless LAN, MAN.

UNIT I  FUNDAMENTALS OF NETWORKING STANDARDS AND PROTOCOLS
UNIT II    ROUTED AND ROUTING PROTOCOLS

UNIT III    ISDN AND NETWORK MANAGEMENT PROTOCOLS

UNIT IV    SECURITY AND TELEPHONY PROTOCOLS

UNIT V    NETWORK ENVIRONMENTS AND PROTOCOLS

OUTCOMES:
Upon completion of the course, the student should be able to:
- Discuss the existing network architecture models
- Analyze the performance of the various models
- Compare the high speed network protocols
- Design new protocols
- Apply network Security Technologies
- Contrast the various wireless LAN / MAN protocols.

TOTAL:45 PERIODS

TEXTBOOK:

REFERENCES:

BM6005    BIO INFORMATICS

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 9
Need for Bioinformatics technologies – Overview of Bioinformatics technologies Structural bioinformatics – Data format and processing – Secondary resources and applications – Role of Structural bioinformatics - Biological Data Integration System.

UNIT II DATAWAREHOUSING AND DATAMINING IN BIOINFORMATICS 9
Bioinformatics data – Data warehousing architecture – data quality – Biomedical data analysis – DNA data analysis – Protein data analysis – Machine learning – Neural network architecture and applications in bioinformatics

UNIT III MODELING FOR BIOINFORMATICS 9

UNIT IV PATTERN MATCHING AND VISUALIZATION 9

UNIT V MICROARRAY ANALYSIS 9

TOTAL: 45 PERIODS

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:
UNIT I  INFORMATION ENTROPY FUNDAMENTALS  
Uncertainty, Information and Entropy—Source coding Theorem—Huffman coding—Shannon Fano coding—Discrete Memory less channels—channel capacity—channel coding Theorem—Channel capacity Theorem.

UNIT II  DATA AND VOICE CODING  

UNIT III  ERROR CONTROL CODING  
Linear Block codes—Syndrome Decoding—Minimum distance consideration—cyclic codes—Generator Polynomial—Parity check polynomial—Encoder for cyclic codes—calculation of syndrome—Convolutional codes.

UNIT IV  COMPRESSION TECHNIQUES  

UNIT V  AUDIO AND VIDEO CODING  

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:

GE6083  DISASTER MANAGEMENT  LTCP  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
Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

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

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

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

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

TOTAL: 45 PERIODS

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

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

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

UNIT I INTRODUCTION

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 - Benchmarking - Reason to benchmark, 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:

EC6004 SATELLITE COMMUNICATION

OBJECTIVES:
- To understand the basics of satellite orbits.
- To understand the satellite segment and earth segment.
- To analyze the various methods of satellite access.
- To understand the applications of satellites.

UNIT I SATELLITE ORBITS

UNIT II SPACE SEGMENT AND SATELLITE LINK DESIGN
Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking and command. Satellite uplink and downlink Analysis and Design, link budget, E/N calculation- performance impairments-system noise, inter modulation and interference, Propagation Characteristics and Frequency considerations- System reliability and design lifetime.

UNIT III EARTH SEGMENT

UNIT IV SATELLITE ACCESS

UNIT V SATELLITE APPLICATIONS
INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. Direct Broadcast satellites (DBS)- Direct to home Broadcast (DTH), Digital audio broadcast (DAB)- Worldspace services, Business TV(BTV), GRAMSAT, Specialized services – E-mail, Video conferencing, Internet.

TOTAL: 45 PERIODS
OUTCOMES:
Upon Completion of the course, the students will be able to:
- Analyze the satellite orbits.
- Analyze the earth segment and space segment.
- Design various satellite applications

TEXT BOOK:

REFERENCES:

EC6001 MEDICAL ELECTRONICS

OBJECTIVES:
- To gain knowledge about the various physiological parameters both electrical and non electrical and the methods of recording and also the method of transmitting these parameters.
- To study about the various assist devices used in the hospitals.
- To gain knowledge about equipment used for physical medicine and the various recently developed diagnostic and therapeutic techniques.

UNIT I ELECTRO-PHYSIOLOGY AND BIO-POTENTIAL RECORDING
The origin of Bio-potentials; biopotential electrodes, biological amplifiers, ECG, EEG, EMG, PCG, lead systems and recording methods, typical waveforms and signal characteristics.

UNIT II BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENT
pH, PO_2, PCO_2, colorimeter, Auto analyzer, Blood flow meter, cardiac output, respiratory measurement, Blood pressure, temperature, pulse, Blood cell counters.

UNIT III ASSIST DEVICES
Cardiac pacemakers, DC Defibrillator, Dialyser, Heart lung machine

UNIT IV PHYSICAL MEDICINE AND BIOTELEMETRY
Diathermies- Shortwave, ultrasonic and microwave type and their applications, Surgical Diathermy Telemetry principles, frequency selection, biotelemetry, radiopill, electrical safety

UNIT V RECENT TRENDS IN MEDICAL INSTRUMENTATION
Thermograph, endoscopy unit, Laser in medicine, cryogenic application, Introduction to telemedicine

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, students will be able to:
- Discuss the application of electronics in diagnostic and therapeutic area.
- Measure biochemical and various physiological information.
- Describe the working of units which will help to restore normal functioning.

TEXT BOOKS:

REFERENCES:

EC6018 MULTIMEDIA COMPRESSION AND COMMUNICATION

OBJECTIVES:
- To have a complete understanding of error–control coding.
- To understand encoding and decoding of digital data streams.
- To introduce methods for the generation of these codes and their decoding techniques.
- To have a detailed knowledge of compression and decompression techniques.
- To introduce 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
Compression principles-source encoders and destination encoders-lossless and lossy compression-entropy encoding –source encoding -text compression –static Huffman coding dynamic coding – arithmetic coding –Lempel ziv-welsh Compression-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.

TOTAL: 45 PERIODS
OUTCOMES:
Upon Completion of the course, the students will be able to
• Describe various multimedia components
• Describe compression and decompression techniques.
• Apply the compression concepts in multimedia communication.

TEXT BOOK:

REFERENCES:

GE6084 HUMAN RIGHTS L T P C
3 0 0 3

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:

EC6003 ROBOTICS AND AUTOMATION

OBJECTIVES:
- To study the various parts of robots and fields of robotics.
- To study the various kinematics and inverse kinematics of robots.
- To study the Euler, Lagrangian formulation of Robot dynamics.
- To study the trajectory planning for robot.
- To study the control of robots for some specific applications.

UNIT I BASIC CONCEPTS
Definition and origin of robotics – different types of robotics – various generations of robots – degrees of freedom – Asimov’s laws of robotics – dynamic stabilization of robots.

UNIT II POWER SOURCES AND SENSORS

UNIT III MANIPULATORS, ACTUATORS AND GRIPPERS

UNIT IV KINEMATICS AND PATH PLANNING
Solution of inverse kinematics problem – multiple solution jacobian work envelop – hill climbing techniques – robot programming languages.

UNIT V CASE STUDIES

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of the course, the student should be able to:
- Explain the basic concepts of working of robot
- Analyze the function of sensors in the robot
- Write program to use a robot for a typical application
- Use Robots in different applications

TEXT BOOKS:
REFERENCES:

CO6002 ADVANCED WIRELESS COMMUNICATION

OBJECTIVES:
The student should be made to:
• Learn the importance of improving capacity of wireless channel using MIM
• Be exposed to the characteristic of wireless channel
• Be familiar with the techniques for channel improvements using space-time block and Trellis codes
• Learn advanced MIMO system like layered space time codes, MU-MIMO System and MIMO-OFDM systems

UNIT I INTRODUCTION
The crowded spectrum, need for high data rate, MIMO systems – Array Gain, Diversity Gain, Data Pipes, Spatial MUX, MIMO System Model. MIMO System Capacity – channel known the TX, Ch unknown to the TX – capacity of deterministic channels, Random channels and frequency selective channels.

UNIT II RADIO WAVE PROPAGATION
Radio wave propagation – Macroscopic fading - free space and outdoor, small scale fading – Fading measurements – Direct pulse measurements, spread spectrum correlation channel sounding frequency domain channel sounding, Antenna Diversity – Diversity combining methods.

UNIT III STBC
Delay Diversity scheme, Alamotii space time code – Maximum likelihood decoding maximum ratio combining. Transmit diversity space time block codes for real signal constellation and complex signal constellation decoding of STBC.

UNIT IV STTC
Space time coded systems, space time code word design criteria, design of space time T C on slow fading channels, design of STTC on Fast Fading channels, performance analysis in slow and fast fading channels, effect of imperfect channel estimation and Antenna correlation on performance, comparison of STBC & STTC.

UNIT V LAYERED SPACE TIME CODES
LST transmitter – Horizontal and Vertical LST receiver – ML Rx, Zero forcing Rx; MMSE Rx, SIC Rx, ZF V-blast Rx -MMSE V-blast Rx, Iterative Rx- capacity of MIMO – OFDM systems – capacity of MIMO multi user systems.

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course, the student should be able to:

- Discuss methods for improving capacity of wireless channel using MIM
- Explain the characteristic of wireless channel
- Apply the techniques for channel improvements using space-time block and Trellis codes
- Discuss advanced MIMO system like layered space time codes, MU-MIMO System and MIMO-OFDM systems

TEXT BOOKS:

REFERENCES:

EC6007 SPEECH PROCESSING

OBJECTIVES:
- To introduce speech production and related parameters of speech.
- To show the computation and use of techniques such as short time Fourier transform, linear predictive coefficients and other coefficients in the analysis of speech.
- To understand different speech modeling procedures such as Markov and their implementation issues.

UNIT I BASIC CONCEPTS

UNIT II SPEECH ANALYSIS

UNIT III SPEECH MODELING
UNIT IV SPEECH RECOGNITION 8
Large Vocabulary Continuous Speech Recognition: Architecture of a large vocabulary continuous speech recognition system – acoustics and language models – n-grams, context dependent sub-word units; Applications and present status.

UNIT V SPEECH SYNTHESIS 9
Text-to-Speech Synthesis: Concatenative and waveform synthesis methods, sub-word units for TTS, intelligibility and naturalness – role of prosody, Applications and present status.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, students will be able to:
• Model speech production system and describe the fundamentals of speech.
• Extract and compare different speech parameters.
• Choose an appropriate statistical speech model for a given application.
• Design a speech recognition system.
• Use different speech synthesis techniques.

TEXT BOOKS:

REFERENCES:

EC6014 COGNITIVE RADIO L T P C 3 0 0 3

OBJECTIVES:
The student should be made to:
• Know the basics of the software defined radios.
• Learn the design of the wireless networks based on the cognitive radios
• Understand the concepts of wireless networks and next generation networks

UNIT I INTRODUCTION TO SOFTWARE DEFINED RADIO 9
Definitions and potential benefits, software radio architecture evolution, technology tradeoffs and architecture implications.

UNIT II SDR ARCHITECTURE 9
Essential functions of the software radio, basic SDR, hardware architecture, Computational processing resources, software architecture, top level component interfaces, interface topologies among plug and play modules.
UNIT III  INTRODUCTION TO COGNITIVE RADIOS
Marking radio self-aware, cognitive techniques – position awareness, environment awareness in cognitive radios, optimization of radio resources, Artificial Intelligence Techniques.

UNIT IV  COGNITIVE RADIO ARCHITECTURE

UNIT V  NEXT GENERATION WIRELESS NETWORKS
The XG Network architecture, spectrum sensing, spectrum management, spectrum mobility, spectrum sharing, upper layer issues, cross – layer design.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, students will be able to
• Describe the basics of the software defined radios.
• Design the wireless networks based on the cognitive radios
• Explain the concepts behind the wireless networks and next generation networks

TEXT BOOKS:

REFERENCES: