UNIVERSITY DEPARTMENTS

REGULATIONS 2012
CURRICULA AND SYLLABI FOR I TO VIII SEMESTERS

B.E. ELECTRONICS AND COMMUNICATION ENGINEERING (FULL TIME)
## SEMESTER I

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ANNA UNIVERSITY, CHENNAI-600 025

UNIVERSITY DEPARTMENTS R –
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OBJECTIVES

• To enable all students of engineering and technology develop their basic communication Skills in English.

• To give special emphasis to the development of speaking skills amongst the students of Engineering and Technology students.

• To ensure that students use the electronic media such as internet and supplement the learning materials used in the classroom.

• To inculcate the habit of reading for pleasure.

UNIT I

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

UNIT II

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

Reading
- Reading and interpreting visual material; Writing - Jumbled sentences - Coherence and cohesion in writing - Channel conversion (flowchart into process) - Types of paragraph (cause & effect / compare & contrast / narrative / analytical) - Informal writing (letter/e-mail/blogs) - Paraphrasing; Grammar - Tenses (Past) - Use of sequence words - Adjectives; Vocabulary
- Different forms and uses of words, Cause and effect words; E-materials - Interactive exercises for Grammar and Vocabulary - Excerpts from films related to the theme and follow up exercises - Pictures of flow charts and tables for interpretations.

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

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

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.Excel in academic and professional writing.

TOTAL: 60 PERIODS
TEXT BOOKS:

REFERENCES:

EXTENSIVE READERS:

WEBSITE RESOURCES:
1. www.uefap.com
2. www.eslcafe.com
3. www.listen-to-english.com
4. www.owl.english.purdue.edu
5. www.chompchomp.com

MA8151 MATHEMATICS – I
(Common to all branches of B.E. / B.Tech. Programmes in I Semester)
(L T P C 3 1 0 4)

OBJECTIVES:
• To develop the use of matrix algebra techniques this is needed by engineers for practical applications.
• To make the student knowledgeable in the area of infinite series and their convergence so that he/she will be familiar with limitations of using infinite series
approximations for solutions arising in mathematical modeling.

- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.

UNIT I  MATRICES  9+3

UNIT II  INFINITE SERIES  9+3
Sequences – Convergence of series – General properties – Series of positive terms –
Tests of convergence (Comparison test, Integral test, Comparison of ratios and D’Alembert’s ratio test) – Alternating series – Series of positive and negative terms –
Absolute and conditional convergence – Power Series – Convergence of exponential, logarithmic and Binomial Series.

UNIT III  FUNCTIONS OF SEVERAL VARIABLES  9+3
Limits and Continuity – Partial derivatives – Homogeneous functions and Euler’s theorem – Total derivative – Differentiation of implicit functions – Change of variables –

UNIT IV  IMPROPER INTEGRALS  9+3

UNIT V  MULTIPLE INTEGRALS  9+3
Double integrals – Change of order of integration – Double integrals in polar coordinates –

TOTAL : 60 PERIODS

OUTCOMES:

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


REFERENCES:


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

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

UNIT I PROPERTIES OF MATTER 9

UNIT II ACOUSTICS AND ULTRASONICS 9
Classification of sound - loudness and intensity - Weber-Fechner Law - standard intensity and intensity level - decibel - reverberation - reverberation time - rate of growth and decay of sound intensity - derivation of Sabine’s formula - absorption coefficient and its determination - factors affecting acoustics of buildings: focussing, interference, echo, Echelon effect, resonance - noise and their remedies. Ultrasonics - production -
magnetostriction and piezoelectric methods - detection of ultrasound - acoustic grating - industrial applications - NDT - Ultrasonic method: scan modes and practice.

**UNIT III  THERMAL PHYSICS**


**UNIT IV  APPLIED OPTICS**


**UNIT V SOLID STATE PHYSICS**

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

**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:**
OBJECTIVES:

- To make the students acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications in all disciplines.
- To make the students conversant with basics of polymer chemistry.
- To make the students understand the concepts of Kinetics and Catalysis.
- To acquaint the student with concepts of important photophysical and photochemical processes and spectroscopy.
- To acquaint the students with the basics of nano materials, their properties and applications.

UNIT I CHEMICAL 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; Criteria of spontaneity; Gibbs-Helmholtz equation; Clausius-Clapeyron equation; Maxwell relations – Van’t Hoff isotherm and isochore. Chemical potential; Gibbs-Duhem equation – variation of chemical potential with temperature and pressure.

UNIT II POLYMER CHEMISTRY

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

UNIT III KINETICS AND CATALYSIS

UNIT IV PHOTOCHEMISTRY AND SPECTROSCOPY


UNIT V NANOCHEMISTRY


OUTCOMES:

- The knowledge gained on polymer chemistry, thermodynamics, spectroscopy, Kinetics and Catalysis and nano materials will provide a strong platform to understand the concepts on these subjects for further learning.

TEXT BOOKS:


REFERENCES:

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.

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.

TOTAL : 45 PERIODS
TEXTBOOKS:

REFERENCES:

GE8152 ENGINEERING GRAPHICS L T P C 2 0 3 4

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

CONCEPTS AND CONVENTIONS (NOT FOR EXAMINATION) 1
Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT I  PLANE CURVES AND FREE HAND SKETCHING 14
Basic Geometrical Constructions, Curves Used In Engineering Practices

VISUALIZATION CONCEPTS AND FREE HAND SKETCHING: Visualization principles – Representation of Three Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects

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

COMPUTER AIDED DRAFTING (DEMONSTRATION ONLY)
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.

PH8161

PHYSICS LABORATORY

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

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

1. Torsional pendulum
2. Non-uniform bending
3. Lee’s disc
4. Potentiometer
5. Air wedge

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

TOTAL: 30 PERIODS

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.

CY8161 CHEMISTRY LABORATORY (Common to all branches of Engineering and Technology) 0 0 2 1

OBJECTIVES:
• To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.
  To acquaint the students with the determination of molecular weight of a polymer by vacometry
1. Estimation of HCl using Na₂CO₃ as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler’s method.
4. Determination of chloride content of water sample by argentometric method.
5. Estimation of copper content of the given solution by Iodometry.
6. Determination of strength of given hydrochloric acid using pH meter.
7. Determination of strength of acids in a mixture of acids using conductivity meter.
8. Estimation of iron content of the given solution using potentiometer.
9. Estimation of iron content of the water sample using spectrophotometer (1,10- phenanthroline / thiocyanate method).
10. Estimation of sodium and potassium present in water using flame photometer.
14. Determination of CMC.
15. Phase change in a solid.

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

TOTAL: 30 PERIODS

REFERENCE BOOKS:

GE8161 COMPUTER PRACTICES LABORATORY L T P C 0 0 3 2

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
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.

GE8162 ENGINEERING PRACTICES LABORATORY
(Common to all Branches of B.E. / B.Tech. Programmes) 0 0 3 2

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

ROUP – A (CIVIL & ELECTRICAL)

1. CIVIL ENGINEERING PRACTICE 12

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

WOOD WORK:
- Sawing, planing and making common joints: T-Joint, Mortise and Tennon joint, Dovetail joint.

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

2. ELECTRICAL ENGINEERING PRACTICE 9
- Basic household wiring using switches, fuse, indicator – lamp etc.,
• Preparation of wiring diagrams
• Stair case light wiring
• Tube – light wiring
• Study of iron-box, fan with regulator, emergency lamp

GROUP – B (MECHANICAL AND ELECTRONICS) 15

3. MECHANICAL ENGINEERING

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

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

TOTAL: 45 PERIODS

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.

HS8251 TECHNICAL ENGLISH II L T P C 3 0 0 3
(For all branches of B.E / B.Tech programmes)

• To make the students acquire listening and speaking skills meant for both formal and informal contexts
• To help them develop their reading skills by exposing them to different types of reading strategies
• To equip them with writing skills needed for academic as well as workplace situations
• To make them acquire language skills at their own pace by using e-materials and language lab component
UNIT I
Listening - Listening to informal conversations and participating; Speaking - Opening a conversation (greetings, comments on something, weather) - Turn taking - Closing a conversation (excuses, general wish, positive comment, thanks); Reading - Developing analytical skills, Deductive and inductive reasoning - Extensive reading; Writing - Effective use of SMS for sending short notes and messages - Using ‘emoticons’ as symbols in email messages; Grammar - Regular & irregular verbs - Active and passive voice; Vocabulary - Homonyms (e.g. ‘can’) - Homophones (e.g. ‘some’, ‘sum’); E-materials - Interactive exercise on Grammar and vocabulary – blogging; Language Lab - Listening to different types of conversation and answering questions.

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

UNIT III
Listening - Listening to the conversation - Understanding the structure of conversations; Speaking - Conversation skills with a sense of stress, intonation, pronunciation and meaning - Seeking information – expressing feelings (affection, anger, regret etc.); Reading - Speed reading – reading passages with the time limit - Skimming; Writing - Minutes of meeting – format and practice in the preparation of minutes - Writing summary after reading the articles from the journals - Format for the journal articles – elements of technical articles (abstract, introduction, methodology, results, discussion, conclusion, appendices, references) - Writing strategies; Grammar - Conditional clauses - Cause and effect expressions; Vocabulary - Words used as nouns and verbs without any change in the spelling (e.g. ‘rock’, ‘train’, ‘ring’); E-materials - Interactive exercise on Grammar & vocabulary - Speed Reading practice exercises; Language Lab - Intonation practice using EFLU materials – Attending a meeting and writing minutes.
UNIT IV
Listening - Listening to a telephone conversation, Viewing a model interview (face-to-face, telephonic and video conferencing) and observing the practices; Speaking - Role play practice in telephone skills - listening and responding, -asking questions, -note taking – passing on messages, Role play and mock interview for grasping the interview skills; Reading - Reading the job advertisements and the profile of the company concerned – scanning; Writing - Applying for a job – cover letter - résumé preparation – vision, mission and goals of the candidate; Grammar - Numerical expressions - Connectives (discourse markers); Vocabulary - Idioms and their meanings – using idioms in sentences; E-materials - Interactive exercises on Grammar & Vocabulary - Different forms of résumés- Filling up a résumé / cover letter; Language Lab - Telephonic interview – recording the responses - e-résumé writing.

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

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

TOTAL : 60 PERIODS
TEXT BOOKS:

REFERENCE BOOKS

EXTENSIVE READERS

WEB RESOURCES
1. www.esl-lab.com
2. www.englishgrammar.org
3. www.englishclub.com
4. www.mindtools.com
5. www.esl.about.com
OBJECTIVES:

• To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.

• To acquaint the student with the concepts of vector calculus, needed for problems in all engineering disciplines.

• To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow of electric current.

• To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated

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

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

UNIT III  ANALYTIC FUNCTION  9+3

UNIT IV  COMPLEX INTEGRATION  9+3
UNIT V  LAPLACE TRANSFORMS


TOTAL : 60 PERIODS

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

TEXT BOOKS:

REFERENCES:

PH8252  PHYSICS FOR ELECTRONICS ENGINEERING  L T P C
3 0 0 3

OBJECTIVES:
• To Illustrate, with suitable examples, the concepts of conductors, semiconductors, dielectric, magnetic and superconducting materials.
• To make the students familiarize with the optical properties of materials.
• To introduce the essential principles of physics for electronics and communication engineering applications.
UNIT I  ELECTRICAL PROPERTIES OF METALS  9

UNIT II  SEMICONDUCTORS  9

UNIT III  DIELECTRIC MATERIALS AND INSULATION  9
Matter polarization and relative permittivity: definition - dipole moment and polarization vector P-polarization mechanisms: electronic, ionic, orientational, interfacial and total polarization- frequency dependence - local field and Clausius-Mossetti equation - dielectric constant and dielectric loss - Gauss’s law and boundary conditions - dielectric strength and insulation break-down in gases, liquids and solids - capacitor materials - typical capacitor constructions - piezoelectricity, ferroelectricity and pyroelectricity - quartz oscillators and filters - piezo and pyroelectric crystals.

UNIT IV  MAGNETIC PROPERTIES AND SUPERCONDUCTIVITY  9

UNIT V  OPTICAL PROPERTIES OF MATERIALS  9

TOTAL : 45 PERIODS
OUTCOMES:
The student will be able to
- Apply the electrical properties of matter while understanding the relevant electrical phenomenon.
- Apply the concepts of semi conductors and understand the working principle of all types of semiconductor devices
- Apply the concepts of dielectric materials and magnetic properties and understand the electrostatic, electromagnetic, electromechanical behavior of equipments.
- Apply the optical properties of materials and understand the electro optic effects.

TEXT BOOKS:

REFERENCES:

CS8251 DATA STRUCTURES AND OBJECT ORIENTED PROGRAMMING IN C++ 3 0 0 3

OBJECTIVES:
This course comprehends the fundamentals of object oriented programming, particularly in C++, which are then used to implement data structures. This also gives an idea of linear and non-linear data structures and their applications.

UNIT I DATA ABSTRACTION & OVERLOADING 9

UNIT II INHERITANCE & POLYMORPHISM 9
Base Classes and Derived Classes – Protected Members – Casting Class pointers and Member Functions – Overriding – Public, Protected and Private Inheritance – Constructors and Destructors in derived Classes – Implicit Derived – Class Object To
Base – Class Object Conversion – Composition Vs. Inheritance – Virtual functions – This Pointer – Abstract Base Classes and Concrete Classes – Virtual Destructors – Dynamic Binding.

UNIT III  LINEAR DATA STRUCTURES  11
Asymptotic Notations: Big-Oh, Omega and Theta – Best, Worst and Average case Analysis: Definition and an example – Arrays and its representations – Stacks and Queues – Linked lists – Linked list based implementation of Stacks and Queues – Evaluation of Expressions – Linked list based polynomial addition.

UNIT IV  NON-LINEAR DATA STRUCTURES  9

UNIT V  SORTING & SEARCHING  7
Insertion sort – Merge sort – Quick sort – Heap sort – Linear Search – Binary Search.

TOTAL: 45 PERIODS

OUTCOMES
At the end of the course the students will be able to
- Comprehend the fundamentals of object oriented programming, particularly in C++, which is used to implement data structures.
- Have an idea of linear and non-linear data structures and their applications

TEXT BOOKS

REFERENCES:
OBJECTIVES:

- To acquaint the students with the construction, theory and operation of the basic electronic devices such as PN junction diode, Bipolar and Field effect Transistors, Power control devices, LED, LCD and other Opto-electronic devices.

UNIT I  SEMICONDUCTOR DIODE  9
PN junction diode, Current equations, Diffusion and drift current densities, forward and reverse bias characteristics, Switching Characteristics.

UNIT II  BIPOLAR JUNCTION TRANSISTOR  9

UNIT III  FIELD EFFECT TRANSISTORS  9
JFETs – Drain and Transfer characteristics,-Current equations-Pinch off voltage and its significance- MOSFET- Characteristics- Threshold voltage -Channel length modulation,D-MOSFET, E-MOSFET,-Current equation - Equivalent circuit model and its parameters, FINFET,DUAL GATE MOSFET.

UNIT IV  SPECIAL SEMICONDUCTOR DEVICES  9
Metal-Semiconductor Junction- MESFET, Schottky barrier diode-Zener diode-Varactor diode–Tunnel diode- Gallium Arsenide device, LASER diode, LDR.

UNIT V  POWER DEVICES AND DISPLAY DEVICES  9
UJT, SCR, Diac, Triac, Power BJT- Power MOSFET- DMOS-VMOS. LED, LCD, Photo transistor, Opto Coupler, Solar cell, CCD.

TOTAL : 45 PERIODS

Outcomes:

At the end of the course the students will be able to
Understand the construction, theory and operation of the basic electronic devices such as PN junction diode, Bipolar and Field effect Transistors, Power control devices, LED, LCD and other Opto-electronic devices.

TEXT BOOK:

REFERENCES:

EC8251 CIRCUIT THEORY L T P C
3 1 0 4

OBJECTIVES
• To introduce the basic concepts of DC and AC circuits behavior
• To study the transient and steady state response of the circuits subjected to step and sinusoidal excitations.
• To introduce different methods of circuit analysis using Network theorems, duality and topology.

UNIT I DC CIRCUIT ANALYSIS
Basic Components of electric Circuits, Charge, current, Voltage and Power, Voltage and Current Sources, Ohms Law, Kirchoff’s Current Law, Kirchoff’s voltage law, The single Node – Pair Circuit, series and Parallel Connected Independent Sources, Resistors in Series and Parallel, voltage and current division, Nodal analysis, Mesh analysis.

UNIT II NETWORK THEOREM AND DUALITY

UNIT III SINUSOIDAL STEADY STATE ANALYSIS

UNIT IV TRANSIENTS AND RESONANCE IN RLC CIRCUITS

UNIT V COUPLED CIRCUITS AND TOPOLOGY
Magnetically Coupled Circuits, mutual Inductance, the Linear Transformer, the Ideal Transformer, An introduction to Network Topology, Trees and General Nodal analysis, Links and Loop analysis.

TOTAL: 45 + 15 = 60 PERIODS
OUTCOMES:
The end of the course the students will be able to
- Comprehend the basic concepts of DC and AC circuits.
- Evaluate the transient and steady state response of the circuits subjected to step and sinusoidal excitations.
- Solve different methods of circuit analysis using Network theorems, duality etc.,
- Understand the basic concepts of network topology and coupled circuits.

TEXT BOOKS

REFERENCES

CS8213 DATA STRUCTURES AND OBJECT ORIENTED PROGRAMMING LABORATORY
L T P C
0 0 3 2

OBJECTIVES:
The student should be made to:
- Learn C++ programming language.
- Be exposed to the different data structures
- Be familiar with applications using different data structures

Binary tree traversal – graph traversal.
Merge sort – Linear Search – Binary Search.

1. Basic Programs for C++ Concepts
2. Array implementation of List Abstract Data Type (ADT)
3. Linked list implementation of List ADT
4. Cursor implementation of List ADT
5. Stack ADT - Array and linked list implementations
6. The next two exercises are to be done by implementing the following source files:
   i. Program source files for Stack Application 1
   ii. Array implementation of Stack ADT
   iii. Linked list implementation of Stack ADT
   iv. Program source files for Stack Application 2
   v. An appropriate header file for the Stack ADT should be included in (i) and
7. Implement any Stack Application using array implementation of Stack ADT
   (by implementing files (i) and (ii) given above) and then using linked list
8. Implementation of Stack ADT (by using files (i) and implementing file (iii))
9. Implement another Stack Application using array and linked list implementations of Stack ADT
   (by implementing files (iv) and using file (ii), and then by using files (iv) and (iii))
10. Queue ADT – Array and linked list implementations
11. Search Tree ADT - Binary Search Tree
12. Hash Table – separate chaining
13. Implement an interesting application as separate source files and using any of the searchable ADT files developed earlier. Replace the ADT file alone with other appropriate ADT files. Compare the performance.
14. Heap Sort
15. Quick Sort

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.
LABORATORY REQUIREMENTS

Pentium IV PCs with C++ 30 Nos
(or)
Unix server with C++ 30 terminals

EC8214  ELECTRONIC DEVICES AND CIRCUITS LABORATORY  L T P C
0 0 3 2

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

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

OUTCOMES:

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

• Analyze the characteristics of basic electronic devices
• Design RL and RC circuits
• Apply KVL, KCL, Thevinin, Norton and Super Position Theorems for circuit analysis

TOTAL: 45 PERIODS
LABORATORY REQUIREMENTS

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

MA8357 TRANSFORM TECHNIQUES AND PARTIAL DIFFERENTIAL EQUATION (BRANCH SPECIFIC COURSE) 3 1 0 4

OBJECTIVES:
• To introduce the effective mathematical tools for the solutions of partial differential equations that model physical processes;
• 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 in which the functions used are not periodic;
• To develop Z-transform techniques which will perform the same task for discrete timesystems as Laplace Transform, a valuable aid in analysis of continuous time systems

UNIT I PARTIAL DIFFERENTIAL EQUATIONS 9+3
Formation – Solutions of first order equations – Standard types and Equations reducible to standard types – Singular solutions – Lagrange’s Linear equation – Integral surface passing through a given curve – Classification of Partial Differential Equations – Solution of linear equations of higher order with constant coefficients – Linear non-homogeneous PDE.

UNIT II FOURIER SERIES 9+3
Dirichlet’s conditions – General Fourier series – Odd and even functions – Half-range Sine and Cosine series – Complex form of Fourier series – Parseval’s identity – Harmonic Analysis.
UNIT III APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATION 9+3
Method of separation of Variables – Solutions of one dimensional wave equation and one- dimensional heat equation – Steady state solution of two-dimensional heat equation – Fourier series solutions in cartesian coordinates.

UNIT IV FOURIER TRANSFORM 9+3

UNIT V Z – TRANSFORM AND DIFFERENCE EQUATIONS 9+3

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.

TOTAL: 60 PERIODS

TEXT BOOK:

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

UNIT- I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY

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

Field study of common plants, insects, birds
Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT- II ENVIRONMENTAL POLLUTION

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.

Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT- III NATURAL RESOURCES

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

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

UNIT-IV SOCIAL ISSUES AND THE ENVIRONMENT

UNIT-V HUMAN POPULATION AND THE ENVIRONMENT

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 environment at infant stage.
- Ignorance and incomplete knowledge has lead to misconceptions.
- Development and improvement in standard of living has lead to serious environmental disasters

TEXT BOOKS:
REFERENCE BOOKS:

EC8301 ELECTRONIC CIRCUITS – I

OBJECTIVES:
• To learn about biasing of BJTs and MOSFETs
• To design and construct amplifiers
• To study the effect of source and load
• To construct amplifiers with active loads
• To study high frequency response of all amplifiers

UNIT I BIASING OF DISCRETE BJT AND MOSFET
DC Load line, operating point, Various biasing methods for BJT-Design-Stability-Bias compensation, Thermal stability, Design of biasing for JFET, Design of biasing for MOSFET

UNIT II BJT AMPLIFIERS

UNIT III JFET AND MOSFET AMPLIFIERS
Small signal analysis of JFT amplifiers- Small signal Analysis of MOSFET and JFET, Common source amplifier, Voltage swing limitations, Small signal analysis of MOSFET and JFET Source follower and Common Gate amplifiers, - BiMOS Cascode amplifier

UNIT IV FREQUENCY ANALYSIS OF BJT AND MOSFET AMPLIFIERS
Low frequency and Miller effect , High frequency analysis of CE and MOSFET CS amplifier, Short circuit current gain, cut off frequency – $f_\alpha$ and $f_\beta$ unity gain and Determination of bandwidth of single stage and multistage amplifiers
UNIT V IC MOSFET AMPLIFIERS

IC Amplifiers- IC biasing Current steering circuit using MOSFET- MOSFET current sources- PMOS and NMOS current sources. Amplifier with active loads - enhancement load, Depletion load and PMOS and NMOS current sources load- CMOS common source and source follower- CMOS differential amplifier- CMRR

OUTCOMES:
At the end of the course the students will be able to
- Identify biasing of BJTs and MOSFETs.
- Design and construct amplifiers.
- Determine the effect of source and load.
- Construct amplifiers with active loads.
- Exposed to high frequency response of BJT and FET amplifiers.
- Know the construction of IC amplifiers.

TEXT BOOKS

REFERENCES:

EC8351 DIGITAL ELECTRONICS AND SYSTEM DESIGN L T P C 3 0 0 3

OBJECTIVES:
- To introduce Boolean algebra and its applications in digital systems
- To introduce design of various combinations nal digital circuits using logic gates
- To bring out the analysis and design procedures for synchronous and asynchronous sequential circuits
- To introduce the electronic circuits involved in the making of logic gates
• To introduce semiconductor memories and related technology

UNIT I  BASIC CONCEPTS AND COMBINATIONAL CIRCUITS  9
Number Systems – Decimal, Binary, Octal, Hexadecimal, 1s and 2s complements,
Codes– Binary, BCD, 84-2-1, 2421, Excess 3, Biquinary, Gray, Alphanumeric codes,
Boolean theorems, Logic gates , Universal gates, Sum of products and product of
sums, Minterms and Maxterms, Karnaugh map and Tabulation methods, Problem
formulation and design of combinational circuits, Code-Converters

UNIT II  MSI CIRCUITS  9
Half and Full Adders, Half and Full Subtractors, Binary Parallel Adder, Carry Look
Ahead Adder, BCD Adder, Magnitude Comparator, Decoder, Encoder, Priority
Encoder, Mux/ Demux, Implementation of combinational logic using standard ICs,
ROM, EPROM and EEPROM, PLA and PAL

UNIT III  SYNCHRONOUS SEQUENTIAL CIRCUITS  9
Flip flops – SR, JK, T, D, Master/Slave FF, Triggering of FFS, Analysis and design of
clocked sequential circuits – Moore / Mealy models, state minimization, state
assignment, circuit implementation, Counters, Ripple Counters, Ring Counters, Shift
registers, Universal Shift Register.

UNIT III  ASYNCHRONOUS SEQUENTIAL CIRCUITS  9
Stable and Unstable states, output specifications, cycles and races, state reduction, race
free assignments, Hazards, Essential Hazards, Pulse mode sequential circuits, Design
of Hazard free circuits

UNIT V  LOGIC FAMILIES AND SEMICONDUCTOR MEMORIES  9
Logic families- TTL, MOS, CMOS, Comparison of Logic families, Basic memory cell,
RAM, Memory decoding, Static and Dynamic memories.

TOTAL : 45 PERIODS

OUTCOMES:
At the end of the course the students will be able to
• Use Boolean algebra and applied to digital systems.
• Design various combinational digital circuits using logic gates.
• Bring out the analysis and design procedures for synchronous and asynchronous
  sequential circuits.
• Understand electronic circuits involved in the design of logic gates.
• Understand the semiconductor memories and related technology.

TEXT BOOKS:
   2002
REFERENCES:

EC8353 SIGNALS AND SYSTEMS L T P C
3 0 0 3

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 9
Continuous time signals (CT signals) - Discrete time signals (DT signals) – Step, Ramp, Pulse, Impulse, Exponential - classification of CT and DT signals – periodic and a periodic signals, random signals, Energy & Power signals - CT systems and DT systems, Classification of systems.

UNIT II ANALYSIS OF CONTINUOUS TIME SIGNALS 9
Fourier series analysis- Spectrum of Continuous Time (CT) signals- Fourier and Laplace transforms in Signal Analysis.

UNIT III LINEAR TIME INvariant – CONTINUOUS TIME SYSTEMS 9
Differential Equation-Block diagram representation-impulse response, convolution integrals- Fourier and Laplace transforms in Analysis.

UNIT IV ANALYSIS OF DISCRETE TIME SIGNALS 9
Baseband Sampling of CT signals- Aliasing, Reconstruction of CT signal from DT signal DTFT and properties, Z-transform & properties.

UNIT V LINEAR TIME INVARIANT – DISCRETE TIME SYSTEMS 9
Difference Equations-Block diagram representation-Impulse response-Convolution sum-DTFT and Z Transform analysis of Recursive & Non-Recursive systems.

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course the students will be able to
- Analyze the properties of a continuous time signal in the Fourier transform and Laplace Transform domain.
- Analyze the properties of a discrete time signal in the Fourier transform and Z transform domain.
• Characterize a continuous time system in the time domain, Fourier Transform domain and Laplace Transform domain.
• Characterize a discrete time system in the time domain, Fourier Transform domain and Z-transform domain.

TEXTBOOKS

REFERENCES

EE8351  BASICS OF ELECTRICAL ENGINEERING  L T P C  3 0 0 3

OBJECTIVES:
• To introduce three phase supply and power measurement
• To teach concepts in electrical generators, motors and transformers
• To introduce power generation, transmission and distribution concepts.

UNIT I  THREE PHASE CIRCUITS  9
Three phase supply – Star connection – Delta connection – Balanced and Unbalanced Loads- Power in three-phase systems – Measurement of power and power factor in three-phase systems – Comparison of star and delta - Advantages

UNIT II  DC MACHINES  9
Construction of DC machines – Theory of operation of DC generators – Characteristics of DC generators- Operating principle of DC motors – Types of DC motors and their characteristics– Speed control of DC motors- Applications.

UNIT III  TRANSFORMER  9
UNIT IV  INDUCTION MACHINES AND SYNCHRONOUS MACHINES


UNIT V  MEASUREMENT AND INSTRUMENTATION


OUTCOMES:
At the end of the course the students will be able to
- Understand three phase supply and power measurement.
- Comprehend concepts in electrical generators, motors, transformers, power generation, transmission and distribution concepts.

TEXT BOOKS
REFERENCES:

EC8311 DIGITAL SYSTEMS LABORATORY

OBJECTIVES:
- To learn hardware implementation and testing of digital circuits
- To learn building digital circuits such as adders, encoders, decoders, magnitude comparators, Flipflops, counters, shift registers using relevant digital ICs
- To simulate basic combinational and sequential circuits using Hardware Description Language

1. Implementation of Boolean expression using universal gates
2. Priority encoder
3. Half adder, Full adder and BCD adder
4. 2-bit Magnitude Comparator
5. Implementation of Boolean expressions using MUX
6. RS, JK, T and D FFs – truth Table verification
7. BCD counter, Mod 5, 6, 9 counters
8. Counters with 7 segment display
9. Ring counter, Johnson counter
10. Data transfer using shift register
11. Realization of Digital circuits using HDL

TOTAL: 45 PERIODS

OUTCOMES
- Ability to design, build and test any digital logic circuit using digital ICs for handling real life projects

LAB REQUIREMENTS
1. Digital Trainer Kit - 15 Nos.
   (with 5 V, Variable and fixed frequency Clock, Bread Board, Four Seven Segment displays, LEDs for output display, Logic 1 and 0 Input switches)
2. Logic ICs - 50 Nos each
   (7400, 7402, 7404, 7408, 7410, 7420, 7432, 7447,
EC8312 ELECTRONIC CIRCUITS – I LABORATORY

OBJECTIVES:
The student should be made to:
- To understand Bias in Amplifier circuits
- Study the characteristic of CE, CB and CC Amplifier
- Learn the frequency response of CS Amplifiers
- Study the Transfer characteristic of differential amplifier
- Study the frequency response characteristics of multistage amplifiers
- Perform SPICE simulation of Electronic Circuits

1. Frequency Response of CE amplifier
2. Frequency response of CB amplifier
3. CC Amplifier - buffer
4. Frequency response of CS Amplifiers
5. Differential Amplifiers - Transfer characteristic.
6. CMRR Measurement
7. Cascode amplifier
8. Cascade amplifier
9. Spice Simulation of Common Emitter and Common Source amplifiers

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Analyze the differential amplifier characteristics
- Analyze the frequency response characteristics of single stage and multi stage amplifiers using BJT and JFET
- Simulate various amplifiers using PSpice

LAB REQUIREMENTS
- CRO (30MHz) – 10 Nos.
- Function Generators (3MHz) – 10 Nos.
- Dual Regulated Power Supplies (0 – 30V) – 10 Nos.
- Pentium IV PC – 10 Nos.
- Transistor (BJJ-NPN) – 50 Nos.
OBJECTIVES:
The basic concepts and tools of the subject covered are:
- Solving systems of linear equations, Matrix operations.
- Vector spaces and subspaces; linear independence and span of a set of vectors, basis and dimension; the standard bases for common vector spaces.
- Inner product spaces: Cauchy-Schwarz inequality, orthonormal bases, the
- Gramm- Schmid procedure, orthogonal complement of a subspace, orthogonal projection.
- Linear Transformations: kernel and range of a linear transformation, the Rank-NullityTheorem, linear transformations and matrices, change of basis, similarity of matrices.
- Eigenvalues and eigenvectors, diagonalizability of a real symmetric matrix, canonical forms.
- Mathematical foundations of numerical techniques for solving linear system, eigen value problems and generalized inverses.

UNIT I VECTOR SPACES 9+3

UNIT II ORTHOGONALITY 9+3

UNIT III EIGENVALUES, EIGENVECTORS AND POSITIVE DEFINITE MATRICES 10
Diagonal form of a Matrix – Difference equations and the powers $A^t$ – Differential equations and the exponential $e^{At}$ – similarity transformations - Minima, Maxima and Saddle points, Test for Positive, Negative and Semidefinite and Indefinite Matrices.

UNIT IV NUMERICAL SOLUTION OF LINEAR SYSTEM OF EQUATIONS 10+3
UNIT V NUMERICAL SOLUTION OF EIGENVALUE PROBLEMS AND GENERALISED INVERSES 10+3


TOTAL: 60 PERIODS

OUTCOMES:
At the end of the course the students will be able to
- Understand the solving techniques of Linear equations and the inner product spaces using Cauchy- Schwarz inequality, Orthonormal bases, Orthogonal Complement of the subspace.
- Understand the mathematical foundation of Numerical methods.

TEXT BOOKS:

REFERENCES:

EC8401 COMMUNICATION THEORY L T P C 3 0 0 3

OBJECTIVES:
- To introduce the concepts of various modulations and their spectral analysis
- To introduce random processes and their characteristics
- To understand noise impact on modulations and
- To introduce some of the essential baseband signal processing techniques.
UNIT I   AMPLITUDE MODULATION  

UNIT II   ANGLE MODULATION  
Angle modulation – PM and FM – Narrow band, Wideband FM - Spectral analysis of modulated signal- FM Modulators and FM Demodulators- Discriminator, PLL, Stereo FM

UNIT III   RANDOM PROCESS  

UNIT IV   NOISE PERFORMANCE  

UNIT V  BASEBAND TECHNIQUES  
Quantization – Uniform and non-uniform quantization – Quantization noise – Companding laws of speech signals – PCM, DPCM, ADPCM, DM, ADM, and Subband Coding. Multiplexing– TDM (E and T lines), FDM.

TOTAL : 45 PERIODS

OUTCOMES:
At the end of the course the students will be able to
- Identify the concepts of various modulations and their spectral analysis.
- Understand random processes and their characteristics, noise impact on modulations and essential baseband signal processing techniques.

TEXT BOOKS:

REFERENCES:
2. H P Hsu, Schaum Outline Series - “Analog and Digital Communications” TMH 2006
OBJECTIVES:

- To impart knowledge on the basics of static electric and magnetic field and the associated laws.
- To give insight into the propagation of EM waves and also to introduce the methods in computational electromagnetics.

UNIT I  STATIC ELECTRIC FIELD
Introduction to co-ordinate systems, Gradient, Divergence, Curl, Divergence theorem, Stokes theorem, Coulombs law, Electric field intensity, Principle of superposition, Electric scalar potential, Electric flux density. Gauss’s law and its application, Permittivity, Polarization, Boundary relation, Capacitance, Dielectric strength, Energy and Energy density, Poisson and Laplace equation and their application, Numerical examples

UNIT II  STATIC MAGNETIC FIELD

UNIT III  TIME VARYING ELECTRIC AND MAGNETIC FIELDS
Faradays law, Transformer and Mutual induction, Maxwell’s equation, Self and Mutual inductance, Displacement current, Amperes law and its inconsistency for time varying fields, Boundary relation, Poynting vector, Numerical examples.

UNIT IV  PLANE EM WAVES IN ISOTROPIC MEDIA
Wave equation from Maxwell’s Equation, Uniform plane waves in perfect dielectric, conductors, free space. Polarization, Reflection and Refraction of plane waves at different boundaries, Surface impedance, Numerical examples

UNIT V  APPLICATION OF STATIC FIELDS AND COMPUTATIONAL METHODS
Deflection of a charged particle, CRO, Ink Jet Printer, Electro static generator, Magnetic Separator, Cyclotron, Velocity selector and Mass Spectrometer, Electromagnetic pump, Introduction to field computation methods-FDM, FEM, MOM, Numerical examples

TOTAL : 45 PERIODS

OUTCOMES
At the end of the course the students will be able to
- Have knowledge on the basics of static electric and magnetic field and the associated laws.
- Understand the propagation of EM waves and also get introduce the methods in computational electromagnetics.
TEXT BOOKS:

REFERENCES:

EC8403 ELECTRONIC CIRCUITS II L T P C
3 1 0 4

OBJECTIVES:
• To study about feedback amplifiers and oscillator principles
• To design oscillators
• To study about tuned amplifiers
• To study about active filters
• To know the principles of DC-DC convertors

UNIT I FEEDBACK AMPLIFIERS AND STABILITY

UNIT II OSCILLATORS
Barkhausen criteria for oscillator – Analysis of RC oscillators – Phase shift and Wein bridge oscillators – LC oscillators – Colpitts, Hartley, Clapp, Crystal, Armstrong, Franklin and Ring Oscillators

UNIT III TUNED AMPLIFIERS
UNIT IV  ACTIVE FILTERS
Filter transmission –Types - specification, transfer function - Butterworth and Chebyshev filters - First and second order filter functions - circuit implementation – single-amplifier bi quadratic active filters - Switched-capacitor filters

UNIT V  POWER AMPLIFIERS AND DC CONVERTERS
Power amplifiers- class A-Class B-ClassAB-Class C-Power MOSFET-Temerature Effect- Class AB Power amplifier using MOSFET –DC/DC convertors – Buck, Boost, Buck-Boost analysis and design

Outcomes:
At the end of the course the students will be able to:
• Have Knowledge about feedback amplifiers and oscillator principles.
• Design and Construct oscillators, tuned amplifier’s, Multivibrators and DC-DC convertors.

TOTAL : 45 L + 15 T = 60 PERIODS

TEXTBOOKS:

REFERENCES
2. Muhammed H.Rashid power electronics Pearson Education / PHI , 2004

EC8451  COMPUTER ARCHITECTURE AND ORGANIZATION

OBJECTIVES:
• To study the general purpose architecture for computer system .
• To study the design of data path unit and control unit for ALU operation.
• Understanding the concept of various memories.
• To introduce the concept of interfacing and organization of multiple processors.

UNIT I  INTRODUCTION
UNIT II DATA PATH DESIGN 9
Fixed Point Arithmetic, Addition, Subtraction, Multiplication and Division, Combinational and Sequential ALUs, Carry look ahead adder, Robertson algorithm, booth’s algorithm, non- restoring division algorithm, Floating Point Arithmetic, Coprocessor, Pipeline Processing, Pipeline Design, Modified booth’s Algorithm

UNIT III CONTROL DESIGN 9
Hardwired Control, Microprogrammed Control, Multiplier Control Unit, CPU Control Unit, Pipeline Control, Instruction Pipelines, Pipeline Performance, Superscalar Processing, Nano Programming.

UNIT IV MEMORY ORGANIZATION 9
Random Access Memories, Serial - Access Memories, RAM Interfaces, Magnetic Surface Recording, Optical Memories, multilevel memories, Cache & Virtual Memory, Memory Allocation, Associative Memory.

UNIT V SYSTEM ORGANIZATION 9
Communication methods, Buses, Bus Control, Bus Interfacing, Bus arbitration, IO and system control, IO interface circuits, Handshaking, DMA and interrupts, vectored interrupts, PCI interrupts, pipeline interrupts, IOP organization, operation systems, multiprocessors, fault tolerance, RISC and CISC processors, Superscalar and vector processor.

OUTCOMES;
At the end of the course the students will be able to
• Describe the general purpose architecture for computer system.
• Design data path unit and control unit for ALU operation
• Understanding the concept of various memories, interfacing and organization of multiple processors.

TEXTBOOKS:

REFERENCES
OBJECTIVES:
• To study the circuit configuration of linear integrated circuits
• To introduce practical applications of linear integrated circuits
• To introduce the concept of analog multiplier and Phase Locked Loop with applications
• To study ADC and DAC
• To introduce special function ICs and its construction

UNIT I CIRCUIT CONFIGURATION FOR LINEAR ICS
Current sources, Analysis of difference amplifiers with active loads, supply and temperature independent biasing, Band gap references, Monolithic IC operational amplifiers, specifications, frequency compensation, slew rate and methods of improving slew rate.

UNIT II APPLICATION OF OPERATIONAL AMPLIFIERS
Linear and Nonlinear Circuits using operational amplifiers and their analysis, Inverting and Non inverting Amplifiers, Differentiator, Integrator Voltage to Current converter, Instrumentation amplifier, Sine wave Oscillators, Low pass and band pass filters, comparator, Multivibrator and Schmitt trigger, Triangle wave generator, Precision rectifier, Log and Antilog amplifiers, Non-linear function generator.

UNIT III ANALOG MULTIPLIER AND PLL
Analysis of four quadrant and variable Tran conductance multipliers, Voltage controlled Oscillator, Closed loop analysis of PLL, AM, PM and FSK modulators and demodulators. Frequency synthesizers, Compander ICs

UNIT IV ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTORS
Analog switches, High speed sample and hold circuits and sample and hold IC’s, Types of D/A converter Current driven DAC, Switches for DAC, A/D converter, Flash, Single slope, Dual slope, Successive approximation, DM and ADM, Voltage to Time and Voltage to frequency converters.

UNIT V SPECIAL FUNCTION ICS
Timers, Voltage regulators - linear and switched mode types, Switched capacitor filter, Frequency to Voltage converters, Tuned amplifiers, Power amplifiers and Isolation Amplifiers, Video amplifiers, Fiber optics ICs and Opto couplers, Sources for Noises, Op Amp noise analysis and Low noise OP-Amps.

TOTAL : 45 PERIODS
OUTCOMES:
At the end of the course the students will be able to
- Describe practical applications of linear integrated circuits.
- Apply the concept of analog multiplier and Phase Locked Loop with applications.
- Analyze Analog to Digital Converter and Digital to Analog Converter
- Identify special function ICs and its construction

TEXT BOOK:

REFERENCES:

EC8411 ELECTRONIC CIRCUITS – II LABORATORY

OBJECTIVES:
- To gain hands on experience in designing feedback amplifier, tuned amplifier and oscillators.
- To learn the design of active filters
- To learn simulation software used for circuit design.
- To understand the concepts of multivibrators and power amplifiers.

1. Design and Analysis of Feedback amplifiers
2. Design of RC Oscillators
3. Design of LC Oscillators
4. LPF and HPF
5. Single Tuned amplifier
6. Spice simulation of feedback amplifiers
7. Spice simulation of oscillators and Multivibrators
8. Class A and Class B Power Amplifiers.

TOTAL: 45 PERIODS
OUTCOMES:
On completion of this lab course, the students will be able to
- Analyze feedback amplifiers
- Design sinusoidal oscillators, tuned amplifiers, wave-shaping circuits and multivibrators
- Analyze electronic circuits through simulation.

LAB REQUIREMENTS:
CRO (30MHz) – 10 Nos.
Function Generators (3MHz) – 10 Nos.
Dual Regulated Power Supplies (0 – 30V) – 10 Nos.
Pentium IV PC (LTSPICE or equivalent s/w) – 10 user license
BC 107, BC 147 – 50 Nos.
Resistors, Capacitors & Inductors – As required
Breadboards – 15 Nos.

EE8262 ELECTRICAL ENGINEERING LABORATORY L T P C
0 0 3 2

OBJECTIVES:
- To provide hands on experience with generators and motors.
- To understand the working of DC/AC motors and generators
- To study the characteristics of transducers
- To learn the use of transformer
- To understand the behavior of linear system through simulation
- To gain knowledge of controllers
1. Study of DC & AC motor starters
2. Open Circuit and Short Circuit test on single phase transformer to draw its equivalent circuit
3. Regulation of three phase alternator
4. Study of three phase circuits
5. Speed Control of DC shunt motor
6. Load Test on DC shunt motor
7. OCC & Load Characteristics of DC shunt generator
8. Load test on single-phase transformer
9. Load test on three-phase Induction motor
10. Load test on single-Phase Induction motor

TOTAL: 45 PERIODS
OUTCOMES:
At the end of the course, the student should be able to:
- Perform experiments to study the load characteristics of DC motors / generators.
- Design bridge network circuit to measure the values of passive component.
- Analyse the stability of linear system through simulation software.
- Obtain transfer function of DC generators.

LAB REQUIREMENTS:

<table>
<thead>
<tr>
<th>S.No</th>
<th>Equipment</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>DC Shunt Motor with Loading Arrangement; 3HP,220V,14A,750RPM,0.6A(Shunt field)</td>
<td>2</td>
</tr>
<tr>
<td>2.</td>
<td>DC Shunt Motor Coupled With Three phase Alternator; DC Shunt, Motor kW: 5.2, volts: 220, Amps: 27.5, Speed: 1500, RPM Field</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Three phase Alternator kVA: 7.5, volts: 415, Amps: 10.4, Speed: 1500, RPM Field</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Single Phase Transformer; 2 KVA, 230/110-166 V</td>
<td>1</td>
</tr>
<tr>
<td>4.</td>
<td>Three Phase Induction Motor with Loading Arrangement; 3.7KW, 415v, 7.5A, 1430 RPM</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>Single Phase Induction Motor with Loading Arrangement</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>DC Shunt Motor Coupled With DC Compound; DC Shunt, Motor kW: 7.4, volts: 220, Amps: 38.5, Speed: 960, RPM Field</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>DC Compound, Generator kW: 7.5, volts: 220, Amps: 38.5, Speed: 960, RPM Field</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Tachometer - Digital/Analog</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------------------------------</td>
<td>---</td>
</tr>
<tr>
<td>8.</td>
<td>Single Phase Auto Transformer; (0-270)V</td>
<td>2</td>
</tr>
<tr>
<td>9.</td>
<td>Three Phase Auto Transformer; (0-270)V</td>
<td>1</td>
</tr>
<tr>
<td>10.</td>
<td>MC Voltmeter-(0-300/600)V</td>
<td>5</td>
</tr>
<tr>
<td>11.</td>
<td>MC Ammeter (0-10/20)A</td>
<td>5</td>
</tr>
<tr>
<td>12.</td>
<td>MC Ammeter (0-2/1)A</td>
<td>4</td>
</tr>
<tr>
<td>13.</td>
<td>MI Voltmeter (0-300/600)V</td>
<td>5</td>
</tr>
<tr>
<td>14.</td>
<td>MI Ammeter (0-10/20)A</td>
<td>6</td>
</tr>
<tr>
<td>15.</td>
<td>MI Ammeter (0-1/2)A</td>
<td>4</td>
</tr>
<tr>
<td>16.</td>
<td>UPF Wattmeter (300/600V, 10/20A)</td>
<td>4</td>
</tr>
<tr>
<td>17.</td>
<td>LPF Wattmeter (300/600V, 10/20A)</td>
<td>4</td>
</tr>
<tr>
<td>18.</td>
<td>Single Phase Resistive Loading Bank (10KW)</td>
<td>2</td>
</tr>
<tr>
<td>19.</td>
<td>Three Phase Resistive Loading Bank (10KW)</td>
<td>2</td>
</tr>
<tr>
<td>20.</td>
<td>SPST switch</td>
<td>2</td>
</tr>
<tr>
<td>21.</td>
<td>Fuse various ranges</td>
<td>As per the requirement</td>
</tr>
<tr>
<td>22.</td>
<td>Wires</td>
<td>As per the requirement</td>
</tr>
<tr>
<td>23.</td>
<td>Rheostats (100Ω, 1A; 250Ω, 1.5A; 75Ω, 16A, 1000Ω, 1A)</td>
<td>Each 2</td>
</tr>
</tbody>
</table>

EC8501  CONTROL SYSTEM ENGINEERING  L T P C  3 0 0 3

OBJECTIVES:

• To introduce the elements of control system and their modeling using various techniques.
• To introduce methods for analyzing the time response, the frequency response and the stability of systems.
• To introduce the state variable analysis method.

UNIT I  CONTROL SYSTEM MODELING  9

Basic Elements of Control System – Open loop and Closed loop systems - Differential equation - Transfer function, Modeling of Electric systems, Translational and rotational mechanical systems - Block diagram reduction Techniques - Signal flow graph.
UNIT II TIME RESPONSE ANALYSIS
Time response analysis - First Order Systems - Impulse and Step Response analysis of second order systems - Steady state errors – P, PI, PD and PID Compensation, Analysis using MATLAB

UNIT III FREQUENCY RESPONSE ANALYSIS

UNIT IV STABILITY ANALYSIS

UNIT V STATE VARIABLE ANALYSIS

OUTCOMES
At the end of the course the students will be able to
Have Clear concepts of continuous-time control systems design and stability analysis in time domain and in frequency domain.

TOTAL : 45 PERIODS

TEXTBOOK:

REFERENCES:
OBJECTIVES:
• To understand the concept of information, types of channels
• To understand the capabilities of various source coding theorems and the fundamental limit of transmission over the channel.
• To understand the capabilities of various channel coding theorems
• To develop the knowledge on pass band communication and spread spectrum.

UNIT I  INFORMATION THEORY

UNIT II  ERROR CONTROL CODING TECHNIQUES
Channel coding theorem – Linear block codes – Hamming codes – Cyclic codes – Convolutional codes – Viterbi decoding.

UNIT III  BASEBAND TECHNIQUES
Pulse Modulation-PAM,PPM and PDM, Line codes – RZ,NRZ, Manchester, Binary N-zero substitution codes - PSDs – ISI – Nyquist criterion for distortionless transmission – Pulse shaping – Correlative coding - M-ary schemes – Eye pattern

UNIT IV  BANDPASS SIGNALING

UNIT V  SYNCHRONISATION AND SPREAD SPECTRUM TECHNIQUES

OUTCOMES:

TOTAL: 45 PERIODS
At the end of the course the students will be able to
• Understand the concepts of information, types of channels.
• Understand the capabilities of various source coding theorems and the fundamental limit of transmission over the channel.
• Describe the capabilities of various channel coding theorems.
• Identify pass band communication and spread spectrum.

TEXT BOOKS:

REFERENCES:
1. H P Hsu, Schaum Outline Series - “Analog and Digital Communications”, TMH 2006

EC8503 MICROPROCESSOR AND MICROCONTROLLERS 3003

OBJECTIVES:
• To study the architecture of 8085 and 8086, 8051
• To study the addressing modes and instruction set of 8085 and 8086, 8051
• To introduce the need and use of interrupt structure in 8085 and 8051.
• To develop skill in simple program writing for 8085 and 8051 applications.
• To introduce commonly used peripheral / interfacing ICs.

UNIT I ARCHITECTURE OF 8085 /8086
8085- Functional Block Diagram- Description - Addressing Modes, Timing diagrams. Introduction to 8086 – Architecture, Instruction set, Addressing Modes.

UNIT II ASSEMBLY LANGUAGE PROGRAMMING
8085: Assembly Language Programming, programming techniques, Subroutines, serial I/O and data communication, Interrupts, Interrupt programming, 8086:Simple Assembly Language Programming, Assembler Directives- Interrupts and Interrupt Applications.

UNIT III PERIPHERAL INTERFACING & APPLICATION
Programmable Peripheral Interface (8255), keyboard display controller (8279), ADC, DAC Interface, Programmable Timer Controller (8254), Programmable interrupt
controller (8259), Serial Communication Interface (8251).

UNIT IV MICROCONTROLLER
8051 – Architecture, Special Function Registers(SFRs), I/o Pins Ports and Circuits, Instruction set, Addressing modes, Assembly language programming.
OUTCOMES:
At the end of the course the students will be able to
- Describe the architecture of 8085 and 8086, 8051.
- Identify the addressing modes and instruction set of 8085, 8086 and 8051.
- Analyze the need and use of interrupt function.
- Write simple program writing for 8085 and 8051 based applications and Interfaces.

TEXTBOOKS:

REFERENCES:
5. Nilesh B Bahadure, “Microprocessors The 8086 to Pentium Family, PHI, 2010

EC8504 TRANSMISSION LINES AND WAVE GUIDES  L T P C  3 0 0 3

OBJECTIVES:
- To introduce the various types of transmission lines and to discuss the losses associated.
- To give thorough understanding about impedance transformation and matching.
- Usage of smith chart in problem solving is dealt with.
• Knowledge on filter theories and waveguide theories are imparted.

UNIT I  TRANSMISSION LINE THEORY & PARAMETERS  8
Introduction to different types of transmission lines, Transmission line Equation – Solution – Characteristic impedance- Infinite line concept - Distortion less line – loading – input impedance, Losses in Transmission lines– Reflection loss, Insertion loss, return loss, Introduction to planar transmission lines. Numerical examples

UNIT II  IMPEDANCE MATCHING AND TRANSFORMATION  9

UNIT III  NETWORK COMPONENTS  8
Filter fundamentals, Filter design- lumped element and distributed element approach to filterdesign – Design of Attenuators and Equalizers – Lattice type, Concept of inverse networks– Transients in transmission lines, Lattice diagram. Numerical examples

UNIT IV  RECTANGULAR WAVE GUIDES  10
Waves between Parallel Planes – characteristic of TE , TM and TEM waves, Velocities of propagation, Solution of wave Equation in Rectangular guides, TE and TM modes, Dominant Mode, Attenuation, Mode Excitation, Dielectric slab wave guides, Numerical examples.

UNIT V  CYLINDRICAL WAVE GUIDES  10
Solution of wave equation in circular guides, TE and TM wave in circular guides, Wave impedance, attenuation, mode excitation, formation of cylindrical cavity, Application, cavity resonator and Q for dominant mode, Numerical examples

TOTAL: 45 PERIODS

OUTCOMES
At the end of the course the students will be able to
• Analyze the various types of transmission lines and to discuss the losses associated.
• Understand impedance transformation and matching.
• Use smith chart in problem solving
• Apply knowledge on filter theories and waveguide theories are imparted.

TEXTBOOK:
1. John D Ryder “Networks lines and fields” Prentice Hall of India, 2005

REFERENCES
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  DISCRETE FOURIER TRANSFORM  12

UNIT II  DESIGN OF INFINITE IMPULSE RESPONSE FILTERS  12
Analog filters – Butterworth filters, Chebyshev Type I filters (upto 3rd order), Analog Transformation of prototype LPF to BPF /BSF/ HPF. Transformation of analog filters into equivalent digital filters using Impulse invariant method and Bilinear Z transform method-Realization structures for IIR filters – direct, cascade, parallel forms.

UNIT III  DESIGN OF FINITE IMPULSE RESPONSE FILTERS  12
Design of linear phase FIR filters windowing and Frequency sampling methods - Realization structures for FIR filters – Transversal and Linear phase structures-Comparison of FIR & IIR.

UNIT IV  FINITE WORDLENGTH EFFECTS  12
Representation of numbers-ADC Quantization noise-Coefficient Quantization error-Product Quantization error-truncation & rounding errors -Limit cycle due to product round-off error- Round- off noise power-limit cycle oscillation due to overflow in digital filters- Principle of scaling.

UNIT V  MULTIRATE SIGNAL PROCESSING  12
Introduction to Multirate signal processing-Decimation-Interpolation-Polyphase Decomposition of FIR filter-Multistage implementation of sampling rate conversion-Design of narrow band filters - Applications of Multirate signal processing.

TOTAL: 60 PERIODS

OUTCOMES:
At the end of the course the students will be able to
- Understand discrete Fourier transform and its applications.
- Design of infinite and finite impulse response filters for various applications.
- Apply signal processing concepts in systems having more than one sampling frequency
TEXT BOOKS:

REFERENCES:

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

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

TOTAL: 30 PERIODS

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

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.

REFERENCE BOOKS

EXTENSIVE READERS

WEB RESOURCES
1. www.humanresources.about.com
2. www.careerride.com

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.
OBJECTIVES:

- To study the addressing modes and instruction set of 8085 and 8086, 8051.
- To introduce the Assembly language programming skills in 8085 and 8086, 8051.
- To develop skill in the interfacing concepts using 8085 and 8086, 8051.
- To introduce the concept interfacing add on cards and peripheral / interfacing ICs.

8085 BASED EXPERIMENTS

1. Assembly Language Programming of 8085

8086 BASED EXPERIMENTS

2. Programs for 16 bit Arithmetic, Sorting, Searching and String operations,
3. Programs for Digital clock, Interfacing ADC and DAC
4. Interfacing and Programming 8279, 8259, and 8253.
5. Serial Communication between two Microprocessor Kits using 8251.
6. Interfacing and Programming of Stepper Motor and DC Motor Speed control
   and Parallel Communication between two Microprocessor Kits using Mode 1
   and Mode 2 of 8255.
7. Macroassembler Programming for 8086

8051 BASED EXPERIMENTS

8. Programming using Arithmetic, Logical and Bit Manipulation instructions of
   8051 microcontroller.
9. Programming and verifying Timer, Interrupts and UART operations in
   8051 microcontroller.
10. Interfacing – DAC and ADC and 8051 based temperature measurement
11. Interfacing – LED and LCD
12. Interfacing – stepper motor traffic light control
13. Communication between 8051 Microcontroller kit and PC.
14. R8C based applications

LAB REQUIREMENTS:

1. 8085 trainer kit 15 Nos.
2. 8051 trainer kit 15 Nos.
3. 8086 trainer kit 10 Nos.
4. Macro assembler MASM (Simulator) - 10 Users.
5. 8279 Interfacing card compatible with 8085, 8051 and 8086 trainers. – 2Nos.
6. 8251 Interfacing card compatible with 8085, 8051 and 8086 trainers. – 2Nos.
7. ADC and DAC Interfacing card compatible with 8085, 8051 and 8086 trainers. – 2Nos.
8. Traffic Light - Interfacing card compatible with 8085, 8051 and 8086 trainers. – 2Nos.
9. Stepper motor Interfacing - Interfacing card compatible with 8085, 8051 and 8086 trainers. – 2Nos.
10. (16X2) LCD Display - Interfacing card compatible with 8085, 8051 and 8086 trainers. – 2Nos
11. Temperature measurement card - Interfacing card compatible with 8085, 8051 and 8086 trainers. – 2Nos
12. DC motor speed control card- Interfacing card compatible with 8085, 8051 and 8086 trainers. – 2Nos

TOTAL: 45 PERIODS

OUTCOME:
- The student will be familiar in the architecture and instruction set of the following processors and controller 8085 and 8086, 8051.
- The lab will equip the student with the interfacing knowledge and right selection of processors.
- The lab will equip the student with the right selection of add on cards and peripheral / interfacing ICs for a specific task.

OBJECTIVES:

The student should be made to:
- To visualize the effects of sampling and TDM
- To Implement AM & FM modulation and demodulation
- To implement PCM & DM
- To implement FSK, PSK and DPSK schemes
- To implement Equalization algorithms
- To implement Error control coding schemes
1. Signal Sampling and reconstruction
2. Time Division Multiplexing
3. AM / FM Modulator and Demodulator
4. Pulse Code Modulation and Demodulation
5. Delta Modulation and Demodulation
6. Line coding schemes
7. FSK, PSK and DPSK schemes (Simulation)
8. Error control coding schemes (Simulation)
9. Spread spectrum communication (Simulation)
10. Communication link simulation
11. Symbol Timing Synchronization
12. Equalization – Zero Forcing & LMS algorithms

TOTAL: 45 PERIODS

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

- Simulate end-to-end Communication Link
- Demonstrate their knowledge in base band signaling schemes through implementation of FSK, PSK and DPSK
- Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of communication system
- Simulate & validate the various functional modules of a communication system

LAB REQUIREMENTS:

i) Kits for Signal Sampling, TDM, AM, FM, PCM, DM and Line Coding Schemes
ii) Software Defined Radio platform for link simulation studies
iii) MATLAB / SCILAB for simulation experiments
iv) PCs - 6 No.s

EC8561 DIGITAL SIGNAL PROCESSING LABORATORY

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

DSP PROCESSOR IMPLEMENTATION
1. Study of architecture of Digital Signal Processor
2. MAC operation using various addressing modes
3. Implementation of difference equations
4. Linear Convolution  
5. Circular Convolution  
6. Waveform generation

MATLAB / EQUIVALENT SOFTWARE PACKAGE
7. Generation of sequences  
8. Linear and Circular Convolutions  
9. DFT  
10. FIR filter design  
11. IIR filter design  
12. Finite wordlength effects  
13. Decimation and Interpolation

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

LAB REQUIREMENTS:
TMS 320C5x / TMS 320C6x Kits – 15 Nos.  
MATLAB or Equivalent S/w – 15 User License

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

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

UNIT I    INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS  
Definition of Management –Science or Art – Manager Vs Entrepreneur- types of

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:
At the end of the course the students will be able to
• Apply management principles to become a versatile professional.
• Demonstrate a vivid understanding and significance of inventory systems, finance and management tools.

TEXT BOOKS:
REFERENCES:

EC8601 ANTEENAS AND WAVE PROPAGATION

OBJECTIVES:
• To give insight into 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
Radiation from rectangular apertures, Uniform and Tapered aperture, Horn antenna, Reflector antenna, Aperture blockage, Feeding structures, Slot antennas, Microstrip antennas – Radiation mechanism – Application, Numerical tool for antenna analysis

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

OUTCOMES:
At the end of the course the students will be able to
• Have insight into the radiation phenomena
• Have a thorough understanding of the radiation characteristics of different types of Antennas.
• Identify the different types of propagation of radio waves at various frequencies.

TEXT BOOKS :

REFERENCES:

EC8602 COMMUNICATION NETWORKS L T P C
3 0 0 3

OBJECTIVES:
• To introduce the layered communication architectures
• To understand various physical, data link and routing layer protocols
• To understand application layer protocols and security issues
• To understand various digital switching techniques.
UNIT I NETWORK FUNDAMENTALS AND PHYSICAL LAYER
Introduction to Networks, definition of layers, services, interface and protocols. OSI reference model- layers and duties. TCP/IP reference model – layers and duties. Physical layer- general description, characteristics, signaling media types, topologies, examples physical layer (RS232C, ISDN, ATM,SONET)

UNIT II DATA LINK LAYER AND NETWORK INTERCONNECTION
Logical link control Functions:- Framming, Flow control , Error control: CRC, LLC protocols:- HDLC, P to P. Medium access layer:- Random access, Controlled access, Channelization, IEEE standards:- 802.3, 802.4 and 802.5. Internetworking, Interconnection issues, Interconnection devices:- Repeaters, Hubs, Routers/switches and Gateways.

UNIT III MESSAGE ROUTING TECHNOLOGIES
Circuit switching, packet switching, message switching. Internet protocols; IPV4, IPV6, ARP, RARP, ICMP, IGMP, VPN. Network Routing Algorithms: - Distance vector routing, OSPF, Dijkstra’s, Bellaman Ford, Congestion control algorithms.

UNIT IV END-END PROTOCOLS AND SECURITY

UNIT V DIGITAL SWITCHING
Switching functions, Space Division Switch, Time Division Switch, STS switching, TST switching, No 4 ESS Toll switch, digital cross connect systems.

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course the students will be able to
- Describe the layered communication architectures.
- Understand various physical, data link and routing layer protocols.
- Analyze the application layer protocols and security issues and also the various

TEXT BOOKS
REFERENCES:

EC8651 DIGITAL VLSI L T P C
3 0 0 3

OBJECTIVES:
- In this course, the MOS circuit realization of the various building blocks that is common to any microprocessor or digital VLSI circuit are studied.
- Architectural choices and performance tradeoffs involved in designing and realizing the circuits in CMOS technology are discussed.
- The main focus in this course is on the transistor circuit level design and realization for digital operation and the issues involved as well as the topics covered are quite distinct from those encountered in courses on CMOS Analog IC design.

UNIT I MOS TRANSISTOR PRINCIPLE
NMOS and PMOS transistors, Process parameters for MOS and CMOS, Electrical properties of CMOS circuits and device modeling, Scaling principles and fundamental limits, CMOS inverter scaling, propagation delays, Stick diagram, Layout diagrams

UNIT II COMBINATIONAL LOGIC CIRCUITS
Examples of Combinational Logic Design, Elmore’s constant, Pass transistor Logic, Transmission gates, static and dynamic CMOS design, Power dissipation – Low power design principles

UNIT III SEQUENTIAL LOGIC CIRCUITS
Static and Dynamic Latches and Registers, Timing issues, pipelines, clock strategies, Memory architecture and memory control circuits, Low power memory circuits, Synchronous and Asynchronous design

UNIT IV DESIGNING ARITHEMETIC BUILDING BLOCKS
Data path circuits, Architectures for ripple carry adders, carry look ahead adders, High speed adders, accumulators, Multipliers, dividers, Barrel shifters, speed and area tradeoff
UNIT V IMPLEMENTATION STRATEGIES

Full custom and Semi custom design, Standard cell design and cell libraries, FPGA building block architectures, FPGA interconnect routing procedures.

OUTCOMES:
At the end of the course the students will be able to
- Realize the digital building blocks using MOS circuit.
- Design combinational circuits, sequential circuits and memory circuits
- Understand the concepts of ASIC design flow.

TEXTBOOKS:

REFERENCES:

EC8611 NETWORKING LABORATORY

OBJECTIVES:
- To design and analysis various physical layer protocols that are used in present day technologies
- To understand Medium access layer Protocols
- To understand routing layer protocols
- To understand wired security protocols

1. Analysis of logical link control layer protocols – Stop & wait, Sliding Window, Go-back N
2. Analysis of MAC protocols 6 – ALOHA, SLOTTED ALOHA, CSMA, CSMA/CD, TOKEN BUS, TOKEN RING.
3. Analysis of Routing protocols – OSPF, LINK STATE ROUTING, BELLMAN FORD
4. Client / Server communication using TCP / UDP Socket programming
5. Data Packet Scheduling, Congestion Control
6. Switches / Routers
7. Wi – Fi Physical Layer
8. Wi – Fi MAC Layer
9. Cryptography ( Network Security )
10. LAN / MAN / WAN simulation and performance evaluation

TOTAL: 45 PERIODS

LAB REQUIREMENTS:
LAN TRAINER KITS FOR LLC PROTOCOL STUDIES – 2 No.s
LAN TRAINER KITS FOR MAC PROTOCOL STUDIES – 4 No.s
NETWORK SIMULATION SOFTWARE - NETSIM / QUALNET
                                         / Ns2 / GLOMOSIM
PCs - 8 No.s

OUTCOMES:
- The students get familiarized about the various operations of the computer communication networks.
- Ability of the students is enhanced to design and analyze existing physical, MAC and routing layer protocols.

EC8612 VLSI DESIGN LABORATORY LTPC 0032

OBJECTIVES:
- To learn Hardware Descriptive Language(Verilog/VHDL)
- To learn the fundamental principles of VLSI circuit design in digital and analog domain
- To familiarise fusing of logical modules on FPGAs
- To provide hands on design experience with professional design (EDA) platforms.

FPGA Based experiments.
1. HDL based design entry and simulation of simple counters, state machines, adders (min 8 bit) and multipliers (4 bit min).
2. Synthesis, P&R and post P&R simulation of the components simulated in (1) above. Critical paths and static timing analysis results to be identified. Identify and verify possible conditions under which the blocks will fail to work correctly.
3. Hardware fusing and testing of each of the blocks simulated in (I). Use of either chipscope feature (Xilinx) or the signal tap feature (Altera) is a must. Invoke the PLL and demonstrate the use of the PLL module for clock generation in FPGAs.

IC Design Experiments: (Based on Cadence/MAGMA/Tanner)
4. Design and simulation of a simple 5 transistor differential amplifier. Measure gain, ICMR, and CMRR
5. Layout generation, parasitic extraction and resimulation of the circuit designed in (I)
7. For expt (c) above, P&R, power and clock routing, and post P&R simulation.
8. Analysis of results of static timing analysis.

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to
- Write HDL code for basic as well as advanced digital integrated circuits.
- Import the logic modules into FPGA Boards.
- Synthesize, Place and Route the digital IPs.
- Design, Simulate and Extract the layouts of Analog IC Blocks using EDA tools.

LAB REQUIREMENTS:
Xilinx or Altera FPGA 12 nos
Xilinx software
Cadence/MAGMA/Tanner or equivalent software package 10 User License
PCs 10 No.s

EC8701  OPTICAL COMMUNICATION  L T P C
3 0 0 3

OBJECTIVES:
- To introduce the principle of light propagation through optical fibers
- To understand signal distortion mechanisms in the fiber
- To introduce optical transmitters and receivers for fiber /free space links
- To introduce 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 souces, 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
At the end of the course the students will be able to
- Understand the principle of light propagation through optical fibers, signal distortion mechanisms in the fiber.
- Describe the optical transmitters and receivers for fiber /free space links.
- Identify optical network techniques and understand the components involved.

TEXTBOOKS:

REFERENCES:
OBJECTIVES:

• To study the characteristic of wireless channel
• To understand the design of a cellular system
• To study the various digital signaling techniques and multipath mitigation techniques
• To understand the concepts of multiple antenna techniques

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 andLMS 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.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course the students will be able to
• Illustrate advanced concepts in 2.5G, 3G mobile networks, Adhoc and Sensor networks.
• Identify the importance of internetworking between LAN and 3GWANS.
TEXTBOOKS:

REFERENCES:

EC8711 HIGH FREQUENCY COMMUNICATION LABORATORY L T P C 0 0 3 2

OBJECTIVES:

- To enable the student to verify the basic principles and design aspects involved in high frequency bandpass communication system components design and the performance parameters for the components and the overall system.
- To enable the student to gain insight into the practical aspects of radiation phenomena and thoroughly understand the radiation characteristics of different types of antennas.
- To enable the student to appreciate the practical aspects of bandpass system design and understand the associated link power and risetime budgeting challenges and enable them to design and conduct experiments, as well as to analyze and interpret data to produce meaningful conclusions and match with theoretical concepts.

2. DC Characteristics of LEDs and PIN Photodiodes – Determination of external power Efficiency and dark current of detector Responsivity
3. P-I of LED Characteristics of Laser Diode Sources – Threshold Current Determination and Study of Temperature Effects
4. Gain Characteristics of APDs – Determination of Threshold Voltage and Average gain estimation
5. Analog Transmission Characteristics of a Fiber Optic Link – Determination of Operating Range of LED and System Bandwidth for Glass and Plastic fiber links and determination of device capacity of photo detection
6. Determination of Capacity of a Digital Fiber Optic Link – Maximum Bit Rate estimation for Glass and Plastic fiber links
7. Spectral Characterisation of Optical Sources – Determination of Peak Emission Wavelength and Spectral Width
8. Study of WDM Link Components – WDM Mux / Demux, Isolator, Circulator, Fiber Bragg Grating, EDFA.
9. Gain and Radiation Pattern Measurement of an Antenna - Horn Antenna, Dipole Antenna, Array Antenna,
10. Log-Periodic Antenna, Loop Antenna
11. Determination of Mode Characteristics of a Reflex Klystron Oscillator
12. VSWR and Impedance Measurement and Impedance Matching
13. Dielectric Constant Measurement
14. Characterisation of Directional Couplers and Multiport junctions
15. Gunn Diode Characteristics
16. Microwave IC – Filter Characteristics

OUTCOMES:
1. The student would be able to design and conduct experiments to demonstrate the trade-offs involved in the design of high frequency bandpass communication links and the associated components.
2. The student would be able to comprehensively record and report the measured data, and would be capable of analyzing and interpreting the experimental measurement data and produce meaningful conclusions.

TOTAL: 45 PERIODS

LAB REQUIREMENTS:
MM/SM Glass and plastic fiber patch chords with ST/SC/E2000 connectors
LEDs and LDs with ST / SC / E2000 receptacles – 650 / 850 nm
PiN PDs and APDs with ST / SC / E2000 receptacles – 650 / 850 nm
Stabilized current sources,
Signal generators, Pulse generators,
Oscilloscopes Optical power meters and
Spectrum Analyzers WDM modules
MICROWAVE COMPONENTS?

Microwave source X-band Reflex klystron oscillator / Gunn oscillator  5
nos Klystron / gunn power supply
5 nos Isolator
5 nos Variable attenuator
5 nos Freq meter direct reading type
5 nos Detector with mount
5 nos VSWR meter
2 nos Waveguide slotted-section with probe and carriage
2 nos Directional coupler 3 dB and 10 dB
1 each Waveguide TEE E-plane, H-plane and hybrid
1 each PIN modulator
1 no Horn antenna
2 nos Turn table for receiver antenna
1 no Waveguide 90 deg twist
1 no Plane short
1 no CRO (100 MHz)
5 nos Waveguide stands
15 nos Matched Terminations
5 nos Variable short circuit
2 nos Nuts and bolts
100 nos

EC8712 INNOVATIVE SYSTEM DESIGN LABORATORY L T P C
0 0 3 2

OBJECTIVE:
The objective of this laboratory is
• To encourage the students to identify socially relevant problems.
• To make them think of creative solutions for the same.
• To develop low cost proof of concept system prototype.

METHODOLOGY:
• Students could form teams not exceeding 4 members,
• Students should submit / present their ideas to the Lab-in-Charge and get it approved,
• Student should submit proposal with system/technical details and cost implications,
• Students should periodically demonstrate the progress they have made,
• Students should be evaluated on the basis of the social relevance and utility of the system developed, level of proof of concept, industry support if obtained, etc.

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course the student will able to
• Demonstrate an ability to think and work independently towards conceptualizing a process or product.
EC8001 ADVANCED DIGITAL SIGNAL PROCESSING

OBJECTIVES:
- To bring out the concepts related to stationary and non-stationary random signals
- To emphasize the importance of true estimation of power spectral density
- To introduce the design of linear and adaptive systems for filtering and linear prediction
- To introduce the concept of wavelet transforms in the context of image processing

UNIT – I DISCRETE-TIME RANDOM SIGNALS

UNIT – II SPECTRUM ESTIMATION
Bias and Consistency, Periodogram, Modified periodogram, Blackman-Tukey method, Welchmethod, Parametric methods of spectral estimation, Levinson-Durbin recursion.

UNIT - III LINEAR ESTIMATION AND PREDICTION
Forward and Backward linear prediction, Filtering - FIR Wiener filter- Filtering and linear prediction, non-causal and causal IIR Wiener filters, Discrete Kalman filter.

UNIT - IV ADAPTIVE FILTERS

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

TOTAL : 45 PERIODS

OUTCOMES:

At the end of the course the students will be able to
- Demonstrate an ability to think and work independently towards conceptualizing a process or product.
TEXTBOOKS:

REFERENCE:

EC8002 ADVANCED MICROCONTROLLERS L T P C
3 0 0 3

OBJECTIVES:
• To study the properties and evolution of RISC and CISC processors.
• To study the architecture addressing modes and instruction set of R8C microcontroller.
• To impart knowledge on embedded software development.
• To introduce the concept of microcontroller based system development.

UNIT I RISC PROCESSORS 9
RISC Vs CISC, RISC properties and evolution, Advanced RISC microcontrollers, PIC 8-bit microcontrollers.

UNIT II R8C 16-BIT MICROCONTROLLER 9

UNIT III MSP430 16 - BIT MICROCONTROLLER 9

UNIT IV EMBEDDED SOFTWARE DEVELOPMENT 9
Cross development tools, Debugging techniques, Real-time Operating System, Memory Management, Scheduling techniques.

UNIT V SYSTEM DEVELOPMENT 9

TOTAL : 45 PERIODS
OUTCOMES:
• The student will be familiar in the architecture and instruction set of the following microcontrollers Renesas R8C and Texas MSP430 microcontrollers.
• The student will derive the ability to design and implement any microcontroller based system after undergoing this course.

TEXT BOOK:

REFERENCES

EC8003 ADVANCED WIRELESS COMMUNICATION L T P C
3 0 0 3

OBJECTIVES:
• To teach the importance of improving capacity of wireless channel using MIMO
• To teach the characteristic of wireless channel
• To teach techniques for channel improvements using space-time block and Trellis codes
• To teach 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 out door, 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, Alamotı 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:
- The ability to implement the concepts and the mathematical principles with respect to MIMO systems
- The basics of advanced MIMO communication and MIMO OFDM systems help them to understand the operation of present days wireless network systems.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To introduce the hardware required for aircraft
- To introduce communication and navigation techniques used in aircrafts
- To introduce autopilot and cockpit display related concepts

UNIT I  INTRODUCTION

UNIT II  RADIO NAVIGATION
Types of Radio Navigation – ADF, DME, VOR, LORAN, DECCA, OMEGA. ILS, MLS

UNIT III  INERTIAL AND SATELLITE NAVIGATION SYSTEMS
Inertial sensors – Gyroscopes, Accelerometers, Inertial navigation systems – Block diagram, Platform and strap down INS. Satellite Navigation - GPS

UNIT IV  AIR DATA SYSTEMS AND AUTOPILOT
Air data quantities – Altitude, Airspeed, Mach no., Vertical speed, Total Air temperature, Stall warning, Altitude warning. Autopilot – basic principles – longitudinal and lateral autopilot.

UNIT V  AIRCRAFT DISPLAYS
Display technologies – LED, LCD, CRT, Flat Panel Display. Primary Flight parameter displays - Head Up Display, Helmet Mounted Display, Night vision goggles, Head Down Display, MFD, MFK, Virtual cockpit.

TOTAL : 45 PERIODS

OUTCOMES:
- The student would be able to comprehend the hardware challenges involved in the design of aircrafts and the principles involved in the design of air data systems , autopilots and navigation systems.
- The student would be capable of understanding the differences between the different practical navigation systems and the evolution of the aircraft display systems.

TEXT BOOK:
REFERENCES:

EC8005 CAD FOR VLSI L T P C
3 0 0 3

OBJECTIVES:
• To understand the suite of tools available for support and design of VLSI circuits
• To introduce rules and planning methodologies for synthesizing VLSI circuits
• To introduce different modeling schemes for synthesizing VLSI circuits

UNIT I VLSI DESIGN METHODOLOGIES 9

UNIT II DESIGN RULES 9

UNIT III FLOOR PLANNING 9
Floor planning concepts - shape functions and floorplan sizing - Types of local routing problems- Area routing - channel routing - global routing - algorithms for global routing.

UNIT IV SIMULATION 9
Simulation - Gate-level modeling and simulation - Switch-level modeling and simulation - Combinational Logic Synthesis - Binary Decision Diagrams - Two Level Logic Synthesis.

UNIT V MODELLING AND SYNTHESIS 9
High level Synthesis - Hardware models - Internal representation - Allocation assignment and scheduling - Simple scheduling algorithm - Assignment problem - High level transformations.

TOTAL : 45 PERIODS
Outcomes:
Upon completion of the course the student will be able to:
• Understand VLSI design Methodologies and design rules
• Understand Floor planning concepts
• Know about gate level and switch level modeling and simulation

TEXT BOOK:

REFERENCE:

EC8006 CMOS ANALOG IC DESIGN I

OBJECTIVES:
• To study the DC biasing conditions of various MOS amplifier configurations
• To understand the small signal model of various MOS circuits
• To study OPAMP circuits and its stability conditions
• To study in general negative feedback concept in MOS circuits

UNIT I BASIC BUILDING BLOCKS
NMOS and PMOS device operation in saturation and sub-threshold regions, device transconductance, output impedance and equivalent circuit. Introduction to Device models for simulation. CG, CG, and source follower circuits.

UNIT II MULTIPLE TRANSISTOR STAGES
Cascode circuits. folded cascode circuits, , Differential amplifier circuits, quantitative analysisof differential pair, CMRR, Differential pair with MOS loads, Gilbert Cell, Current Mirrors.

UNIT III FREQUENCY RESPONSE, NOISE.

UNIT IV OPERATIONAL AMPLIFIERS
Two stage op-amps, gain boosting, common mode feedback, input range limitation, slew rate, power supply rejection, noise in op-amps.
UNIT V FEEDBACK AND STABILITY

Properties of feedback circuits, topologies, effect of loading and noise in feedback circuits. Stability in multipole systems, phase margin, frequency compensation in two stage op-amps, other compensation techniques.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student should be able to:
- To built the different configuration of MOS amplifier
- Able to design small signal model MOS circuits
- Analyze stability conditions and other compensation techniques in OPAMPS circuits

TEXT BOOK:

REFERENCE:

EC8007 CMOS ANALOG IC DESIGN II L T P C
3 0 0 3

OBJECTIVES:
- To design MOS circuits applied for various data conversion stages namely, sample and hold, ADC and DAC
- To study designs with better precision in data conversion
- To study various ADC and DAC circuit architectures

UNIT I SAMPLE AND HOLD:
Properties of MOS Switches, multiplexed input architectures, recycling architecture, open and closed loop sampling architectures, switched capacitor and current mode architectures.

UNIT II BUILDING BLOCK OF DATA CONVERSION CIRCUITS:
Amplifiers, open loop and closed loop amplifiers, gain boosting, common mode feedback, bipolar, CMOS and BiCMOS comparators.

UNIT III PRECISION TECHNIQUES:
Comparator cancellation, input and output offset storage principles, comparators using offset cancelled latches, opamp offset cancellation, ADC and DAC calibration techniques.
UNIT IV       ADC/DAC ARCHITECTURES:         9
DAC Performance metrics, reference multiplication and division, switching and logical functions of DACs, Current steering architectures, DAC Performance metrics, Flash ADC architecture, Gray encoding, thermometer encoding and metastability.

UNIT V       OVER SAMPLING CONVERTERS.    9
Delta sigma modulators, alternative modulator architectures, quantization and noise shaping, decimation filtering, implementation of Delta sigma modulators, delta sigma DACs,

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the student should be able to:
  • Build Data Conversion circuits.
  • Discus calibration techniques
  • Analyze ADC/DAC Architecture and Performance

TEXT BOOKS:

EC8008    COGNITIVE RADIO COMMUNICATION    L T P C
                      3 0 0 3

OBJECTIVE:
• To introduce the concept of software defined radios and their architectures
• To introduce the concept of cognitive radio communication and the components involved
• To introduce the cognitive radio architecture and the functions and issues involved in communication system design.

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

UNIT II    SDR ARCHITECTURE    9
Essential functions of the software radio, architecture goals, quantifying degrees of programmability, top level component topology, computational properties of functional components, interface topologies among plug and play modules, architecture partitions.
UNIT III  INTRODUCTION TO COGNITIVE RADIOS
Marking radio self-aware, the cognition cycle, organization of cognition tasks, structuring knowledge for cognition tasks, Enabling location and environment awareness in cognitive radios – concepts, architecture, design considerations.

UNIT IV  COGNITIVE RADIO ARCHITECTURE
Primary Cognitive Radio functions, Behaviors, Components, A–Priori Knowledge taxonomy, observe – phase data structures, Radio procedure knowledge encapsulation, components of orient, plan, decide phases, act phase knowledge representation, design rules.

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

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

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
AIM
The aim of this course is to familiarize the student with the concept of digital control engineering under the topics continuous time systems, digital control algorithms and its state variable based signal processing techniques.

OBJECTIVES
- Study the characteristics of continuous time systems and its effects.
- Learn the basics of signal processing techniques in the digital control systems.
- Design and implementation of the various digital control algorithms.
- Outline the state variable techniques for digital control systems.
- Discuss the concepts of controllability, observability and stability of the digital control system.

UNIT I  CONTINUOUS TIME SYSTEMS  6
Review of frequency and time response analysis and specifications of control systems, need for controllers, continuous time compensations, continuous time PI, PD, PID controllers.

UNIT II  SIGNAL PROCESSING IN DIGITAL CONTROL  12
Sampling, time and frequency domain descriptions, aliasing, hold operations, mathematical model of sample and hold, zero and first order hold, factors limiting the choice of sample rate, reconstruction, Difference equation description, Z-transform method of description, pulse transfer function, time and frequency response of discrete time control systems.

UNIT III  DESIGN OF DIGITAL CONTROL ALGORITHMS  9
Review of principle of compensator design, Z-plane specifications, digital compensator design using frequency response plots, discrete integrator, discrete differentiator, development of digital PID controller, transfer function, design in Z-plane.

UNIT IV  STATE VARIABLE TECHNIQUES  9
Discrete State Variable concepts, Characteristic equation, Eigenvalues and Eigenvectors, Jordan canonical models, Phase Variable companion forms.
UNIT V CONTROLLABILITY, OBSERVABILITY AND STABILITY

Definitions and Theorems of Controllability and Observability, Relationships between Controllability, Observability and Transfer Functions, Jury, Routh, Lyapunov stability analysis, Principles of state and output feedback.

TOTAL : 45 PERIODS

OUTCOMES
Upon completion of the course the student will be able to:

- Outline the characteristics of continuous time systems and determine their impacts on the design of digital control systems. (Level – I (Knowledge))
- Discuss the basics of digital signal processing techniques in the applications of digital control systems. (Level – II (Comprehension))
- Demonstrate the design of various digital control algorithms and its implementation issues in digital control systems. (Level – III (Application))
- Investigate the usage of discrete state variable concepts and its control system specifications. (Level – IV (Analysis))
- Merge the concepts of controllability, observability and stability in a design of modern digital control systems. (Level – V (Synthesis))

TEXT BOOKS:

REFERENCES

EC8010 DIGITAL SWITCHING AND TRANSMISSION

OBJECTIVES:
- To introduce different types of signaling in digital telephony
- To introduce various transmission schemes for telephony and broadband
- To introduce modeling and analysis techniques for data transmission

UNIT I INTRODUCTION
Overview of existing Voice, Data and Multimedia Networks and Services; Review of Basic Communication principles; Synchronous and Asynchronous transmission, Line Codes
UNIT II TRUNK TRANSMISSION
Multiplexing & Framing- types and standards; Trunk signaling; Optical Transmission line codes and Muxing: SONET/SDH; ATM; Microwave and Satellite Systems.

UNIT III LOCAL LOOP TRANSMISSION
The Analog Local Loop; ISDN local loop; DSL and ADSL; Wireless Local Loop; Fiber in the loop; Mobile and Satellite Phone local loop.

UNIT IV SWITCHING
Evolution; Space switching, Time switching and Combination Switching; Blocking and Delay characteristics; Message ,Packet and ATM switching; Advances in switching techniques – shared memory fast packet switches, shared medium fast packet switches and space division fast packet switches, Photonic switching- Optical TDM, WDM.

UNIT V TELETRAFFIC ENGINEERING
Telecom Network Modeling; Arrival Process; Network Blocking performance; Delay Networks--Queuing system analysis and delay performance.

TOTAL : 45 PERIODS

OUTCOMES:
• The student would be able to appreciate the importance of quality of service requirements for different applications and the expectation from the provider networks
• The student would be able to differentiate between the design aspects of trunk networks, the local loop systems and switching systems
• The student would able to understand the concepts behind the traffic modeling and network dimensioning problems

TEXTBOOKS:

REFERENCES:
OBJECTIVES:

- To study the architecture and programming of ARM processor.
- To introduce the basic concepts of hard real time multiprocessing.
- To introduce the analysis concepts for effective programming.
- To study about the basics of the buses used for embedded system networking.

UNIT I  INTRODUCTION TO EMBEDDED COMPUTING AND ARM PROCESSORS

Complex systems and microprocessors – Embedded system design process – Formalism for system design– Design example: Model train controller- ARM Processor Fundamentals- Instruction Set and Programming using ARM Processor.

UNIT II  COMPUTING PLATFORM

CPU: Programming input and output – Supervisor mode, exception and traps – Coprocessor – Memory system mechanism – CPU performance – CPU power consumption- CPU buses – Memory devices – I/O devices – Component interfacing- System Level Performance Analysis- Parallelism. Design Example : Data Compressor.

UNIT III  PROGRAM DESIGN AND ANALYSIS

Program design – Model of programs – Assembly and Linking – Basic compilation techniques – Program Optimization- Analysis and optimization of execution time, power, energy, program size – Program validation and testing- Example : Software Modem.

UNIT IV  PROCESS AND OPERATING SYSTEMS


UNIT V  HARDWARE ACCELERATORS & NETWORKS


TOTAL : 45 PERIODS

OUTCOMES:

- After undergoing this course the student will derive the ability to design and implement embedded system for a given problem.
- The student will be familiar in the programming concept and right selection of interfacing bus /peripheral / interfacing ICs.
- The concept of RTOS will help the student in right selection of OS for a given embedded system.
TEXT BOOKS:

REFERENCES:

EC8012 INFORMATION THEORY L T P C 3 0 0 3

OBJECTIVES:
- To teach different types of entropy
- To teach entropy in the context of data compression
- To teach channel capacities over different channels

UNIT I QUANTITATIVE STUDY OF INFORMATION 8

UNIT II CAPACITY OF NOISELESS CHANNEL 8
Fundamental theorem for a noiseless channel, Data compression, Kraft inequality, Shannon- Fano codes, Huffman codes, Asymptotic equipartition, Rate distortion theory.

UNIT III CHANNEL CAPACITY 9
Properties of channel capacity, Jointly typical sequences, Channel Coding Theorem, converse to channel coding theorem, Joint source channel coding theorem
UNIT IV  DIFFERENTIAL ENTROPY AND GAUSSIAN CHANNEL  
AEP for continuous random variables, relationship between continuous and discrete entropy, properties of differential entropy, Gaussian channel definitions, converse to coding theorem for Gaussian channel, channels with colored noise, Gaussian channels with feedback

UNIT V  NETWORK INFORMATION THEORY  
Gaussian multiple user channels, Multiple access channel, Encoding of correlated sources, Broadcast channel, Relay channel, Source coding and rate distortion with side information, General multi-terminal networks.

OUTCOMES:  
The course teaches types of entropy, data compression and channel capacities over different channels. The student will be capable of understanding and designing various sources, for various types of channel, and means to achieve full channel capacity.

TOTAL : 45 PERIODS

TEXT BOOK:  

REFERENCE:  

EC8013  INTERNET AND JAVA  
OBJECTIVES:  
• To introduce various concepts of internetworking with TCP/IP
• To introduce the principles of world wide web
• To introduce Java programming and Java script programming
• To teach students to develop simple web pages with data bases

UNIT I  INTERNET WORKING WITH TCP/IP  
Review of network technologies, Internet addressing, Address resolution protocols (ARP/ RARP), Routing IP data grams Reliable stream transport service (TCP) TCP/IP over ATM networks, Internet applications-E-mail, Telnet, FTP, NFS, Internet traffic management.
UNIT II      WORLD WIDE WEB
HTTP protocol, Web browsers Netscape, Internet explorer, Web site and web page design, HTML,XHTML, XML, CSS, Dynamic HTML, CGI.

UNIT III     JAVASCRIPT PROGRAMMING
Introduction, Control statements, Functions, Arrays and Objects - Programming

UNIT IV     JAVA PROGRAMMING
Language features, Classes, Object and methods. Sub-classing and dynamic binding, Multithreading, Overview of class library, Object method serialization, Remote method invocation, Java Servelets and Javaserver pages.

UNIT V      WEB DESIGN AND DATABASES
Macromedia Dream Weaver, Web Servers, Databases – SQL, MYSQL, DBI and ADO.NET, Web design

TOTAL : 45 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:
4. Cay S. Horstmann & Gary Cornell, Core JavaTM Volume – I & II, Pearson Education,
OBJECTIVES:
• To introduce principles of various measurement techniques using analog and digital equipments
• To teach Importance of signal generators and analyzers in measurements
• To emphasize the need for data acquisition systems and optical domain measurement techniques

UNIT I SCIENCE OF MEASUREMENT

UNIT II TRANSDUCERS

UNIT III SIGNAL CONDITIONING AND SIGNAL ANALYZERS

UNIT IV DIGITAL INSTRUMENTS

UNIT V DATA DISPLAY AND RECORDING SYSTEMS

TOTAL : 45 PERIODS

OUTCOMES:
Students should have gained knowledge about the transducers and measurement systems and ability to develop and design measurement systems
TEXT BOOKS:

REFERENCES:

EC8015 MEDICAL ELECTRONICS L T P C 3 0 0 3

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 9
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 9
pH, PO₂, PCO₂, colorimeter, Auto analyzer, Blood flow meter, cardiac output, respiratory measurement, Blood pressure, temperature, pulse, Blood cell counters.

UNIT III ASSIST DEVICES 9
Cardiac pacemakers, DC Defibrillator, Dialyser, Heart lung machine
UNIT IV  PHYSICAL MEDICINE AND BIOTELEMETRY  9
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  9
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.

TEXTBOOKS:

REFERENCES:

EC8016  MICROWAVE ENGINEERING  L T P C
3 0 0 3

OBJECTIVES:
- To inculcate understanding of the basics required for circuit representation of RF networks
- To deal with the issues in the design of microwave amplifier
- To instill knowledge on the properties of various microwave components
- To deal with the microwave generation and microwave measurement techniques
UNIT I  TWO PORT RF NETWORKS-CIRCUIT REPRESENTATION  9
Low frequency parameters-impedance , admittance, hybrid and ABCD. High
frequency parameters-Formulation of S parameters, properties of S parameters-
Reciprocal and lossless networks, transmission matrix, Introduction to component basics,
wire, resistor, capacitor and inductor,

UNIT II  MICROWAVE TRANSISTOR AMPLIFIER DESIGN AND MATCHING
NETWORKS  9
Amplifier power relation, stability considerations, gain considerations, noise figure,
impedance matching networks, frequency response, T and Π matching networks,
microstripline matching networks

UNIT III  PASSIVE AND ACTIVE MICROWAVE DEVICES AND CIRCUITS  9
Open, short and matched terminations; coupling probes and loops; power divider;
directional coupler; attenuators; phase shifter; circulator; isolator; Impedance matching
Devices– Tuning screw, stub and quarter-wave transformers. Crystal diodes and
Schottkey diode detector and mixers; PIN diode switch, Gunn diode oscillator; IMPATT
diode oscillator and amplifier; varactor diode; Introduction to MIC.

UNIT IV  MICROWAVE GENERATION  9
High frequency effects in Tubes, Two cavity klystron amplifier; Reflex klystron oscillator;
TWT amplifier, Backwards wave oscillator; Magnetron oscillator – Theory and
applications.

UNIT V  MICROWAVE MEASUREMENTS  9
Measuring Instruments – VSWR meter, Power meter, Spectrum Analyser, Network
Analyser – principles; Measurement of Impedance, frequency, power, VSWR, Q
factor, dielectric constant, S-Parameter.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, students will be able to:
• Explain the active & passive microwave devices & components used in Microwave
  communication systems.
• Analyze the multi- port RF networks and RF transistor amplifiers.
• Generate Microwave signals and design microwave amplifiers.
• Measure and analyze Microwave signal and parameters.

TEXTBOOKS:
   2006.
   2004.
REFERENCES:

EC8017 PARALLEL AND DISTRIBUTED PROCESSING

OBJECTIVES:
• To study the principles of parallel processing
• To understand the concept of shared memory architecture in multiprocessing
• To study the parallel programming models.

UNIT I PARALLEL ARCHITECTURE
Parallel Computer Models, Program and Network properties, Principles of scalable performance

UNIT II PROCESSORS AND MEMORY HIERARCHY, BUS
Advanced processor Technology, Super scalar and vector processor, Memory hierarchy technology, Virtual Memory Technology, Backplane Bus systems.

UNIT III PIPELINING AND SUPER SCALAR TECHNIQUES
Linear Pipeline, Nonlinear pipeline, Instruction pipeline, Arithmetic pipeline, Superscalar and super pipeline design, Parallel and scalable architectures- Multiprocessor and Multicomputers.

UNIT IV SOFTWARE FOR PARALLEL PROGRAMMING
Parallel programming models, languages, compliers- Parallel Program Development and Environments.

UNIT V DISTRIBUTED SYSTEMS
Models, Hardware concepts, communication, synchronization mechanism, case study: MPI and PVM, Distributed file systems.

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of the course, students will be able to:
• Know about processors and memory hierarchy technology
• Understand various types of pipelining methods
• Understand models, languages and compilers for parallel programming
• Understand the concepts of distributed systems.
TEXT BOOKS:

REFERENCES:

EC8018 RF MICROELECTRONICS L T P C 3 0 0 3

OBJECTIVES:
• To introduce radio transceiver architectures
• To understand the design issues in CMOS LNAs, Mixers, Oscillators, PLLs, Synthesizers and Power Amplifiers.

UNIT I TRANSCEIVER ARCHITECTURES 9
Heterodyne and Homodyne architectures, Discrete and CMOS realization passive components for RF, Impedance Matching, Distortion, IIP3 and Blocking Effects, Noise Figure, Noise matching conditions. Friis Formula for cascaded blocks.

UNIT II CMOS LNAS AND MIXERS 9
Noise Figure of and impedance matching issues CS, CG and differential LNAs, Passive mixers and conversion loss, Active mixers, Gilbert cells, linearity and Noise Figure of mixers.

UNIT III OSCILLATORS 9
Negative transconductance, nonlinearity and Differential LC tuned oscillators, Ring oscillators and Colpitts oscillator, Quadrature oscillators–Phase noise.

UNIT IV PLLS AND SYNTHESIZERS 9
Phase Detectors, charge pumps and their transfer functions, Synthesizers based on first, second and third order PLLs and stability issues, Introduction to integer and fractional N synthesizers.
UNIT V  POWER AMPLIFIERS
Class A, B, C, D, E, F and AB power amplifiers, Linearization and impedance matching issues of power amplifiers.

TOTAL : 45 PERIODS

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

- Understand radio transceiver architectures
- Design and Analyze CMOS LNAs, Mixers, Oscillators, PLLs,
- Synthesizers and Power Amplifiers.

TEXT BOOK

REFERENCE:

EC8019  SATELLITE COMMUNICATION  L T P C
3 0 0 3

OBJECTIVES:
• To introduce orbital mechanics and related parameters
• To introduce the different satellite subsytems
• To introduce different aspects of communication link design, multiple access methods
• To expose some of the important applications of satellites

UNIT I  SATELLITE ORBITS AND TRAJECTORIES
Orbital Mechanics—Orbit Equations, Kepler’s Laws, Orbital Period, Orbits and their types, look angle calculation; Satellite Launch.

UNIT II  SATELLITE SUBSYSTEM
Satellite Subsystems—AOCS, TTC&M, Power, Transponders, Antennas; earth control-Effects of earth-Perturbation, suntransit, moontransit, satellite power design, MTBF. Basic Equations; System Noise and G/T ratio; Uplink, Downlink and Design for a specified C/N ratio, with GEO and LEO examples; Atmospheric and Rain effects on link performance.

UNIT III  LINK DESIGN, MODULATION AND ERROR CONTROL
Single link design-double link design aspects, PAM, baseband processing, Digital Modulation for satellite links- BPSK,QPSK and QAM; TDM standards for satellite systems; Error control requirements for satellite link—ARQ, Concatenated Codes, Interleaving, Turbo codes.
UNIT IV  MULTIPLE ACCESS FOR SATELLITE COMMUNICATIONS  9
FDM-FM-FDMA - TDMA-structure and system design; Onboard Processing systems; DAMA and PAMA; CDMA-system design and capacity.

UNIT V  SOME APPLICATIONS  8
Remote sensing, navigation, scientific and military application, VSAT—Network architecture, Access Control protocols and techniques, VSAT Earth stations; Satellite Mobile Telephony—Global star, DBS/DTH Television, GPS, Weather satellites.

OUTCOMES:
- The student would be able to demonstrate an understanding of the basic principles of satellite orbits, placement and control, satellite link design and the communication system components.
- The student would be able to demonstrate an understanding of the different communication, sensing and navigational applications of satellite and their implementation.

TEXT BOOKS:

REFERENCES:

EC8020  SPEECH PROCESSING  L T P C  3 0 0 3

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• To introduce speech recognition and synthesis techniques
UNIT I  BASIC CONCEPTS  10

UNIT II  SPEECH ANALYSIS  10

UNIT III  SPEECH MODELING  8

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.

TEXTBOOKS:
REFERENCES:

EC8021 VLSI SIGNAL PROCESSING L T P C
3 0 0 3

OBJECTIVES:
• To design DSP architectures that are suitable for VLSI implementation for a given algorithm
• To learn high-level algorithms that reduce the number of multipliers, area of implementation and power consumption.
• To address issues related to high performance VLSI architectures such as pipelining styles.

UNIT I PIPELINING AND PARALLEL PROCESSING 9
Introduction to DSP Systems, Typical DSP algorithms, Data flow graph representations, Loop bound and Iteration bound, Longest Path Matrix algorithm; Pipelining and parallel processing of FIR digital filters, Pipelining and Parallel processing for low power.

UNIT II RETIMING AND ALGORITHMIC STRENGTH REDUCTION 9
Retiming - definitions and properties; Unfolding – an algorithm for Unfolding, properties of unfolding, sample period reduction and parallel processing application; Algorithmic strength reduction in filters and transforms – 2-parallel FIR filter, 2-parallel fast FIR filter, DCT algorithm architecture transformation, Odd-Even Merge-Sort architecture, Parallel Rank-Order filters.

UNIT III FAST CONVOLUTION AND COMBINED PIPELINING AND PARALLEL PROCESSING OF IIR FILTERS 9
UNIT IV  BIT-LEVEL ARITHMETIC ARCHITECTURES

Bit-Level Arithmetic Architectures- parallel multipliers with sign extension, parallel carry-ripple array multipliers, parallel carry-save multiplier, 4x 4 bit Baugh-Wooley carry-save multiplication tabular form and implementation, Bit-serial FIR filter, CSD representation, CSD multiplication using Horner’s rule for precision improvement, Distributed Arithmetic

UNIT V  NUMERICAL STRENGTH REDUCTION AND WAVE PIPELINING

Numerical Strength Reduction – subexpression elimination, Multiple Constant Multiplications, Synchronous pipelining and Clocking styles, Clock skew in edge-triggered single-phase clocking, Wave pipelining.

TOTAL : 45 PERIODS

OUTCOMES

• Ability to recognize issues of power, area and speed requirements in the development of dedicated and general purpose DSP architectures
• Ability to design and implement algorithms that reduce the number of multipliers, area of implementation and power consumption in DSP structures

TEXT BOOK


REFERENCES:


EC8022  WIRELESS NETWORKS  L T P C

3 0 0 3

OBJECTIVES:

• To teach advanced Mobile technology of 2.5G and 4G techniques
• To introduce 4G technologies such as Adhoc and Sensor networks
• To teach the importance of internetworking between LAN and 3GWANS

UNIT I  2G & 2.5G EVOLUTION

Evolution of cellular communication, GSM – Architecture, Frame format, channels, call progress. CDMA – IS95 Forward and reverse channel, GPRS and EDGE
UNIT II  3G SYSTEMS  
Migration path to UMTS, UMTS Basics, Air Interface, 3GPP Network Architecture, CDMA2000 overview- Radio and Network components, Network structure, Radio network, TD-CDMA, TD-SCDMA.

UNIT III  WIRELESS LOCAL AREA NETWORKS  
Introduction to wireless LANs - IEEE 802.11 WLANs - Physical Layer- MAC sublayer-MAC Management Sublayer- Overview of WIMAX systems.

UNIT IV  ADHOC & SENSOR NETWORKS  
Characteristics of MANETs, Table-driven and Source-initiated On Demand routing protocols, Hybrid protocols, Wireless Sensor networks- Classification, MAC and Routing protocols.

UNIT V  4G & INTERWORKING  
4G features and challenges, Technology path, Overview of LTE, Interworking Objectives and requirements, Schemes to connect WLANs and 3G Networks, Session Mobility, Interworking Architectures for WLAN and GPRS, System Description, LMDS and MMDS

TOTAL : 45 PERIODS

OUTCOME:
Ability to understand and implement the concepts and the mathematical principles of almost always used essential fundamental of advanced Mobile technology of 2.5G and 4G such as Adhoc and Sensor networks

TEXT BOOKS

REFERENCES:

EC8071 CRYPTOGRAPHY AND NETWORK SECURITY LTPC

OBJECTIVES:
- To teach the importance of security for networks
- To teach the basics of number theory and galois field concepts
- To teach symmetric and asymmetric key in crypto systems
- To teach authentication and key management techniques
- To teach security specific to network layer.

UNIT I NUMBER THEORETIC AND ALGEBRAIC ALGORITHMS

UNIT II MODERN SYMMETRIC KEY CIPHERS

UNIT III ASYMMETRIC KEY ENCIPHERMENT

UNIT IV INTEGRITY AUTHENTICATION AND KEY MANAGEMENT

UNIT V NETWORK SECURITY

TOTAL : 45 PERIODS
OUTCOMES:
Upon Completion of the course, the students should be able to:
- Compare various Cryptographic Techniques
- Design Secure applications
- Inject secure coding in the developed applications

TEXT BOOKS

REFERENCES

EC8072 ELECTRO MAGNETIC INTERFERENCE AND COMPATIBILITY L T P C
3 0 0 3

OBJECTIVES:
- To tutor the basics of EMI,EMC
- To instill knowledge on the EMI coupling mechanism and its mitigation techniques
- To impart comprehensive insight about the current EMC standards and about various measurement techniques

UNIT I BASIC CONCEPTS
Definition of EMI and EMC; Intra and Inter system EMI; Sources and victims of EMI, Conducted and Radiated EMI emission and susceptibility; Transient & ESD; Case Histories; Radiation Hazards to humans.

UNIT II COUPLING MECHANISM
Common mode coupling; Differential mode coupling; Common impedance coupling; Ground loop coupling; Field to cable coupling; Cable to cable coupling; Power mains and Power supply coupling.

UNIT III EMI MITIGATION TECHNIQUES
Shielding – principle, choice of materials for H, E and free space fields, and thickness; EMI gaskets; Bonding; Grounding – circuits, system and cable grounding; Filtering; Transient EMI control devices and applications; PCB Zoning, Component selection, mounting, trace routing.
UNIT IV  STANDARDS AND REGULATION  7
Units of EMI; National and International EMI Standardizing Organizations – IEC, ANSI, FCC, CISPR, BIS, CENELEC; FCC standards; EN Emission and Susceptibility standards and specifications; MIL461E Standards.

UNIT V  TEST METHODS AND INSTRUMENTATION  12
EMI test sites - Open area site; TEM cell; Shielded chamber; Shielded Anechoic chamber; EMI test receivers; Spectrum Analyzer; Transient EMI Test wave Simulators; EMI coupling Networks - Line impedance Stabilization Networks; Feed through capacitors; Antennas and factors; Current probes and calibration factor; MIL-STD test methods.

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

- To design a EMI free system
- To reduce system level crosstalk
- To design high speed Printed Circuit board with minimum interference
- To make our world free from unwanted electromagnetic environment

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:

EC8073  FOUNDATIONS FOR NANO-ELECTRONICS  L T P C
3 0 0 3

OBJECTIVES:
The objectives of the course is to introduce quantum mechanics concepts, approximations and statistical mechanics for understanding nano systems

UNIT I  INTRODUCTION TO QUANTUM MECHANICS  9
Particles, waves, probability amplitudes, schroedinger equation, wavepackets solutions, operators, expectation values, eigenfuntions, piecewise constant potentials.
UNIT II  SIMPLE HARMONIC OSCILLATORS AND APPROXIMATIONS  9
SHM Operators, SHM wavepacket solutions, Quantum LC circuit, WKB approximations, variational methods.

UNIT III  SYSTEMS WITH TWO AND MANY DEGREES OF FREEDOM  9
Two level systems with static and dynamic coupling, problems in more than one dimensions, electromagnetic field quantization, density of states.

UNIT IV  STATISTICAL MECHANICS  9
Basic concepts, microscopic, quantum systems in equilibrium, statistical models applied to metals and semiconductors

UNIT V  APPLICATIONS  9
Hydrogen and Helium atoms, electronic states, Atomic force microscope, Nuclear Magnetic Resonance, carbon nanotube properties and applications

TOTAL : 45 PERIODS

OUTCOMES:
Upon Completion of the course, the students will be able to
•  Understand concepts of quantum mechanics
•  Know about simple harmonic oscillator
•  Understand basic concepts of statistical mechanics in metals and semiconductors

TEXT BOOKS:
2.  Rainer Waser, “Nanoelectronics and Information Technology”, Wiley 2005

REFERENCES:
OBJECTIVES:

- To introduce probability related study of the characteristics of text, voice, image and video data
- To introduce various compression schemes for text, voice, image and video
- To analyse the compression schemes
- To introduce communication protocols for voice over internet and multimedia networking

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 Huffman 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 – best Effort service- protocols for real time interactive Applications-distributing multimedia-beyond best effort service- secluding and policing Mechanisms-integrated services-differentiated Services-RSVP.

OUTCOMES:

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

- Describe various multimedia components
- Describe compression and decompression techniques.
- Apply the compression concepts in multimedia communication.
TEXT BOOKS:

REFERENCES:
1. Marcus Goncalves “Voice over IP Networks”, McGraw Hill,

EC8075 ROBOTICS

OBJECTIVES:
• To introduce the electronics and software aspects in robots
• To bring out the different languages for programming robot
• To specify robot requirements in the industry
• To introduce latest state of the art robots

UNIT I SCOPE OF ROBOTS
The scope of industrial Robots - Definition of an industrial robot - Need for industrial robots –Economic and Social Issues- applications.

UNIT II ROBOT COMPONENTS

UNIT III ROBOT PROGRAMMING
Robot Programming - Methods - interlocks textual languages. Characteristics of Robot level languages, characteristic of task level languages.

UNIT IV ROBOT WORK CELL
Robot Cell Design and Control - Remote Center compliance - Safety in Robotics.
UNIT V FUTURE TRENDS

Advanced robotics, Advanced robotics in Space - Specific features of space robotics systems - long-term technical developments, Advanced robotics in under-water operations. Robotics Technology of the Future - Future Applications.

TOTAL : 45 PERIODS

OUTCOME:

- After undergoing this course the student will gain the ability to design, test and implement robotics for the industry.
- The concept of robotic programming will help him in the selection of right robot level language for the given system.
- The student will be familiar with the future trends in robotics and give a robotic solution for a given task.

TEXTBOOK:


REFERENCES:


EC8076 SOFT COMPUTING AND APPLICATIONS L T P C 3 0 0 3

OBJECTIVES:

- This course gives an idea and principles of various soft computing techniques, which are applicable to core areas such as networks, pattern recognition, image processing
- To introduce fuzzy set theory
- To teach different optimization techniques
- To introduce neural networks and neuro-fuzzy modeling
To teach various applications of computational intelligence

UNIT I  FUZZY SET THEORY  10

UNIT II  OPTIMIZATION  8

UNIT III  NEURAL NETWORKS  10

UNIT IV  NEURO FUZZY MODELING  9

UNIT V  APPLICATIONS OF COMPUTATIONAL INTELLIGENCE  8

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.
- Discuss hybrid soft computing.

TEXT BOOKS:
2. N.P.Padhy, “Artificial Intelligence and Intelligent Systems”, Oxford University
REFERENCES:

GE8751 ENGINEERING ETHICS AND HUMAN VALUES

OBJECTIVES:
- The course explains various moral issues through predominant theories. It educates the code of ethics as well as the industry standards and how they can be used for ensuring safety and reducing the risk. The course enunciated the Rights and Responsibilities of individuals. Various other ethical global issues also have been explained along with case studies.

UNIT I HUMAN VALUES

UNIT II ENGINEERING ETHICS

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

UNIT V   GLOBAL ISSUES

TOTAL: 45 PERIODS

OUTCOMES

• Ability to understand and implement the concepts and the mathematical principles of almost always used essential fundamental preprocessing algorithms in image processing such as enhancement, denoising, deblurring, segmentation.
• Ability to compress the images to the desired level as required in storage and internet transmission of images

TEXTBOOK

REFERENCES:

WEB SOURCES:
1. www.onlineethics.org
2. www.nspe.org
3. www.globalethics.org
AIM
To provide comprehensive knowledge about the principles, practices, tools and techniques of Total Quality Management.

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

UNIT I INTRODUCTION

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

UNIT III TQM TOOLS & TECHNIQUES I

UNIT IV TQM TOOLS & TECHNIQUES II

UNIT V QUALITY SYSTEMS

OUTCOME:
• The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.
TEXT BOOK:

REFERENCE BOOKS:

BM8751 PRINCIPLES OF 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 terms of features

UNIT I DIGITAL IMAGE FUNDAMENTALS
9
Elements of digital image processing systems, Vidicon and Digital Camera working principles, - Elements of visual perception, brightness, contrast, hue, saturation, mach band effect, Color image fundamentals - RGB, HSI models, Image sampling, Quantization, dither, Two- dimensional mathematical preliminaries, 2D transforms - DFT, DCT, KLT, SVD.

UNIT II IMAGE ENHANCEMENT
9
Point processing, Histograms, Histogram equalization and specification techniques, Noise distributions, Spatial averaging, Directional Smoothing, Median, Geometric mean, Harmonic mean, Contraharmonic mean filters, Homomorphic filtering, Color image enhancement.

UNIT III IMAGE RESTORATION
9
UNIT IV  IMAGE SEGMENTATION
Edge detection, Edge linking via Hough transform – Thresholding – Region based segmentation– Region growing – Region splitting and Merging – Segmentation by morphological watersheds – Hybrid methods

UNIT V  IMAGE COMPRESSION
Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, Vector Quantization, Transform coding, JPEG standard, MPEG.

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 BOOKS:

REFERENCES:
OBJECTIVES:

- To learn the components and operations of operating systems
- To get an idea about process synchronization
- To learn concepts behind inter-process communication
- To learn disk scheduling and process scheduling
- To understand deadlock handling and memory management

UNIT I OPERATING SYSTEMS OVERVIEW


UNIT II PROCESS MANAGEMENT


UNIT III STORAGE MANAGEMENT


UNIT IV I/O SYSTEMS


UNIT V CASE STUDY

OUTCOMES:

- To write programs using multi-threading
- To solve problems related to process scheduling and disk scheduling
- To use synchronization concepts in real-time programs
- To apply banker’s algorithm for solving problems in deadlocks
- To solve problems related to paging and segmentation
- To implement OS concepts in Linux

TEXT BOOKS:


REFERENCES:

UNIT II JAVA NETWORKING FUNDAMENTALS 9

UNIT III CLIENT SIDE TECHNOLOGIES 9

UNIT IV SERVER SIDE TECHNOLOGIES 9

UNIT V APPLICATION DEVELOPMENT ENVIRONMENT 9

TOTAL: 45 PERIODS

OUTCOMES:
Able to program in Java and create simple Web based applications.

TEXT BOOK:

REFERENCE BOOKS:
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  

UNIT II  REQUIREMENTS AND SYSTEM DESIGN  
UNIT III DESIGN AND TESTING

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

UNIT V BUSINESS DYNAMICS ENGINEERING SERVICES INDUSTRY

TOTAL: 45 PERIODS

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:
1. Hiriyappa B, “Corporate Strategy – Managing the Business”, Authorhouse, USA,
   2013
2. Peter F Drucker, “People and Performance”, Butterworth – Heinemann
   Concepts and Practice”, Prentice Hall India, New Delhi, 2003
4. Mark S Sanders and Ernest J McCormick, "Human Factors in Engineering and

GE8072 DISASTER MANAGEMENT L T P C
                                      3 0 0 3

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

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

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

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

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

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

GE8073 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
OUTCOME:
- Engineering students will acquire the basic knowledge of human rights.

REFERENCES: