Academic Scheme

for

B.Tech Electronics and Communication Engineering

Four Years Programme

Syllabus

(I – VIII Semesters)

(For Batch 2013 & onwards)

Department of Electronics and Communication Engineering
IUST, Awantipora, Pulwama -192122

Syllabus

for

I – VIII
Semesters

(For Batch 2013 & onwards)

Department of

Electronics and Communication Engineering

IUST, Awantipora, Pulwama -192122

1st Semester

Course Code	Course Title	L – P	Credit
ECE 101T	Computer Fundamentals & Programming	4 – 0	4
ECE 102T	Physics-I	4 – 0	4
ECE 103T	Chemistry-I	4 – 0	4
ECE 104T	Mathematics-I	4 – 0	4
ECE 105T/P	Engineering Drawing	2 – 3	4
ECE 106P	Computer Fundamental & Programming Lab	0 – 2	1
ECE 107P	Physics-I Lab	0 – 2	1
ECE 108P	Chemistry –I Lab	0 – 2	1
ECE 109P	Engineering Workshop	0 – 3	2
	Total Credits	**18 - 12**	**25**

2nd Semester

Course Code	Course Title	L – P	Credit
ECE 201T	Physics-II	4 – 0	4
ECE 202T	Chemistry-II	4 – 0	4
ECE 203T	Mathematics-II	4 – 0	4
ECE 204T	Professional Communication and Moral Ethics	4 – 0	4
ECE 205T	Engineering Mechanics	4 – 0	4
ECE 206T/P	Machine Drawing	3 – 2	4
ECE 207P	Computer Programming Lab	0 – 3	2
ECE 208P	Physics-II Lab	0 – 2	1
ECE 209P	Chemistry-II Lab	0 – 2	1
	Total Credits	**23– 9**	**28**

Semester-III

Course Code	Course Title	L – P	Credit
ECE 301T	Analog Electronics	4 – 0	4
ECE 302T	Basic Electrical Engineering	4 – 0	4
ECE 303T	Signals and systems	4 – 0	4
ECE 304T	Electrical & Electronic Instrumentation	4 – 0	4
ECE 305T	Mathematics -III	4 – 0	4
ECE-306T	Electronic Engineering Materials & Device Fabrication	4 – 0	4
ECE 307P	Analog Electronics Lab	0 – 2	1
ECE 308P	Electrical & Electronic Instrumentation Lab	0 – 2	1
ECE 309P	Basic Electrical Engineering Lab	0 – 2	1
	Total Credits	24 – 6	27

Semester-IV

Course Code	Course Title	L – P	Credit
ECE 401T	Network Analysis	4 – 0	4
ECE 402T	Communication System -I	4 – 0	4
ECE 403T	Digital Electronics and logic Design	4 – 0	4
ECE 404T	Electronic Devices & circuits	4 – 0	4
ECE 405T	Control System	4 – 0	4
ECE 406T	Electromagnetic Waves	4 – 0	4
ECE 407P	Digital Electronics and logic design lab	0 – 2	1
ECE 408P	Communication System-I Lab	0 – 2	1
ECE 409P	Electronic devices & Circuit Lab	0 – 2	1
ECE-410P	Control System Lab	0 – 2	1
	Total Credits	20 - 14	28

Semester-V

Course Code	Course Title	L – P	Credits
ECE 501T	Computer Organization and Architecture	4 – 0	4
ECE 502T	Statistics and theory of Probability	4 – 0	4
ECE 503T	Microprocessors	4 – 0	4
ECE 504T	Electrical Machines	4 – 0	4
ECE 505T	Data Structures	4 – 0	4
ECE 506P	Numerical methods for Engineers Lab.	0 – 3	2
ECE 507P	Electrical Machines lab.	0 – 2	1
ECE 508P	Microprocessors Laboratory	0 – 2	1
ECE 509P	Data structures lab.	**0 - 2**	**1**
	Total Credits	**20 – 9**	**25**

Semester-VI

Course Code	Course Title	L – P	Credit
ECE 601T	Microwave Engineering	4 – 0	4
ECE 602T	Antennas, Wave Propagation and Transmission Lines	4 – 0	4
ECE 603T	Linear Integrated Circuits	4 – 0	4
ECE 604T	Power Electronics	4 – 0	4
ECE 605T	Digital System Design (DSD)	4 – 0	4
ECE 606P	Microwave Engineering Lab	0 – 2	1
ECE 607P	DSD Lab	0 – 2	1
ECE 608P	Linear Integrated Circuits Lab	0 – 2	1
ECE 609P	Power Electronics Lab	0 – 2	1
ECE 610P	Computing Lab.	0 – 4	2
	Total Credits	20-12	26

Semester-VII

Course Code	Course Title	L – P	Credit
ECE 701T	Digital Signal Processing	4 – 0	4
ECE 702T	Data Communication	4 – 0	4
ECE 703T	Embedded System	4 – 0	4
ECE 704T	Random Process and Noise	4 – 0	4
ECE 705T	Power Systems	4 – 0	4
ECE 706P	Embedded system Lab	0 – 2	1
ECE 707P	Practical Training		1
ECE 708	Seminar		2
ECE 709P	Data Communication Lab	0 – 2	1
	Total Credits	**20 - 4**	**25**

Semester-VIII

Course Code	Course Title	L — P	Credit
ECE 801T	Wireless Communication	4 – 0	4
ECE 802T	Industrial Managements and Economics	4 – 0	4
ECE 803TE	Elective-I	4 – 0	4
ECE 804TE	Elective-II	4 – 0	4
ECE 805P	Wireless Communication Lab.	0 – 2	1
ECE-806PE	Elective-I Lab	0 - 2	1
ECE-807PE	Elective-II Lab	0 - 2	1
ECE 808	Project Work		10
	Total Credits	**16 – 6**	29

List of Electives

Elective-I	Elective-II
Image Processing	Radar Systems
Network Security	TV & Video Engineering
VLSI Design	Artificial Neural Networks & Fuzzy Logic
Consumer Electronics	Medical Electronics
Object Oriented Programming Language (OOPs)	Optical Fibre Communication

Semester-I

ECE -101T- Computer Fundamentals and Programming

L – P

4 – 0

Unit-I

Computer Fundamentals: Computer components, characteristics& classification of computers, hardware& software, peripheral devices, system software, application software, compiler, interpreter, utility program, : Assemblers, Interpreters, Compilers.

Logic Circuits & Computer Architecture, Switching circuits, AND, OR, NOT operations. Interconnection of units, processor to memory communication etc, Bus architecture, virtual memory.

Data Representation: Representation of characters, Integers, fractions. Hexadecimal representation of numbers, decimal –to- binary conversion. Binary Arithmetic, Binary addition, subtraction, two's complement, representation of numbers, addition/ subtraction of numbers in two's complement, binary multiplication and division

Unit-II

Microsoft Windows- An overview of different versions of Windows, Basic Windows elements, File management through Windows. Using essential accessories: System tools – Disk cleanup, Disk defragmenter. Command Prompt- Directory navigation, path setting, creating and using batch files. Drives, files, directories, directory structure. Application Management: Installing, uninstalling, Running applications. Linux- An overview of Linux, Basic Linux elements: System Features, Software Features, File Structure, File handling in Linux: H/W,S/W requirements, Preliminary steps before installation, specifics on Hard drive repartitioning and booting a Linux system. Basic shell commands.

Unit-III

Programming Language Classification & Methodology: Introduction to Computer Languages, Generation of Languages, Flow Charts, Dataflow Diagram Translators

Introduction to C Programming: Engineering problem solving methodology, computer languages, History of C, High-level languages, A simple C Program.

C-Programs: Program structure, constants and variables, scientific notation, memory concepts, Assignment statements.

Steps in Programming: Numeric data types, symbolic constants, arithmetic operators, priority of operators, Mathematical functions.

Unit IV

Making Decisions: The decision making process, Arithmetic comparisons, logical expressions, Algorithms, Pseudo-code, control structures. *If* Selection structure, *if/else* Selection structure, *while* repetition structure, formulating Algorithms, Assignment operators, Nested *If* statements.

*C Program Control:*Essentials of Repetition, Counter-Controlled Repetition, *for* repetition structure, *for* structure, *Switch* multiple-selection structure. *Do/while* repetition structure, *break* and *continue* statements, logical operators.

Unit-V

*Functions:*Program modules, Math library functions, Functions, Function definition and prototypes, header files, calling functions, random number generation, recursion.

*Arrays and Matrices:*Programs without arrays, using arrays, arrays and addresses, multi-dimensional arrays, storing arrays, searching arrays

Books Recommended

1. Fundamentals of Computers, V. Rajaraman, Prentice-Hall, 2006 edition.
2. Introduction to computers, Peter Norton, Tata McGraw Hill, Sixth Edition.

ECE -102T- Physics-I

L – P

4 – 0

Unit-I

Vector Analysis, Rotation of coordinate axis and transformation of vectors, Gradient of scalar field, divergence and curl of vector field in Cartesians, spherical polar and cylindrical coordinate systems, Gauss's divergence theorem, Stokes's theorem

Unit-II

Collision of particles, Conservative and non-conservative forces, elastics and inelastic scattering, frames of references, laboratory and center of mass system, kinematics of elastics scattering in laboratory system, application of conservation theorem in solving collision and scattering problems.

Unit-III

Vibration and Acoustics, Differential equation of simple harmonic motion, energy of simple harmonic oscillator, damped harmonic motion, energy dissipation, forced oscillations, amplitude and velocity resonance, sharpness of resonance, energy consideration in forced oscillations

Unit-IV

Electromagnetic Theory: Coulombs law and Gauss's theorem, calculation of electric field and potential, Biot -Savart's law, Ampere's theorem, divergence and curl of magnetic field, Faraday's law,

Unit-V

Maxwell's equation, electromagnetic wave equation in free space, its solution in one dimension and discussion, energy and momentum in electromagnetic wave, Introduction to plasma: Debye shielding, plasma parameter, plasma frequency

Books Recommended

1. Introduction to classical Mechanics by R.G.Takwale and P.S Puranik (Tata McGraw Hill publishing Co.)
2. Classical Mechanics by N.C. Rana and P.S. Jog (Tata McGraw Hills)
3. Introduction to Electrodynamics By David Griffiths (Pearson Education)
4. Introduction to Plasma theory by Dwight R. Nicholson (John Wiley)
5. Vibrations and Waves by A.P French, 1996

ECE -103T- Chemistry -I

L – P

4 – 0

Unit-I Chemical Thermodynamics

Introduction and Importance, Concept of Heat and Work, State Functions and Path Functions. First Law of Thermodynamics, Work done in Isothermal and Adiabatic Conditions. Heat capacities, Relation between Cp and Cv relations, Second Law of Thermodynamics, Concept of Entropy, Gibbs free energy. Free Energy Changes as Criteria of Reversible and Irreversible process, Gibbs-Helmholtz's equation, Clausius- Clapeyron equation.

Unit-II Electrochemistry

Introduction, Conductivity of Electrolytes, Kohlrausch's Law of Independent Migration of Ions and its Application, Debye Huckel Theory of Strong Electrolytes. Electrochemical cells, Electrode-Potential, Standard Electrode Potential, Types of Electrodes (Metal-Metal Ion electrode, Gas Electrodes, Metal Insoluble Metal Salt Electrode), Fuel Cells, Hybrid cells, pH: Measurement and Control

Unit-III General Organic Chemistry

Introduction, Electronic Displacements in Organic Molecules, Reaction Intermediates, Types of Organic reaction (Addition, Elimination, Substitution, and Rearrangements Reaction).Isomerism: Structural Isomerism, Geometrical isomerism, E/Z system of Nomenclature, Chirality, Optical isomerism, Optical Activity without Chirality

Unit-IV Alloys

Introduction To Alloys, Advantages of Alloys over other Metallic Materials, Manufacturing of Alloys (Fusion Method, Powder Metallurgy, Electrodeposition and Reduction method), Classification of Alloys (Ferrous and non-Ferrous metal Alloys), Carbon steels (Carbon Steels Classification, Composition and Uses), Alloy Steels (Low, Medium and High alloys steels), Effect of Different Alloying Elements on Properties of Alloy steels, Engineering Application of Copper, Nickel and Aluminum Alloys

Unit-V Instrumental Techniques

Introduction, Advantages and Disadvantages of Instrumental and Non-Instrumental Methods, Electromagnetic Radiation, Electromagnetic Spectrum, Light Absorption (Beers-Lambert Law)

Infrared Spectroscopy (Modes of vibration, IR bands corresponding to different functional groups and Applications), UV-VIS spectroscopy (Types of Transition, Chromophors, Auxo-chromes and Applications)

Books Recommended:

J.C. Kuriacose and J. Rejaraman: Chemistry in Engineering and Technology Volumes I & II (Tata McGraw Hill publishing company Limited, New Delhi)

P.C. Jain. Engineering Chemistry, (Dhanpat Rai & Sons, Nai Sarak; New Delhi).

Physical Chemistry – Puri Sharma and Patharua.

Inorganic Chemistry (J.D. Lee).
Physical Chemistry by Peter Atkins,Julio depaula
Electrochemistry and Corrosion Science by N.Perez
A Textbook of Organic Chemistry, V. K. Ahluwalia and Madhuri Goyal

ECE -104T- Mathematics-I

L – P

4 – 0

Unit-I

Introduction to differential calculus, Leibnitz's Theorem for n^{th} derivative, Taylor's theorem, Tangent and Normal, Partial Differentiation, Euler's theorem, Double points, asymptotes, curvature and tracing of curves.

Unit-II

Limit, continuity and differentiability of functions of several variables, chain rule, Jacobi theorem. Taylor's theorem of one and two variables, extrema of functions, two or more variables using method of Lagrange's multipliers

Unit-III

Ordinary differential equations: Exact ordinary differential Equations and Ordinary differential equations reducible to exact differential equations. Linear differential equations and equations reducible to linear form. Linear Differential Equations of second and higher order with constant and variable coefficients.

Unit-IV

Non-linear differential equation of first order, Simultaneous differential equation of the form dx/P = dy/Q = dz/R, Applications of ordinary differential equations,

Unit-V

Algebraic Equation, Elements of the theory of polynomial equations.
Fundamental theorem of Algebra, Relation between the roots and the coefficients of an equation, Solution of cubic & bi-quadratic equations

Books Recommended

1. Differential calculus, Shanti Narayan, S.Chand
2. A text Book on Engineering Mathematics by Bali, N.P, Luxmi Publications
3. Ordinary and Partial Differential equation, M.D.Raisinghania, S.Chand and Co

Reference Books

1. Advanced Engineering Mathematics by Jain, R.K. and Iyengar SRK, Narosa, 2001
2. Advanced Engineering Mathematics, Kreyszig, J.Wiley
3. Linear Algebra, Hoffmann & Kunze, Prentice-Hall
4. Differential equations and its applications, H.T.Piaggio, Prentice-Hall
5. Engineering mathematics Vol I-II, Sastry, Prentice Hall of India

ECE -105T/P- Engineering Drawing

L –P

2 –3

UNIT- I:

Basic Concepts of drawing quadrants, drawing instruments, types of lines etc.

Dimensioning: General rules of dimensioning. Types: Aligned, unidirectional, chain, parallel, combined, title, block & margins.

Orthographic projections: Concept of horizontal and vertical planes, first and third angle projections, orthographic projections of simple blocks, missing lines and missing views.

Projection of points, lines and planes: Projection of points in different quadrants, projection of lines and planes positioned in different orientations with respect to the principle planes.

UNIT II

Projection of solids: Projection of simple geometrical solids placed in simple positions and with single rotations of the face, edge or axis of the solid with respect to one of the principal planes of projection.

UNIT III

Section of solids: Principal of sectioning, Section of simple geometrical solids, types of the section planes and their trace representation and location, true shape sections, sectioning by auxiliary planes.

UNIT IV

Development of surfaces: Development of surfaces of simple sectional solids and intersecting solids, transition pieces, cones & cylinders.

UNIT V

Isometric projections: Classification of pictorial projections, Isometric projection of plane figures, prisms, pyramids, cylinders and for the given orthographic projections. Introduction to Auto CADD. Basic commands of CADD.

Books Recommended :

1. Gill, P.S Engineering Drawing, S.K. Kataria and sons,
2. Bhatt, N.D Enginnering Drawing, Charotar Book Stall, TulsiSadan, Anand
3. James, D Bethune Engineering Graphics with Auto CADD, 2006.
4. Narayana, Kannaiya Engineering Drawing, Scitech Publications, Chennai

Reference Books

1. Sham Tickoo, Auto CADD 2006
2. B.C.RanaM.B.Shah Engineering Drawing, Pearson Education

ECE -106P - Computer Fundamental & Programming Lab

L – P

0 –2

1. Familiarization with DOS environment and its important commands
2. Learning some configuration commands & creating batch files in DOS environment
3. Understanding network sharing and working with Windows utilities
4. An Introduction to Linux
5. Working with MS Office 2010
6. Learning basics of Microsoft Word
7. Exploring the advanced features of Microsoft Word
8. Working with Microsoft Excel
9. Familiarization with the environment of Microsoft Power Point
10. Creating databases using Microsoft Access
11. Creating queries, forms and reports in Microsoft Access
12. Creating a hard copy of the crucial CMOS boot configuration and restoring CMOS boot configuration when lost
13. Experimenting with the AND, OR, NAND, NOR, XOR and NOT Integrated circuits
14. Finding expression for the given logic diagram, implementing the circuit on breadboard, and observing output for various combinations of inputs
15. Demonstrating various components of a PC and their interconnection
16. Internet Basics and Networks Media
17. Internet basics
18. Familiarization with various network cables and their accessories
19. Program to print “Hello World”.
20. Program to add, subtract, multiply, divide and find remainder between two numbers.
21. Program to check whether three numbers are equal or find the largest and smallest of the three using if-else.
22. Develop a menu-based calculator using switch.
23. Program to generate odd, even, fibnoccii, lucas and other common series using loops.
24. Program to develop a menu-based grade card using do-while and use continue and break statements.
25. Write functions for finding sum, difference, product and remainder between two numbers and return the result.
26. Write a function to find factorial using recursion.
27. Programs to find minimum, maximum of an array.
28. Program to implement linear search and selection sort.
29. Program to add and multiply two matrices.
30. Program to find transpose of a matrix.

ECE -107P - Physics-I Lab

L – P

0 – 2

List of Experiments

1. To determine the value of e/m of electron
2. To study the bar pendulum
3. To study the Kater's reversible pendulum
4. To study the bending of beam apparatus
5. To study the Newton's ring apparatus
6. To determine the wavelength of light using a spectrometer
7. To study a Polarizer and analyzer
8. Stephens constant using incandescent lamps
9. Energy band of a semi-conductor diode

Recommended Books:

1. Practical Physics by SL Gupta,
2. Advanced Practical Physics, SP Singh, Pragati Prakashan

ECE -108P - Chemistry-I Lab

L – P

0 – 2

List of Experiments

Basic Introduction on Solution Preparation, Concentration terms, Handling of Glass wares Chemicals and Instruments, Precautions

1. Determination of strength of NaOH solution by standardization of sodium hydroxide using Oxalic acid
2. To determine the acid value of a given mineral oil or vegetable oil.
3. To determine the moisture content of a given sample of coal.
4. To determine the Degree of dissociation of a weak acid by Conductometry
5. To determine the ash content of a given sample of coal.
6. Determination of the strength and pK_a value of the weak acid by titration with a alkali.
7. Estimation of calcium in Lime stone
8. To determine the Aniline point of the given sample of a Lubricating oil
9. To determine the flash and fire point of given oil by Pensky-Martins flash point apparatus.

Demonstration Experiments

1. Determination of pH of different concentration of acid and bases by pH meter
2. Determination of calorific value of solid fuels using Bomb Calorimetery

ECE -109P- Engineering Workshop

L – P

0 – 3

1. **WOOD AND WOOD WORKING (CARPENTRY):** Various types of wood, defects in timber, seasoning of wood, carpentry tools and measuring devices. Common safety in wood working. Exercises on carpentry processes like marking, sawing, planning, and chiseling. Exercise for wood working joints, like Halved joints, Dovetail joints, Mortoise and Tenon joints.
2. **MACHINE SHOP:** Introduction to Machine tools, like lathes, shapers, drilling machines, sawing machines, grinding machines & milling machine with their uses; principal parts and accessories. Types of cutting tools, materials. Simple and basic metal removal operations on machines such as lathes, milling machine, shaper, grinder & drilling machines using mild steel. Safety precautions of machine tools. Introduction to CNC lathe.
3. **WELDING SHOP:**Introduction to welding applications & methods, welding equipments & electrodes. Edge preparation and simple arc- welding operations on M.S for joints like lap, butt, corner, edge & T-joint. Safety measures. Welding defects.
4. **FITTING SHOP:** Description of fitting and cutting tools like clamping tools i e vices, measuring & marking tools, calipers, vernier calipers, micrometers, dial indicators, gauges,hacksaw,files,striking tools,chiseles, drills, taps, reamers, Die & die stock. Demonstration of above tools through simple operations on M.S pieces.
5. **BLACK SMITHY SHOP**: Description of supporting, holding, striking, cutting & forming/finishing tools. Heating devices and measuring tools. Simple hand forging operations like drawing down, cutting, jumping and bending. Safety precautions.
6. **FOUNDRY SHOP:** Description of foundry tools & equipments like, hand tools, moulding boxes (flasks), moulding machines, simple melting and pouring (ladles) equipments. Introduction to moulding, moulding sands, types of moulds & cores . Making of simple sand mould with core and casting.
7. **SHEET METAL SHOP :** Demonstration of Sheet metal tools for measuring, working tools like scribers,punches,chisels,snips,hammers,stakes & holders, pliers, groovers, folding bars & gauges. Simple operations like measuring& marking, lying out, cutting, shearing, bending stretch forming, riveting. Lancing, notching.Introduction to hems and seam.

Books recommended

1. Raghuvanshi , B.S; A course in workshop technology, Vol I -II. Dhanpat Rai and Sons

2. Garg S.K Workshop Technology (Manufacturing Processes) Laxmi Publications (P) LTD.

3. Hajira chowdry, Workshop Practice

4. Singh, S; Manufacturing Practice, S.K. Kataria and Sons , New Delhi

Semester-II

ECE - 201T – Physics - II

L – P

4 – 0

Unit-I

Quantum Mechanics: De-Broglie Hypothesis, Davison Germer experiment, wave function and its properties, expectation value, quantum mechanical operator, Wave Packet, Normalisation factor, Uncertainty principle. Schrodinger Equation for free Particle, Schrodinger wave Equation; Time Dependent and Time Independent, Tunnelling effect and its example (Tunnel diode or alpha decay).

Unit-II

Elementary Solid State Physics: Crystal lattice, Crystal structure, Unit cells, Miller Indices, Bravais lattice, Photographic crystal X-ray diffraction techniques.

Classification of solids, formation of energy bands in metals, semiconductors and insulators, intrinsic and extrinsic semiconductors, Fermi energy.

Unit-III

Diffraction: Optical diffraction techniques- Fresnel and Fraunhoffer diffraction.

X-ray diffraction techniques (Single crystal and Polycrystalline materials)- Laue's method, Powder method, Oscillation and Rotation method.

Unit-IV

Special theory of Relativity*:* Frames of reference, Michelson-Morley experiment, Basic postulates of special theory of relativity, Length contraction, time dilatation, Time-energy relation.

Superconductivity: Meissner Effect, Type I and Type II Superconductors, BCS theory (Qualitative only), applications of superconductors

Unit-V

Lasers*:* Introduction, Principle of laser, Stimulated and spontaneous emission, Population inversion, Einstein coefficients, optical pumping, **Resonant Cavity and its modes**, He-Ne Laser, Ruby Laser, Semiconductor Lasers, Applications of Lasers.

Books recommended:

- A. Ghatak, "Optics"
- N. Subrahmanyam and Brij Lal, "Optics"
- Jenkins and White, "Fundamentals of Optics"
- Rajnikant, "Applied Solid State Physics"

ECE - 202T – Chemistry - II

L – P
4 – 0

Unit-I NANO-TECHNOLGY

Nanoscale and Its Significance, Properties at Nanoscale (Optical, Electrical and Magnetic). Nanostructures (Nano-rods, Nano-rings, Nano-particals), General Methods of Preparation, Carbon Nanotubes, Nanoelectrodes, Nonopolymers

Unit-II CORROSION

Introduction, Effects of Corrosion, Factors Effecting the Rate of Corrosion (Nature of the Metal and Nature of the Environment), Electrochemical Theory of Corrosion, Dry Corrosion and Wet Corrosion, Types of Corrosion (Pitting Corrosion, Crevice Corrosion, Galvanic Corrosion and Stress corrosion), Testing and Measurement of Corrosion, Corrosion Protection and Inhibition, Cathodic Protection, Anodic Protection, Protective Coatings

Unit-III POLYMERS

Advantages of Polymers over other Engineering Materials, Functionality, Degree of Polymerization, Concept of Molecular Weight, Polymerization (Addition, Condensation and Copolymerization), Polymerization Techniques (Bulk, Solution, Suspension and Emulsion polymerizations), Preparation, Properties and Engineering application of some Important Polymers, Polythene (LDPE and HDPE), Polyvinyl Chloride, Polystyrene, Teflon, Phenol Formaldehyde. Introduction to polymeric composites

Unit-IV LUBRICANTS

Introduction, Theories of Lubrication, Mechanism of Lubrication, Classification of Lubricants (Solid, Semi-Solid, liquid), Properties of Lubricants and Their Significance, Additives for Lubricants, Selection of Lubricants

Unit-V INSTRUMENTAL TECHNIQUES II

X-ray Spectroscopy: Principle and Applications

Nuclear Magnetic Resonance: Chemical Shift, Splitting and Application

Thermal Analysis: Principle, Working and Application

Basic introduction to SEM and TEM

Books Recommended:

- S.S Dara A Text Book of Engineering S Chand & Co limited New Delhi
- Advanced Practical Physical Chemistry by Yadav, Goyal publication
- Spectroscopic methods : Williams and Fleming
- Applied Chemistry : Theory And Practice By O. P. Vermani
- A Text book of Engineering Chemistry by S.S. Dara, S.Chand & Co, New Delhi
- Laboratory Manual on Engineering Chemistry by S.K. Bhasin and Sudha Rani, Dhanpat Rai Publishing Company, New Delhi (2004).
- Applied chemistry,Balsaraf V. M. Et. Al., I. K. International Publishing House Pvt. Ltd (2010
- Electrochemistry and Corrosion Science by N.Perez

ECE - 203T - Mathematics - II

L – P
4 – 0

Unit-I

Differential Equation**:** Partial differential equations of first order , langrage linear equation Standard form, Charpit's method to solve non linear partial differential equation,

Unit-II

Partial differential equation of second and higher order, Homogenous partial differential equations with constant coefficients, vibration of stretched flexible string, heat flow equation. Wave equation, solutions by the method of separation of variables. Series solutions of ordinary differential equations

Unit-III

Fourier Series **:** Fourier Series, Integral Calculus**:** Differential under the sign of integration. Double and triple integrals, change of variables, Beta and Gamma functions

Unit-IV

Matrices**:** Review of algebra of matrices, partitioning of Matrices, Hermitian and skew-Hermitian Matrices. Orthogonal and unitary matrices, Triangular matrices, Rank of a matrix. Equivalent matrices, elementary transformations, Normal form

Unit-V

Inverse of matrix(Differential Methods) and solution of simultaneous equation by elementary operation. Normal form, Eigen values, and Eigen vectors of a matrix. Caley- Hamilton theorem, Quadratic Form.

Books Recommended:

- Advanced Engineering Mathematics by E.Kreyszig
- Differential equations and its applications, H.T.Piaggio, Prentice-Hall
- Applied Mathematics for Engineers byP.N.Wartikar
- Advanced Engineering Mathematics,2/e by Greenberg, Pearson education, 2004
- Ordinary and partial Differential equation, M.D. Raisingania, S.Chand and Co
- Linear Algebra,Hoffmann & Kunze, Prentice-Hall
- Mathematical Analysis by S.C.Malik & Savita Arora New Age international Limited
- Integral Calculus by Shanty Narayan.

ECE -204T- Professional Communication & Moral Ethics

L – P

4– 0

Unit I

Communication: definition and description; types of communication; body language; barriers to Communication. Speech sounds: description and articulation of Phonemes, words, word stress, sentence stress and intonation in basic patterns; basics of connected speech and conversational patterns.

Unit II

Written communication: nature, styles and types, Report writing; structure, drafting and types; business correspondence: purpose, types of business letters; resume; proposals and invitations; emails. Presentation: skills and deliverance; making and answering phone calls; debating and group discussions; facing interviews.

Unit III

Engineering ethics, Nature and scope, Types of ethics: Common ethics, Personal ethics, Professional ethics, Origin of ethical theories, Rights and responsibilities of engineers, Case studies.

Unit IV

Islamic perspective on ethics and education, concept of rights and duties in Islam, sociological perspective on education, social and value implications of technology, Environmental Obligations on Engineers

Unit V

Moral development, Different stages of moral development; pre-conventional, conventional and post-conventional, Moral and non-moral actions, Impediments to responsible action, Computer ethics, Computer Crimes, need of computer ethics, hacking, Bio-Ethics,

RECOMMENDED BOOKS:

1. Battacharaya, Inderjit. An Approach to communication Skills.
2. P.D. Chaturvedi and M. Chaturvedi, Business Communication, Delhi: Pearson Education, 2006.
3. Charles B. Fleddermann, Enginerring Ethics 2nd ed. Pearson education Inc.
4. FrankanaWalliam .K :Ethics
5. Sinha. J.N :Manual of Ethics

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ECE - 205T- Engineering Mechan
L – P
4 – 0

Unit I

Analysis of Stresses & Strains: Forces & stresses, normal stress &normal strain, axial loading, stress strain diagram(mild steel),mechanical property, hooke's law, modulus of elasticity, ultimate & allowable stress, factor of safety, composite sections, bars of varying cross section, superposition principle, temperature stresses, poisson's ratio, bulk modulus, shear strain, relation among E,V,&G.

Unit II

Moments of Area of Plane Area: Centre of gravity (symmetrical & Un _symmetrical section), moment of inertia of (symmetrical & unsymmetrical section), parallel axis theorem, perpendicular axis theorem, radius of gyration.

Unit III

Bending moment & shearing force: Notation & sign convention for fluctural loads, shear force & bending moment diagram of determinate structures (cantilever, simply supported beams & varying load beams) supported to point loads, UDL, VDL, computing of reactions using equation of equilibrium.

Unit IV

Trusses: Planner truss structures, idealisation of planner structures, sign convention & member force representation. Analysis of trusses with method of joints, sections and graphical

Unit V

Torsion in Shafts: Preliminary discussion of stresses in a shaft, deformation in a circular shaft, polar moment of inertia, angle of twist, design of transmission shaft.

Books Recommended

- Shames I.H, Engineering Mechanics, Prentice Hall, New Delhi.
- D.S.Kumar, Engineering Mechanics, S.K.Kataria & Sons, New Delhi.
- R.S.Khurmi, Strength of Materials, S.Chand & Company Ltd, New Delhi.

ECE – 206P - Machine Drawing

L – P
3 – 2

UNIT I: Principles of Sectioning, types of Sections, standard practices.

UNIT II: Nut and Bolt, types and their assembly, threads and various types of screw threads, threaded fasteners, locking devices, foundation bolts.

Permanent fasteners: Rivet and riveted Joints, welding symbols and welding joints.

UNIT III: Pin and cotter joints (temporary fasteners), Spigot and socket type cotter joint, sleeve type cotter joint, knuckle joint, Gib and cotter joint.

UNIT IV: Keys and Shaft Couplings (temporary fasteners), Flanged (Protected and unprotected), Muff coupling (Pin type), friction coupling, clutches, Oldham coupling and universal coupling.

UNIT V: Shaft bearing: Type of Bearings, journal bearings, pivot bearings, thrust bearings, ball bearings, bearing bracket, hangers and ball bearings.

Books Recommended:

1. P.S Gill — Machine Drawing
2. N.D Bhatt — Machine Drawing

ECE - 207P - Computer Programming Lab

L – P

0 – 3

Introduction to Pointers:A first look at pointers, declaring pointers, using pointers, naming pointers, pointer operators, pointer expression and pointer arithmetic.

Arrays and Pointers:Arrays and pointers in practice, multidimensional arrays, and pointers, accessing array elements, dynamic memory allocation – The Malloc function.

Characters and Strings:Fundamentals of strings and characters, character handling library, string conversion function, standard I/O library function, comparison, search and memory function of string.

Structures : Definition, initializing, assigning values, passing of structures as arguments, Arrays of structures, pointers to structures, self referential structures. Unions, typedef, bit fields, C program examples.

***Console & File I/O* :** Standard I/O, Formatted I/O, opening & closing of files, I/O operations on files.

Books Recommended:

- *C How to Program*, Deitel & Deitel, Prentice hall
- Let us C, Yashavant kanetkar, BPB Publications

Lab Programs

1. Write a program in C to copy one array to another array ?
2. Write a program in C to merge two arrays ?
3. Write a program in C to read and display biodata using structures ?
4. Write a program in C to read and display integer array using functions ?
5. Write a program in C to read and display biodata using functions ?
6. Write a program in C to read and display a 3 x 3 Matrix ?
7. Write a program in C to transpose the 3 x 3 Matrix ?
8. Write a program in C to print the sum of two 3 x 3 Matrix. ?
9. Write a program in C to print the product of two 3 x 3 Matrix ?
10. Write a program in C to read and display a N x N Matrix ?
11. Write a program in C to transpose the N x N Matrix ?

12. Write a program in C to print the sum of two N x N Matrix ?
13. Write a program in C to print the product of two N x N Matrix ?
14. Write a program in C to read and display a M x N Matrix ?
15. Write a program in C to transpose of M x N Matrix ?
16. Write a program in C to print the sum of two M x N Matrix ?
17. Write a program in C to print the sum of two M x N Matrix ?
18. Write a program in C to find sum of two matrices using array
19. Write a program to sort a 4X4 matrix
20. Write a function to swap two numbers using call by reference.
21. Write a function to find minimum of an array using pointers.
22. Write a function to reverse a string using pointers.
23. Write a program in C to convert upper case letters into lower case?
24. Write a function to store names of students using (character) pointer arrays.
25. Write a program in C to encraph the given file?
26. Write a program in C to decraph the given file?
27. Write a program in C to copy the file contents into array?
28. Write a program in C to display page by page of the file contents including line number. ?
29. Write a program in C to display line by line and count the no of upper and lower case letters and numbers?
30. Write a program in C to display page by page of the file contents including line number. ?
31. Write a program in C to display line by line and count the no of upper and lower case letters and numbers?
32. Write a program in C to print the particular line when pattern is occurred using command line arguments.(grep command in unix:) ?
33. Write a program in C to print the particular line with line number when pattern is occurred using command line arguments in all files(Grep command in unix:) ?
34. Write a program in C to read and store the bio-data into file ?
35. Write a program in C to read the bio-data from file and print it to the screen?
36. Write a program in C to read the bio-data from file and calculate hra and da?
37. Write a program in C to display the Nth record ?
38. Write a program in C to edit the n th record ?
39. Write a program to sort all the records in a file (containing student record) based on their marks
40. Write a program in C to read and display the bio-data of 10 students using structure?
41. Implement above structure based programs using dynamic memory allocation.
42. Implement linked lists and perform addition, deletion, searching.
43. Write a program in C to read and display the sum of two complex numbers?
44. Write a program in C to read the biodata from file using command line arguments?
45. Write a program in C to display the text from file using command line arguments (cat command in unix) ?
46. Write a program in C to copy one file to another file using command line arguments (cp command in unix) ?

ECE - 208P – Physics - II Lab

L – P

0 – 2

Lab 1 Determination of refractive index of prism by spectrometer.

Lab 2 Determination the wavelength of sodium light by diffraction grating.

Lab 3 Determination of Wavelength of sodium light by Newton's ring.

Lab 4 Study of Zener diode voltage regulating characteristics.

Lab 5 To study double slit interference by He-Ne laser.

Lab 6 To plot the graph for the transistor characteristics.

Lab 7 To plot the graph for the semi-conductor diode.

Lab 8 To find the dead time of a G. M. Counter.

ECE - 209P – Chemistry - II Lab

L – P

0 – 2

List of Experiments

1) Synthesis of the phenol formaldehyde resin
2) Synthesis of the urea formaldehyde resin
3) To determine the temporary and permanent hardness of the a sample of water by complexometeric titration
4) To determine the Alkalinity of the given sample of water
5) Determination of the ion exchange capacity of cation exchange resin
6) Determination of the ion exchange capacity of anion exchange resin
7) Titration of Fe (II) Vs K_2CrO_7 and Determination of Redox potential of Fe^{2+} /Fe^{3+}
8) Estimation of Copper in Brass with sodium thiosulphate
9) To determine the concentration of the $KMnO_4$ solution using spectrophotometer.

Demonstration of Experiments

Determination of specific rotation of the sucrose by Polorimetry

Spectrophotometer (concentration determination, wavelength maximum)

SEMESTER-III

Analog Electronics (ECE- 301T)

L – P
4 – 0

UNIT-I:

Introduction to Semiconductors: p and n types, transport mechanism of charge carriers, electric properties, Hall Effect etc. Electronic Devices, their characteristics and applications

UNIT-II:

PN junction diode: current components in p-n junctions, characteristics-piecewise linear approximation, temperature dependence, diode resistance, diode capacitance, switching times, circuits etc., basic operation of Zener diode, avalanche breakdown diode, Schottky diodes, tunnel diode

UNIT-III:

Rectifiers (Half wave rectifier, Full wave rectifier: CT & Bridge type), filters (pie and T), clippers, clampers, peak detector, sampling gate, voltage multipliers.

UNIT-IV:

Transistors: Current components of transistor, Types, operation and characteristics, Ebers-Moll model, CE, CB and CC configurations, input-output characteristics and graphical analysis of basic amplifier circuits, thermal; runaway, Early-Effect. Transistor Biasing, Bias stability, h-parameters: low frequency h-parameter model, analysis and design of transistor amplifier circuits using h-parameters

UNIT-V:

Special semiconductor devices: TRIAC, DIAC, SCR, UJT, Photodiode, Phototransistor, LCD, LED, MOS, VMOS, Solar cells, Photoconductive cell, Cathode Ray Oscilloscope: Basic operation and measurement applications

Books Recommended:

- Electronic Circuits by D.Schelling and C.Belove
- Integrated Electronics by Millman&Halkias.
- Electronic circuits by G.Grob.
- Electronic Devices and Circuit Theory by Boylestead and Nashelsky. 1994
- Microelectronic Circuits Adel S. Sedraand Kenneth C. Smith.

Basic Electrical Engineering (ECE -302T)

L – P
4 – 0

UNIT-I:

Electric Circuits Laws: Basic electric circuit terminology, Ohm's law, Kirchhoff's current law (KCL) and Kirchhoff's Voltage law (KVL), circuit parameters (resistance, Inductance and capacitance), series and parallel combinations of resistance, Inductance and capacitance, Nodal analysis.

UNIT-II:

Energy Source, Ideal and Practical voltage and current sources and their transformation,Dependent voltage sources and dependent current sources, D.C. Circuit Analysis, Power and energy relations, Analysis of series and parallel DC circuits,

UNIT-III:

Loop and Nodal methods of circuit analysis, Superposition theorem, Thevenin's and Norton's theorems, maximum Power theorem, Delta - star (Y) Transformation

UNIT-IV:

*A.C Circuit Analysis:*Basic terminology and definitions, Phasor and complex number representation, solutions of sinusoidally excited RLC circuits, Power and energy relations in A.C. circuits, Applications of network theorems to A.C. circuits, Resonance in series and parallel circuits, Concepts of active & reactive powers.

UNIT-V

Steady State A.C three phases Circuits: Concept of a 3-phase voltage, wye (Y) circuits. Delta (Δ) circuits, Current and voltage relations in Y and Δ Circuits, Characteristics of a 3 -phase system, Magnetically Coupled circuits, Mutual inductance

Books Recommended:

1. Fundamentals of Electric Engineering byBogart, Tata McGraw Hill,1998
2. Electrical Engineering Fundamentals by Deltoro, Prentice Hall India (PHI)
3. Theory and problems of Basic Electric engineering by Nagrath and Kothari..PHI
4. Basic Electric Engineering by Cathey, Schaum's outline series, Tata McGraw Hill
5. Circuit analysis by William Hayat, Tata McGraw Hill, and 2nd Ed

Signals and Systems (ECE -303T)

L – P
4 – 0

UNIT I: Representation of signals

Continuous and discrete time signals: Classification of Signals – Periodic aperiodic even – odd – energy and power signals – Deterministic and random signals – complex exponential and sinusoidal signals – periodicity – properties of discrete time complex exponential unit impulse – unit step impulse functions – Transformation in independent variable of signals: time scaling, time shifting.

Determination of Fourier series representation of continuous time and discrete time periodic signals – Explanation of properties of continuous time and discrete time Fourier series

UNIT II: Analysis of continuous time signals and systems

Continuous time Fourier Transform and Laplace Transform analysis with examples – properties of the Continuous time Fourier Transform and Laplace Transform basic properties, Parseval's relation, and convolution in time and frequency domains.

Basic properties of continuous time systems: Linearity, Causality, time invariance, stability, magnitude and Phase representations of frequency response of LTI systems -Analysis and characterization of LTI systems using Laplace transform: Computation of impulse response and transfer function using Laplace transform.

UNIT III: Sampling theorem and z-transforms

Representation of continuous time signals by its sample - Sampling theorem – Reconstruction of a Signal from its samples, aliasing – discrete time processing of continuous time signals, sampling of band pass signals

Basic principles of z-transform - z-transform definition – region of convergence – properties of ROC – Properties of z-transform – Poles and Zeros – inverse z-transform using Contour integration - Residue Theorem, Power Series expansion and Partial fraction expansion, Relationship between z-transform and Fourier transform.

UNIT IV: Discrete time systems

Computation of Impulse & response & Transfer function using Z Transform. DTFT Properties and examples – LTI-DT systems -Characterization using difference equation – Block diagram representation – Properties of convolution and the interconnection of LTI Systems – Causality and stability of LTI Systems.

UNIT V: Systems with finite and infinite duration impulse response

Systems with finite duration and infinite duration impulse response – recursive and non-recursive discrete time system – realization structures – direct form – I, direct form – II, Transpose, cascade and parallel forms

Text book:

1. AlanV.Oppenheim, Alan S.Willsky with S.Hamid Nawab, Signals & Systems, 2nd editionn., Pearson Education, 1997
2. Signals and systems by Simon Haykins and Barry Van Veen

References:

1. John G.Proakis and Dimitris G.Manolakis, Digital Signal Processing, Principles, Algorithms and Applications, 3rd edn., PHI, 2000.
2. M.J.Roberts, Signals and Systems Analysis using Transform method and MATLAB, TMH 2003.
3. Simon Haykin and Barry Van Veen, Signals and Systems, John Wiley, 1999
4. K.Lindner, "Signals and Systems", McGraw Hill International, 1999.
5. Moman .H. Hays," Digital Signal Processing ", Schaum's outlines, Tata McGraw-Hill Co Ltd., 2004.
6. Ashok Amhardar, "Analog and Digital Signal Processing", 2nd Edition Thomson 2002.

Electrical and Electronic Instrumentation (ECE -304T)

L – P
4 – 0

UNIT-I

Units: S.I. systems of units, dimensions and standards, errors in measurement.

Electric Circuit Components: Resistance, inductance, capacitance, measurement of low, medium, high resistance and use of different D.C. bridges

UNIT-II

Measurement of inductance and capacitance using different A.C. bridges D.C. and A.C. potentiometers and their application.

UNIT-III

Indicating Instruments: Construction and theory of D' Arson Val galvanometer and its use as moving coil ammeters voltmeters, moving iron type ammeters and voltmeters, dynamometer type wattmeter, induction type energy meter, vibration galvanometer, magnetic oscillographs.

UNIT-IV:

Electronic Measurements: Basic principles of vacuum tube and transistors voltmeter, D V M, Multimeters, electronic wattmeter, C.R.O. and its applications.

UNIT-V:

Measurement of Non Electrical Quantities: Various types of transducers, measurement of displacement, speed, stress, strain.

Recommended Books:

1. Electrical Measurements by Cooper
2. Electronic and Electrical measurements instrumentation by A.K.Sawhney

Reference books:

1. A course in Electronic and Electrical measurements instrumentation by J.B. Gupta
2. Electrical and Electronic Measurements by Banerjee, Gopal Krishna
3. Electrical Measurements and instrumentation by U.A Bakshi, A.V Bakshi
4.

Mathematics III (ECE -305T)

L – P
4 – 0

UNIT-I:

Laplace transform, Shifting theorem, Laplace transforms of different functions, Heaviside's unit function, Dirac Delta function and its Laplace transforms, Heaviside's expansion theorem.Inverse Laplace transforms, Initial and final value theorems, convolution theorem and applications, use of Laplace transforms in the solution of linear differential equations.

UNIT-II:

Z-transform, Inverse Z- Transform and applications of Z -transform to difference equations

UNIT-III:

Bessel's functions, Recurrence relations, modified Bessel's function of first kind.Legendre polynomials, Rodrigues formula, Recurrence relations

UNIT-IV:

Definition of Fourier transform, Fourier Sine and Cosine transform Fourier integral formula.

UNIT-V:

Introduction to complex variables, analytic functions, harmonic conjugate, conformal transformation of some simple functions, complex integration, Cauchy's theorem, Cauchy's integral formula, Laurent's theorem, residues and contour integration

Recommended Books:

1. Laplace Transforms by Spiegel (Schaum Series)
2. The use of Integral Transforms by Iam.N.Snedden, Tata McGraw Hill
3. Integral Transforms by LoknathDebnath, C.R.C. Press, New York.
4. Complex variables and applications by R.V. Churchill, McGraw Hill International Book Company
5. Advance Engineering Mathematics by R.K.Jain&S.R.K. Iyengen-Norosa-2001.
6. Higher Engineering mathematics, BS Grewal, Khanna Publishers, Delhi

Electronic Engineering Materials & Device Fabrication (ECE- 306T)

L – P
4 – 0

UNIT-I
Crystal structure: crystalline state, Bravais lattices, Miller indices, Reciprocal lattice, Common Crystal structures, Crystalline Interference, Bragg Diffraction, crystal imperfections

UNIT-II
Free electron theory, Energy bands in solids, metals, insulators, semiconductors and semi-metals, free electron in one and three-dimensions, free electron and density of states, Fermi-Dirac statistics, conduction in metals and alloys, conductors and resistors, Materials for resistors, capacitors and inductors.

UNIT-III
Growth of single crystals, the Czochralski Technique, Zone refining technique, GaAs crystal growth technique, Epitaxial growth, Vapour phase and molecular beam Epitaxy, Diffusion Technology and Photolithography , Metallization and Etching ,

UNIT-IV
Magnetism, magnetic properties of materials; diamagnetic, paramagnetic and ferromagnetic properties of materials, ferro-magnetism and anti-ferromagnetism, ferrites ,Dielectric materials, Piezoelectricity ,Polarization and Dielectric Constant, Superconductivity, London equation and BCS theory(qualitative only), Josephson effect.

UNIT-V
Introduction to Nanotechnology, Nanostructures, Carbon Nanotubes (CT), Quantum Dots and Semiconductor Nanoparticles, Nanophotonics, Nanosensors, Future prospectus and application of Nanotechnology.

Recommended Books:

1. Introduction to solid-state physics by Kittle
2. solid state physics by Dekker
3. Material science & Engineering by Raghavan
4. Electronics & materials by Streetman
5. Physics of semiconductor devices by D.k.Roy
6. Semiconductor Devices Physics And technology by SM Sze
7. The material Science of Semiconductors by AugusRochett
8. Nanotechnology: Fundamentals and Applications by Mansi Karkare
9. Nanotechnology: A Gentle Introduction to the Next Big Idea by Mark A Ratner, Daniel Ratner

AnalogElectronics Lab (ECE - 307P)

L – P
0 – 2

Lab 1	To obtain diode characteristics
Lab 2	To assemble a half wave and full wave rectifier and to study their performance
Lab 3	To obtain Zener diode characteristics and use Zener diode as a voltage regulator
Lab 4	To assemble and observe the performance of clipping and clamping circuits
Lab 5	To obtain transistor characteristics in the following configurations:i).common base ii).common emitter
Lab 6	To assemble a CE amplifier and observe its performance
Lab 7	To obtain frequency response of a RC coupled CE amplifier
Lab 8	To assemble an emitter follower circuit and observe its performance
Lab 9	To obtain JFET characteristics and to observe performance of a source follower
Lab 10	To illustrate use of FET as a voltage variable resistor
Lab 11	**Project Presentation**
Lab 12	***Final Examination & Viva***

Recommended Books:

1. Basic Electronics (A text-lab manual), Zbar, Malvino& Miller, Tata Mcgraw Hill

Electrical and Electronic Instrumentation Lab (ECE- 308P)

L – P
0 – 2

Lab Schedule

Lab 1 To study AC bridges for measurement of Inductances

Lab 2 To measure Capacitance using AC Bridge

Lab 3 To measure Inductance using AC bridge techniques

Lab 4 To study the construction of a moving coil Galvanometer and to convert it to Voltmeter and Current meter

Lab 5 To measure unknown frequency using Oscilloscope

Lab 6 To measure time using a CRO

Basic Electrical Engineering lab (ECE-309P)

L - P
0 - 2

List of Experiments

Experiment No: 1

To study the color coding of resistors, Connection of Ammeters, voltmeters, Wattmeter's and Millimeters in DC and AC circuits and selection of their ranges, Use of LCRQ meter.

Experiment No: 2

To study the series and parallel operation of resistors and verifying their effective values by LCRQ meter.

b) Repeat the same for inductors.

c) Repeat the same for capacitors.

Experiments on D.C. Circuits:

3. To verify the KVL and KCL in D.C. circuits.

4. To verify the star delta transformation of networks.

5. To verify the superposition theorem.

6. To verify the maximum power transfer theorem.

7. To verify Norton's Theorem.

8. To verify Superposition Theorem.

Experiments on A.C. Circuits:

9. To measure electric power in single phase AC circuits with resistive load, RL load and RLC load.

10. To measure the power and power factor in three phase AC circuits.

11 To study the series resonance.

12. To study the parallel resonance.

SEMESTER-IV

Network Analysis (ECE-401T)

L -- P
4 -- 0

Unit-I:

Development of the circuit concept: Charge and energy, capacitance, inductance and resistance parameters in the light of field and circuit concepts, Approximate realization of a physical system as a circuit.

Conventions for describing networks: Reference directions for currents and voltages, conventions for magnetically coupled circuits. Circuit topology

Unit-II:

First order differential equation: Differential equations as applied in solving networks. Application of initial conditions, Evaluating initial conditions in networks

Laplace Transformation properties, Solution of Network problems with Laplace transformation, Wave form analysis and synthesis: The unit step, ramp and impulse functions and their Laplace transforms. Initial and final value of f (t) from f (S), Convolution integral, convolution as summation

Unit-III:

Network theorems and impedance functions: Complex frequency, transform impedance and transform circuits, series and parallel combinations of elements.

Network Functions-poles and zeros: Network functions for one port and two port networks (ladder and general networks).Poles and zeros of network functions. Restriction on pole and zero locations for driving point and transfer functions. Time domain behavior from pole zero plot.

Unit-IV:

Two port parameters: Relationship of two port parameters. Admittance, impedance, transmission and hybrid parameters, Relationship between sets, Parallel connection of two port networks, Characteristic impedance of two port network

Unit-IV:

Filter fundamentals – pass and stop band, filter classification, constant K & m derived filters, behavior of characteristics impedance over pass and stop bands, design of filters.

Books Recommended:

1. Network analysis by Van Valkenberg
2. Network Analysis and Synthesis F. Kuo.
3. Ryder JD, Networks ,Fields and lines

Communication System-I (ECE- 402T)

L -- P
4 -- 0

UNIT-I

Evolution, introduction and benefits of communication technology, Classification of signals (deterministic & non-deterministic signals, even & odd signals) Signal Spectrum: Fourier series analysis of periodic signals, Fourier transform. Amplitude spectrum of signals, power spectrum of signals, Modulation & Need for modulation

Amplitude modulation (AM): definition, AM modulation index, spectrum of AM signal, power analysis of AM signal, Standard AM generation, detection using envelop detector. DSB/SC-AM, Generation & detection of SSB-SC modulation, Vestigial Side band A M signal (Brief ideas**).**

UNIT-II

Frequency modulation (FM): Basic definition, Frequency modulation index, Carson Bandwidth of FM signal, Narrow band and broad band FM signal. Generation of FM, Detection of FM, pre-emphasis, de-emphasis, FM threshold effect

UNIT-III

Elements of digital communication systems, advantages of digital communication systems, Elements of PCM : Sampling, Quantization and Coding, Quantization error (proof not required), Differential PCM systems(DPCM), Delta modulation, its drawbacks, adaptive delta modulation, comparison of PCM and DM systems. Digital Modulation techniques, ASK, FSK, PSK, DPSK, DEPSK, QPSK, M-ary PSK, ASK, FSK. Similarity of BFSK and BPSK, Base band signal receiver, the optimum filter, matched filter, probability of error using matched filter, coherent reception, non-coherent detection of FSK.

UNIT-IV

Frequency division multiplexing (FDM), Tuned radio frequency receiver, heterodyne receiver, image frequency, Pulse modulation Techniques-Pulse Amplitude modulation (PAM), Pulse Position Modulation (PPM) Pulse Width Modulation (PWM).

UNIT-V

Definition of noise, sources of noise, Noise power, White noise, Band limited white noise, signal to noise ratio, SNR of base band communication system, SSB, DSB/SC, Standard-AM, SNR of FM, Noise figure, Relative performance.

Books Recommended:

1) Electronic Communication system; G. Kennedy
2) Electronic Communication Systems(Fundamentals through advanced), W. Tomassi, Pearson Education
3) Communication System by Simon Hykin

References:

1. Communication system; Analog and Digital, Sanjay Sharma
2. Electronic Communications, Roody- Coolan, PHI
3. Electronic Communication by Louis. E. Frenzel

Digital Electronics and Logic Design (ECE -403T)

L-P
4 -0

UNIT-I: Logic Families

RTL, DTL, TTL, ECL, ICL, HTL, NMOS and CMOS logic gates, circuit diagram and analysis, characteristics and specifications, tri-state gates, totem-pole configuration.

UNIT-II: Number Systems and Codes

Binary, octal, and hexa- decimal number systems, binary arithmetic, binary code, excess-3 code, gray code, error detection and correction codes. Boolean algebra: Postulates and theorems, logic functions, minimization of Boolean functions using algebraic, Karnaugh map and Quine – McClausky methods, realization using logic gates.

UNIT-III: Combinational Circuits

Introduction to combinational circuits, realization of basic combinational functions like Adder, Subtractor, Encoder/Decoder, Multiplexer, Comparators, delays and hazards in combinational circuits, code converters.

Unit-IV: Sequential Circuits

Flip-Flops: SR, JK, T, D, Master/Slave FF, triggering of FF, analysis of clocked sequential circuits-their design, state minimization, state assignment, circuit implementation, registers: shift registers, inter-conversion of shift registers, Ripple counters.

UNIT-V: Programmable Logic Devices (PLD's):

PAL, PLA, GAL, FPGA, Evolution and introduction to microprocessors, internal architecture (ALU, Register Array, timing and Control Unit), Organization of microprocessor based system. Input/output devices, system bus, microprocessor languages (machine language, assembly language),and ASCII code.

Books Recommended:

1. Morris Mano, "Digital logic and Computer Design ", Prentice-Hall of India.
2. Ronald J. Tocci, "Digital Systems, Principles and Applications", Prentice-Hall of India.
3. Jain R.P., "Modern Digital Electronics ", Tata McGraw Hill.
4. Floyd T.L., "Digital Fundamentals ", Charles E. Merrill Publishing Company.

Electronic Devices and Circuits (ECE -404T)

L – P
4 – 0

UNIT-I

High frequency hybrid-pi model, analysis and design of transistor amplifier circuits at high frequencies, Multistage Amplifiers, RC coupled, direct, transformer coupled, frequency response, bandwidth, gain bandwidth product, CASCODE amplifier, Darlington pair

UNIT-II

JFET's: operation and characteristics, models, application as low and high frequency amplifiers, MOSFET types, operation and characteristics, biasing and h-parameter model

UNIT-III

Feedback Basics, negative feedback, effect of negative feedback on the performance of amplifiers e.g., on bandwidth, types of feedback amplifiers, current-shunt, current-series, voltage-shunt and voltage series feedback, analysis of the feedback amplifier circuits

UNIT-IV

Sinusoidal oscillators: basic operation, analysis of general oscillator circuits, barkhausen criterion, various types of oscillator circuits and their analysis: Hartley, Colpitt's, Crystal, Phase shift, Wien Bridge, design of practical oscillator circuits.

UNIT-V

Power Amplifiers: classification of power amplifiers, Class A , Class B, Class AB and Class C power amplifiers, analysis and design, power supplies and IC regulators, Multivibrators: bi-stable, mono-stable and astable multivibrator circuits and their analysis, Wave form generators, triangular and square wave generators, 555 timer

Books Recommended:

1. Integrated Electronics by Millman&Halkias.
2. Electronic Devices by Robert .L. Boylested & Louis Nashlesky

Control Systems (ECE- 405T)

L - P
4 - 0

UNIT–I: Introduction to linear control systems

Control Systems- examples and classification; Open Loop and closed loop control systems and their differences; Transfer functions; Block diagram representation of systems; Signal flow graphs - Reduction using Mason's gain formula; Models of some Industrial Control Devices and Systems.

UNIT-II: Continuous-Time System Response and Stability

Standard test signals; Time domain performance of first and second order control systems-time domain specifications of these systems-steady state and transient response, steady state errors and error constants; The concept of stability, BIBO stability, Relation between characteristic equation roots and BIBO stability, Routh-Hurwitz stability criterion, Relative stability analysis;

UNIT-III: Root Locus and Frequency Response Analysis

The Root locus technique and its Construction Principles; Frequency response and Frequency domain specifications; Bode diagrams - Determination of Stability, Phase Margin and Gain Margin from the Bode Diagrams; Nyquist Methods - Determination of Stability, Phase Margin and Gain Margin from the Nyquist Diagrams

UNIT-IV: Classical Control System Design Methods

Control System Design using Root Locus methods - Relationship between Root Locus and Time Domain – Cascade (Lag, Lead, Lag-Lead, PI, PID) and Feedback (PD) compensation using Root Locus plots; Compensator design using Bode plots - Cascade (Lead, Lag, Lag-Lead, PI, PID) and Feedback (PD) compensation.

UNIT-V: Control system analysis using State Variable methods

Introduction to the State variable representation; Conversion of State variable models to transfer functions and vice-versa; Eigen values and Eigen vectors; Solution of state equations; Properties of state transition matrix- computation of state transition matrix by Laplace transformation and Cayley-Hamilton theorem; Concepts of Controllability and Observability.

Text Books:

1. Nise S. - Control Systems engineering, 4th edition John Wiley and Sons.
2. Gopal M.- Control Systems–Principles and Design, Tata McGraw-Hill Ltd., 3rd edition.

Reference Books:

1. Stefani R., Savant C, Shahian B, Hostetter G.- Design of Feedback Control Systems, Saunders College Publishing, 3rd edition.
2. Ogata Katsuhiko- Modern Control Engineering, Prentice Hall of India Pvt. Ltd., 3rd edition.

Electromagnetic Waves (ECE-406T)

L - P
4 - 0

UNIT-I

Electromagnetic theory (Vector Analysis): Review of scalar and vector fields; vector addition, subtraction and multiplication, co-ordinate systems—Cylindrical co-ordinate and spherical polar co-ordinates, vector representation of surfaces, physical representation of gradient, divergence and curl, gauss divergence theorem, stokes theorem, Dirac-Delta function, tutorial problems.

UNIT-II

Electrostatic fields: - Introduction, Coulomb's law of force, Electric field intensity—Electric field due to a system of charges, field due to sheet of charge, field due to continuous volume charge, electric flux density: Gauss law and its applications; Electrostatic potential; Poisson's equation and Laplace Equation; capacitors and capacitances; energy associated in electrostatic fields; Dielectrics in static electric field, Boundary conditions for electrostatic fields.

UNIT-III

Magneto-static fields:- Introduction, Biot-Savart's law or (Ampere law for forces); Magnetic flux density, Magnetic field intensity, Ampere Circuital Law, magnetic scalar and vector potential, Inductor, magnetic induction and Faraday's law, self and mutual Inductance, Steady Electric current, tutorial problems.

UNIT-IV

Time-varying fields: Maxwell's equations and Boundary conditions; Introduction, equation of continuity for time varying fields, inconsistency of Ampere's law, Displacement current (Physical interpretation). Time varying field equations, Boundary conditions

UNIT-V

Electromagnetic waves: Introduction, solution of wave equation in free space, wave equation for conducting media, uniform plane wave propagation, wave propagation in lossless and conducting mediums; wave propagation in good conductors, depth of penetration, wave propagation in good dielectrics, wave polarization, reflection and refraction of plane waves at plane Boundary (perfect conductor-normal incidence); poynting vector and pointing theorem.

Books Recommended:

1. Introduction to Electromagnetics by Griffith
2. Theoretical Physics Vol-II by Constant
3. Electromagnetic field and waves by Corson & Lorrain

Digital Electronics and logic design lab (ECE-407P)

L - P
0 - 2

1. To verify the truth table of the following logic gates:
    - AND, OR, NOT
    - NAND, NOR, XOR, XNOR
    -
2. Realization of :
    - Half Adder and verify its truth table
    - Full Adder and verify its truth table
    - Half subtractor and verify its truth table
    - Full subtractor and verify its truth table
    -
3. To design multiplexer and demultiplexer using 2-input NAND gates.

4. Realization of :
    - Flip-Flops
    - Ripple Counters

Communication System-I Lab (ECE -408P)

L - P
0 - 2

List of Experiments:

1. To realize Amplitude Modulation (AMDSB-FC) & Demodulation
2. To realize Amplitude Modulation (AMDSB-SC) & Demodulation
3. To realize Amplitude Modulation (AMSSB-FC) & Demodulation
4. To realize Frequency Modulation (FM) & Demodulation
5. To realize Pulse Amplitude Modulation (PAM) & Demodulation
6. To realize Pulse Width Modulation (PWM) & Demodulation
7. To realize Pulse Position Modulation (PPM) & Demodulation
8. To realize Pulse Code Modulation (PCM) & Demodulation
9. To realize Frequency Shift Keying Modulation & Demodulation
10. To realize Amplitude Shift Keying Modulation & Demodulation
11. To realize Phase Shift Keying Modulation & Demodulation

Electronic Devices and Circuits Lab (ECE- 409P)

L – P
0 – 4

List of Experiments:

Lab 1 To plot the Gain-frequency response of CE Amplifier

Lab 2 To plot the Gain-frequency response of a CB amplifier

Lab 3 To plot the gain-frequency response of an Emitter follower Amplifier

Lab 4 To study the gain-frequency response of a cascaded amplifier

Lab 5 To determine g_m and r_{out} of a JFET

Lab 6 To plot the I-V characteristics of a BJT and determine h_{fe}, h_{ie} and h_{oe}

Lab 7 To plot the I_E-V_E characteristics of a UJT

Lab 8 to study a relaxation oscillator using a UJT

Lab 9 To study the operating characteristics of a Solar Photo-voltaic Cell

Lab 10 To draw the characteristics of a SCR

Control System Laboratory (ECE-410P)

L - P
0 - 2

List of Experiments:

1. To study the performance of Relay control Combination of P, I and D control schemes in a Temperature control system.
2. To study the torque-speed characteristics of an AC servomotor, determine its parameters and evaluate its transfer function.
3. To study the open loop and closed loop step response of first, second and third order simulated linear systems.
4. To study D.C. motor angular position control system, do step response studies for various values of forward gain.
5. Study the effect of velocity feedback on the transient and steady state performance of D.C. motor speed control system.
6. To study the computer simulation of a number of systems.
7. Use of MATLAB / SIMULINK /Control System tool boxes.

Semester-V

Computer Organization & Architecture (ECE-501T)

L - P
4 - 0

UNIT-I:

Basic Computer Organization and Design
Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Complete Computer Description, Control Memory, Address Sequencing, Micro program Example.

UNIT-II:

Register Transfer and Micro-operations
Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic Shift Unit.

UNIT-III:

Central Processing Unit
Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control. Computer Arithmetic: Addition and Subtraction, Decimal Arithmetic Unit.

UNIT-IV: -

Input-Output Organization
Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access.

UNIT-V: -

Memory Organization
Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

Recommended Books:

1) M Mano, "Computer System and Architecture", PHI.
2) W. Stallings, "Computer Organization & Architecture", PHI.
3) J. P. Hayes, "Computer Architecture and Organization", McGraw Hill
4) J. L Hennessy and D. A. Patterson, "Computer Architecture: A quantitative approach", Morgon Kauffman, 1992.
5) Computer Systems Organization and Architecture, John D. Carpinelli, Pearson Education Inc.

Statistics and Theory of Probability (ECE-502T)

L - P
4 - 0

UNIT-I

Statistics: Measures of central tendency and Measures of variations (Dispersions), Moments, Measures of Skewness and Kurtosis. Moment generating functions, problems

UNIT-II

Probability: Random experiment, sample space, events, classical, statistical and axiomatic definitions of probability. Statements and proof of theorems on addition and multiplication of probabilities, problems

UNIT-III

Conditional Probability: Bayes theorem on conditional probability. Random variables, Derivation of formulae for mean, variance and moments of random variables for discrete and continuous cases, Laws of expectation problems. Problems

UNIT-IV

Standard Distributions: Binomial, Poisson and Normal Distributions, Beta and Gamma Distribution, t Distribution, F-Distribution, Chi-square Distribution and their applications.

UNIT-V

Method of Least Squares & Correlation: Methods of least squares, fitting of straight line and parabola of degree 'p'. Regression and Correlation, Multiple and Partial Correlation, Problems

Books Recommended:

- Fundamentals of Mathematical Statistic by S.C.Gupta and V.K. Kapoor, Sulltan Chand & Sons New Delhi, Latest edition.
- Statistical Theory and Methodology in Science & Engineering by Brownlee, John Wiley & Sons.
- Introduction to Mathematical Statistics by R.E.Walpole 3rd edition New York Macmillan publication.
- Data Analysis for Scientists & Engineers by Meyer, John Wiley & Sons.

Microprocessors (ECE-503T)

L - P
4 - 0

UNIT- I

8085 pinout diagram, function of different pins, data bus, address bus, multiplexing and demultiplexing of address/data lines, control bus, control and status signals, internal architecture (ALU, Register Array, timing and Control Unit), flags, basic interfacing devices (buffers, tristate devices, decoders, encoders, latches), Memories (ROM, RAM & their types).

UNIT -II

Different addressing modes, instruction set, arithmetic and logic operations, 8085 assembly language programming, (addition, subtraction, multiplication, Division), timing diagrams, T-states (clock cycles), machine cycles, instruction cycles.

UNIT -III

Addressing techniques, memory mapped I/O and I/O mapped I/O scheme, Partial and absolute address decoding. Basic interfacing concepts, interfacing input devices, interfacing output devices, 8085 Interrupts, stack and subroutines, counters and time delays

UNIT- IV

Interfacing peripheral devices, Multi-purpose programmable device (8155), Interfacing of different devices , stepper motor, A/D and D/A converters, Programmable peripheral interface (8255), 8259A programmable interrupt controller, Direct memory access and DMA controller (8237). The 8254 programmable interval timer.

Unit -V

8086 architecture, addressing modes, Instruction set, Basic programming concepts, interrupts.

Recommended books:

1. Ramesh S Gaonkar, Microprocessor Architecture, Programming and Applications with 8085. PRI Publishing (India) Pvt. Ltd.
2. Gilmore, Microprocessors, TMH India.
3. K.L. Short, Microprocessors and Programming Logic
4. D. Hall
5. A.K. Roy

Electrical Machines (ECE-504T)

L - P
4 - 0

UNIT-I
Transformers: Operating principle, classification, construction, emf equation, phasor diagrams, equivalent circuit model, losses & efficiency, voltage regulation, polarity test, autotransformers, three-phase transformer connections

UNIT-II
D.C. Machines: Operating principle, generator & motor action, construction, types of excitation, emf & torque equations, power stages & efficiency. Commutation & Armature Reaction, characteristics & application of d.c generators, starting & speed control of d.c motors, characteristics & applications of d.c motors, electric braking.

UNIT-III
Induction Machines: Three-phase induction motors. Principle of operation, construction, types. Rotating magnetic field, emf equation of an AC Machine, torque developed in an induction motor, equivalent circuit model, torque-speed characteristics, starting & speed control.
Single phase induction motors, starting, application.

UNIT-IV
Synchronous Machines: Construction, types & operating principle of synchronous generator, A.C armature windings, equivalent circuit, phasor diagrams, voltage regulation, parallel operation, synchronization, Power Angle characteristics, and effect of field excitation change.
Synchronous Motor, principle, starting, hunting, damper windings

UNIT-V
Special Purpose Motors: Stepper Motor, Universal Motor, Shaded-pole Motor.

Books Recommended:

1. Electrical Machines, Drives and Power Systems by Theodore Wildi, Pearson Education.
2. Electric Machinery by Fitzgerald, Kingslay, Umans. Tata McGraw Hill.
3. Electric Machines by Nagrath and Kothari. Tata McGraw Hill.

Data Structures (ECE-505T)

L - P
4 - 0

UNIT - I:

Introduction: Structure & Problem Solving, Primitive Data Structures, Operation on Primitive Data Structures, Recursion Function & its Examples.
String Manipulation, String Matching Techniques & Applications.

UNIT - II:

Concept of Stack & Queue, Singly & Doubly – Linked Lists, Circular Linked List, their Implementation & Comparison, Array Based & Linked List Based Implementation of Stack & Queue & their Applications.

UNIT - III:

Searching: Sequential & Binary Search on Array-based Ordered Lists, Binary Trees, their Implementation & Traversal, Binary Search Trees: Searching, Insertion & Deletion of Nodes, Height Balance & Concept of AVL Trees, Concept & purpose of B- Trees.

UNIT - IV:

Concept of Hash Functions, Hash-tables & Hashing with Chaining, Sorting Techniques: Insertion Sort, Selection Sort, Quick Sort, Heap Sort, External Sorting: K-Way Merge Strategy.

File Structure: Sequential Files, Indexed Files, Direct Files.

UNIT - V:

Graphs: Definition, Terminology & Representation using Adjacency Matrix & Linked List. Shortest Path Algorithms & their Implementations, Graph Traversals: BFS & DFS algorithms & their Implementations.

BOOKS RECOMMENDED:

1. Shams outline series “Data Structures”
2. Langsam Augenstein Tenenbaum, “Data Structures using C and C++”

REFERENCE BOOKS:

1. Tremblay & Sorenson, “An Introduction to Data Structures With Applications”, McGraw hill, Kongakusha.
2. Horowitz Sahni Mehta , “Fundamentals of Data structures”, SBCS Publication

Numerical Methods for Engineers lab (ECE-506P)

L - P
4 - 0

UNIT-I

1. **Finite Difference:** Difference Table and its usage. The difference operators Δ ,∇ and the operator E.
2. **Interpolation:** Interpolation with equal intervals, Newton's advancing difference formula. Newton's backward difference formula. Interpolation with unequal intervals. Newton's divided difference formula. Lagrange's interpolation formula.
3. **Central Differences:** The central difference operator δ and the overraging operator μ. Relations between the operators.Gauss forward and backward interpolation formula, Sterlings, Bessel's, Laplace and Everetts formulae.

UNIT-II

1. **Inverse interpolation**: Inverse interpolation by (i) Langrage's (ii) Methods of successive e approximation & (iii) Methods of elimination of third differences
2. **Numerical solution of algebraic and Transcendental Equations:** Graphic Method, Regula-Falsi method, Bolzano's Process of bisection of intervals, Newton-Raphson Method and its geometrical significance.

UNIT-III

1. **Numerical Integration:** Numerical Integration, General Quadrature Formula, Simpson's one-third and three-eight rules, Weddles' rule, Hardy's rule, Trapezoidal rule.
2. **Numerical differentiation: Numerical** differentiation of a function. Differential coefficient of a function in terms of its differences. Applications

UNIT-IV

1. **Difference Equations:** Linear-homogeneous and non-homogenoeus difference equations of order n with constant coefficient, and their solution, methods of undetermined coefficient.
2. **Numerical Solution of ordinary differential equations:** Numerical solution of ordinary differential equations, Picard's method. Taylor's series method, Euler's method, Runge-Kutta Method.

UNIT-V

Laboratory: Writing computer programmes for numerical methods like Simpson's rule, Newton- Raplian method & Range-Kutta method etc. Running of programme exercises

Books Recommended:

1. Numerical Methods for Scientists and Engineering by M.K.Jain, S.R.Iyengar&R.K. Jain, Wiley Eastern Ltd.
2. Mathematical Numerical Analysis by S.C. Scarborough, Oxford and IBH publishing Company.
3. Introductory methods in Numerical Analysis by S.S.Sastry, Prentice Hall of India.
4. Numerical Solution of Differential equations by M.K.Jain.
5. Numerical Methods for Science & Engineering by R.G.Stanton.

Electrical Machines Lab (ECE-506P)

L - P
0 - 2

Experiments on Transformers

- To perform open circuit and short circuit tests on a single-phase transformer
- To perform polarity test on a single phase transformer
- To determine the efficiency and voltage regulation of a single phase transformer

Experiments on Induction Machines

- To study the different parts of an Induction motor
- To determine the equivalent–circuit parameters of a 3 -ϕ Induction motor by (i) No load test (ii) Blocked rotor test
- To determine the Torque / speed characteristics of a 3-ϕ Induction motor
- To determine the equivalent circuit parameters of a 1-ϕ Induction motor by (i) No load test (ii) Blocked rotor test

Experiments on Direct Current Machines

- To study various parts of a dc machine and draw sketches of the same.
- To plot the saturation curve of a dc machine.
- To plot the external characteristics of a separately excited dc generator.
- To study the voltages buildup of a dc shunt generator.
- To plot the external characteristic of a dc shunt generator and compare the characteristics with that of a separately excited generator.
- To plot the external characteristic of a dc compound generator and compare the characteristics when run as a shunt generator, an over compound generator, a flat compound generator, an under compound generator and differentially compounded generator.

Experiments on synchronous machines

- Study of the construction of a synchronous machine.
- To obtain the OCC and SCC of a synchronous machine.
- To find voltage regulation of an alternator by actual loading.

Microprocessors Laboratory (ECE-508P)

L - P
0 - 2

LIST OF EXPERIMENTS

1. To write a program to add two single byte numbers.
2. To write a program to subtract one 8-bit number from another 8-bit number.
3. To write a program to multiply two single byte numbers.
4. To write a program to divide one number by another.
5. Write a program to introduce a time delay using subroutine.
6. Write a program to find the greatest of three numbers
7. To write a program to read data from an input device and send its complement to output.
8. To write a program to rotate a stepper motor both in clockwise and anti-clockwise direction
9. To design and interface a circuit to read data from analog to digital convertor, using 8255A in the memory-mapped I/O.
10. To design and interface a circuit to convert digital data into analog signal, using 8255A in the memory-mapped I/O.

Data Structures Lab (ECE-509P)

L - P
0 - 2

1. Implementation of stack and queue using Array and linked list.
2. Applications of stack like Tower of Hanoi, Conversion of Infix Expression to polish notation, Conversion of Polish Expression to Code.
3. Implementation of single and doubly linked list and various operations on them.
4. Applications of Linked List Polynomial Manipulation.
5. Circular Linked List.
6. Sorting techniques- Bubble sort, Selection sort, Insertion Sort, Merge Sort, Quick Sort, Radix Sort, Bucket Sort, and Heap Sort.
7. BST and its implementation.
8. Heap and its implementation.
9. Hashing and its Implementation.
10. Graphs and their Representation using Array and Linked List.
11. BFS and DFS of Graph.

Semester-VI

MICROWAVE ENGINEERING (ECE -601T)

L - P
4 - 0

UNIT-I

Microwave Rectangular Waveguides: Solutions of wave equations in rectangular coordinates, TE modes in rectangular waveguides, Power transmission and losses in rectangular waveguides, Excitation of modes in rectangular waveguides, Characteristics of standard waveguides,

UNIT-II

Microwave Circular Waveguides: Solutions of wave equations in cylindrical coordinates, TE modes in circular waveguides, TM modes in circular waveguides, TEM modes, Power transmission in circular waveguides and transmission lines, Excitations of modes in circular waveguides, characteristics of Standard Circular waveguides

UNIT-III

Microwave components: Circular cavity resonator, Q-factor of a cavity resonator, Microwave junctions, waveguide Tee, Magic Tee, directional couplers, Matrix of hybrid couplers, Circulators, Isolators, Waveguide corners and bends

UNIT-IV

Microwave Solid State Devices: Microwave Tunnel diodes, Microwave JFET's and MESFET's, Transferred electron devices (TED's), Gunn effect, Ridley-Watkins-Hilsum Theory, Gunn-diode Microwave Oscillator, Avalanche Transit time devices, READ diode, IMPATT diodes , TRAPATT diode, BARITT diode, Parametric Amplifier

UNIT-V

Microwave linear Beam and crossed field Tubes: Klystrons, Bunching and velocity modulation process, multi-cavity klystron amplifier, Reflex Klystron, Helix Traveling wave tube (TWT's), Microwave crossed field tubes: Magnetron Oscillator, Linear Magnetron, FWCFA

Text Books

1. S.Y. Liao, Microwave Devices and circuits, Prentice-Hall (Pearson Edu), 2003 Ed
2. KC Gupta, Microwave , New Age International Publishers, New Delhi, 2004 Ed
3. VL Gupta and ML Sisodia, New Age International publishers, New Delhi
4. David M. Pozar, Microwave Engineering, John Wiley

Antennas, Wave Propagation and Transmission Lines (ECE-602T)

L - P
4 - 0

UNIT-I

Transmission Line Theory:

The transmission line general solution, Basic definitions, Distortion less line, telephone cables, inductance loading, line not terminated in Z_o, reflection open and short circulated lines , Reflection co-efficient, Reflector factor and reflection loss .Parameters of open-wire and coaxial liens at radio frequency ,constants of a dissipation less line, Standing Wave Ratio, Input, Impedance of loss less, open wire and short circuited lines ,Quarter wave lines as impedance transformer , Half wave and eight wave lines .Impedance matching. The smith diagram and its application

UNIT-II

Antenna' s

Basic Antenna parameters, elementary doublet, Half wave antenna, vertical antenna above ground , the grounded quarter wave antenna , Directivity and Antenna gain , Bandwidth and beam width, Radiation patterns, Folded dipole and applications. Antenna arrays, Parabolic reflector , properties and feed mechanism, Horn Antenna, Loop Antenna.

UNIT-III

Propagation of Waves

Waves in free space, Attenuation, Absorption And polarization, effects of environment, Ground wave propagation, sky wave propagation, space wave propagation, Troposcatter propagation and Extra-terrestrial propagation .

UNIT-IV

Satellite communication:

Introduction & overview, system overview, geo-synchronous satellite orbit geometry & launch, satellite communication frequency band, geometric relationship & pointing angles, orbit variations, satellite link parameters, link angles, link performance factors, propagation, transponders, antennas.

UNIT-V

Design of Antenna:

Yagi Antenna and Horn Antenna, Parabolic Antenna

Books Recommended:

1. Network, lines and fields by J D Ryder.
2. Electronic communication system by G. Kennedy.
3. Fields and waves in comm. Electronics by R W V Duzer.
4. Antennas by J. D .Kraus, McGraw Hill Pub.ss
5. Handbook of Modern Electronics & Electrical Engineering, Charles Belove, Wiley Inter-Science, New York 1992.

Linear Integrated Circuits (ECE-603)

L - P
4 - 0

UNIT-I

Differential Amplifier (DA), Circuit and analysis of DA, Methods of Enhancing input impedance, Common mode and different mode signals Common mode Rejection Ratio (CMMR), output offset voltage, input offset current, input bias current, Operational amplifier-Band width, frequency response Slew rate.

UNIT-II

Basic applications of Op amp (integrator, differentiator, voltage follower, Inverting and Noninverting amplifier), Input and output impedance of Inverting amplifier, Precision ac/dc converters, Sample and hold systems, Instrumentation amplifier, Electronic Analog Computation, Analog multiplexer, Digital to analog converters (DAC)-Binary weighted and R/2R ladder, Analog to digital converters (ADC)-Flash type, Successive approximation, counter type and single slope.

UNIT-III

Comparators, Applications of comparators, Regenerative comparators (Schmitt-trigger) , Square wave and triangular wave generators, pulse generators, voltage time-base generators, Step(Stair-case) generators, Modulation of square wave, Clippers , Clampers and Peak detectors

UNIT- IV

Phase locked loop, Basic building block, Operation of loop components, Locking of PLL, Lock-in range, Pull-in range,Frequency Synthesizer, , FM demodulator, FKS, Demodulator, PLL motor speed control, VCO, SE/NE 656, 555 timer , 555 timer as astable and mono-stable multivibrators.

Unit V

Active filters, low pass, high pass, band pass & band reject filters, sinusoidal generators, Phase shift oscillator, General form of oscillator configuration, Wien-bridge oscillator, and Crystal oscillator.

References:

1. *OP- Amp and Linear Integrated Circuits by R. A. Gayakward Prientence Hall of India Ltd.*
2. Electronic Principles by Albert Paul Malvino, Fourth Edition, McGraw-Hill International Editions
3. *Integrated Electronics By Milliman and Halkias, McGraw hill Book company*
4. *Operational Amplifiers and Linear Integrated Circuits by Robert F. Coughlin and Frederick F. Drisiol, Gayakward, Prientence Hall of India Private Ltd.*
5. *Phase Locked loops – Theory, Design and Applications By R. E. Best, McGraw Hill Book Company.*

Power Electronics (ECE-604T)

L - P
4 - 0

UNIT-I:

Introduction to Power Electronics and Power Semi-conductor Devices:

Power Semiconductor devices-Power Diodes, BJTs, MOSFETs and SCR , Basic theory and operation, Characteristics, Ratings, Protection and cooling, Triggering Circuits for SCRs, Recent Advances in Power Semiconductor Devices. Commutation Techniques for SCRs

UNIT-II:

AC-DC Converters

AC-DC uncontrolled converters-Single phase Half wave Rectifiers (Analysis for different types of load), Concept of freewheeling, Single phase Full wave rectifiers (Analysis for different types of load), Three phase bridge rectifiers (Analysis for different types of load), issue of harmonics, Effect of source inductance. Semi-converters and full converters Analysis for different types of loads

UNIT-III:

DC-DC converters

Introduction- Control of DC-DC converters. Buck, Boost and Buck-Boost chopper configurations- Continuous and Discontinuous conduction mode, output voltage ripple.

UNIT-IV:

Inverters

Introduction-Principle of operation and classification (VSI and CSI), Performance parameters Single phase inverters Three phase inverters PWM control-performance of square wave inverters, Single-pulse-width modulation, Multiple-pulse-width modulation, Sinusoidal-pulse-width modulation Current-Source Inverters.

UNIT-V:

AC Voltage Controllers

Introduction-Principle of AC voltage control (On-Off control, Phase control, Single-Phase controllers (Analysis for different types of load)-evaluation of performance parameters. Three-Phase controllers (Different circuit configurations) ‖ Cycloconverters (1-phase and 3-phase)

Books Recommended:

1. Power Electronics: Converters, Applications, and Design, 3rd Edition.**Mohan, Ned, Undeland, Robbins**, John Wiley.
2. Power Electronics: Circuits, Devices and Applications, 3rd Edition.**M. H. Rashid**, Prentice Hall.
3. Power Electronics, 3rd Edition, **Lander Cyril W**, McGraw-Hill, ISBN: 0077077148.
4. Principles of Power Electronics, 1/E , **Kassakian, Schlecht&Verghese**, Prentice Hall, ISBN: 0201096897.
5. Power electronics by PS Bhimrah.

Digital System Design (DSD) (ECE-605T)

L - P

4 - 0

UNIT -I:

INTRODUCTION: History. Why use VHDL? Hardware design construction, design levels, HDLs Hardware simulation and synthesis. Using VHDL for design synthesis, terminology

PROGRAMMABLE LOGIC DEVICES: Why use programmable logic? What is a programmable logic device? Block diagram, microcell structures and characteristics of PLDs and CPLDs. Architecture and features of FPGAs. Future direction of programmable logic

UNIT- II:

BEHAVIORAL MODELING: Entity declaration, architecture body, Data types, operators &attributes, process statement, variable assignment, signal assignment, WHEN, GENERATE (simple& selected). Wait, If, Case, Null, Loop, Exit, Next and Assertion statements.

DATA FLOW AND STRUCTURAL MODELLING: Concurrent signal assignment, sequential signal assignment, conditional signal assignment, selected signal assignment, block statements, concurrent assertion statement, component declaration, component instantiation.

UNIT -III:

GENERICS AND CONFIGURATIONS: Generics, Why configurations? default configurations, component configurations. Generics in configuration, Generic value specification in architecture, block configurations, architecture configurations, signals and variables.

UNIT -IV:

SUBPROGRAMS AND PACKAGES: Subprograms – functions, procedures, declarations. Package declarations, package body, use clause, predefined package standard. Design libraries, design file. Introduction to Verilog

UNIT -V:

State Machines, Additional Circuit Design: Carry Ripple adder, Carry Look Ahead adder, Barrel shifter, comparators etc.

Suggested Books:

1. D. Perry, VHDL, 3rdEd.- TMH.
2. J.Bhasker, A.VHDL- Primer, PHI.
3. Skahil, VHDL for Programmable logic- 2nd edition

Microwave Engineering Lab (ECE-606P)

L - P
0 - 2

Expt.1 To study Gunn Oscillator as a source of Microwave power and to study

i. I –V Characteristics

ii. Power and Frequency as a function of bias characteristics

Expt.2 To study Klystron Oscillator as a source of Microwave power and to study its operation (Electronic Tuning Range and Electronic Tuning Sensitivity)

Expt.3 To study the directional coupler and to verify its power at different ports

Expt.4 To study a slotted waveguide section and its application in the measurement of VSWR

Expt.5 To measure the attenuation of microwave signals by substitution method

Expt.6 To study a PIN diode modulator in conjunction with Gunn Oscillator and to study Modulation depth.

Expt.7 To study the radiation Characteristics (Gain v's Frequency) of microwave Horn antenna

Expt.8 To study the radiation characteristics of a microwave helical antenna

DSD Lab (ECE-607P)

L - P

0 - 2

VHDL Programming

1. Write a VHDL Program to implement a 3:8 decoder.
2. Write a VHDL Program to implement an 8:1 multiplexer using behavioral modeling.
3. Write a VHDL Program to implement a 1:8 demultiplexer using behavioral modeling
4. Write a VHDL Program to implement 4 bit addition/subtraction.
5. Write a VHDL Program to implement 4 bit comparator.
6. Write a VHDL Program to generate Mod- 10 up counter.
7. Write a VHDL Program to generate the 1010 sequence detector. The overlapping patterns are allowed.
8. Write a program to perform serial to parallel transfer of 4 bit binary number.
9. Write a program to perform parallel to serial transfer of 4 bit binary number.
10. rite a program to design a 2 bit ALU containing 4 arithmetic & 4 logic operation
11. Design of different Sequential and Combinational circuits using Xilinix Simulator.

Linear Integrated Circuits Lab (ECE-608)

L - P
0 - 2

1. To study following applications of a typical Op-amp:
    a) Inverting, Non-inverting Amplifier and Voltage follower.
    b) Integrator and Differentiator
    c) Digital to Analog converter.
    d) Clipper and Clamper.
    e) Instrumentation amplifier.
2. To design a different active filters using Operational Amplifiers
3. To design following oscillators using op-amps.
    a) Wien bridge oscillator.
    b) Phase shift oscillator.
4. To implement square and Triangular wave generators using Op-Amp.
5. To implement frequency Synthesizer.
6. To use 555 timer as astable multivibrator
7. To implement precision rectifier using Op-Amp.

Power Electronics Lab (ECE-609P)

L - 0
P - 2

List of Experiments

1. To obtain the V-I static characteristics of an SCR, TRIAC and DIAC
2. To study various triggering circuits.
3. To obtain the UJT characteristics.
4. To study half wave gate controlled rectifier using one SCR.
5. To study single phase half controlled, full wave rectifier.
6. To study various techniques of forced commutation of an SCR.
7. To study the speed control of a DC shunt motor using single phase bridge converter
8. To study three phase half controlled, full wave rectifier.

Computing Lab (ECE-610P)

L - P
0 - 2

1. To simulate Amplitude modulation and demodulation using Scilab/ Matlab.

2. To simulate Frequency modulation and demodulation using Scilab/ Matlab.

3. To simulate integrator and differentiator using scilab/ Matlab.

4. To sample and quantize a continuous time signal scilab/ Matlab.

5. To implement ASK, FSK, PSK using Scilab/Matlab

6. To implement Half adder and Full adder using PSpice/ Workbench

7. To implement Half Subtractor and Full subtractor using PSpice/ Workbench

8. To implement 4:1 Multiplexer and De-demultiplexer using PSpice/ Workbench

9. To implement Astable Multibirator using PSpice/ Workbench

10. To simulate Amplitude modulator and demodulator using PSpice/ Workbench

Semester-VII

Digital Signal Processing (ECE-701T)

L - P

4 - 0

AIM

To review signals and systems, study DFT and FFT, discuss the design of IIR & FIR filters and study typical applications of digital signal processing.

OBJECTIVES

- To have an overview of signals and systems.
- To study DFT & FFT
- To study the design of IIR filters.
- To study the design of FIR filters.
- To study the effect of finite word lengths & applications of DSP

UNIT-I: SIGNALS AND SYSTEMS

Basic elements of digital signal Processing –Concept of frequency in continuous time and discrete time signals –Sampling theorem –Discrete time signals. Discrete time systems –Analysis of Linear time invariant systems –Z transform –Convolution

UNIT-II: FAST FOURIER TRANSFORMS

Introduction to DFT – Efficient computation of DFT Properties of DFT – FFT algorithms – Radix-2 and Radix-4 FFT algorithms – Decimation in Time – Decimation in Frequency algorithms – Use of FFT algorithms in Linear Filtering and correlation.

UNIT- III: IIR FILTER DESIGN

Structure of IIR – System Design of Discrete time IIR filter from continuous time filter – IIR filter design by Impulse Invariance. Bilinear transformation – Approximation derivatives – Design of IIR filter in the Frequency domain

UNIT-IV: FIR FILTER DESIGN

Symmetric & Anti-symmetric FIR filters – Linear phase filter – Windowing technique – Rectangular, Kaiser Windows – Frequency sampling techniques – Structure for FIR systems.

UNIT-V : FINITE WORD LENGTH EFFECTS

Quantization noise – derivation for quantization noise power – Fixed point and binary floating point number representation – comparison – over flow error – truncation error – co-efficient quantization error - limit cycle oscillation – signal scaling – analytical model of sample and hold operations – Application of DSP – Model of Speech Wave Form – Vocoder.

TEXT BOOK:

1. John G Proakis and Dimtris G Manolakis, “Digital Signal Processing Principles, Algorithms and Application”, PHI/Pearson Education, 2000, 3rd Edition.

REFERENCES:

1. Alan V Oppenheim, Ronald W Schafer and John R Buck, “Discrete Time Signal Processing”, PHI/Pearson Education, 2000, 2nd Edition.
2. Johny R.Johnson, “Introduction to Digital Signal Processing”, Prentice Hall of India/Pearson Education, 2002.
3. Sanjit K.Mitra, “Digital Signal Processing: A Computer – Based Approach”, Tata McGraw-Hill, 2001,

Data Communication (ECE-702T)

L - P
4 - 0

UNIT-I

Transmission of Data, Pulse Modulation, Bit & Baud Rate, Channel, Capacity, Shannon's Law, Synchronous & Asynchronous Transmission, UART, USART, Line Encoding, Unipolar Encoding, Polar Encoding, Bipolar Encoding ,Manchester Encoding, Standard Digital Code, EDCDIC, ASCII.

UNIT-II

Modems, Basic Definition, Modem Types, Modem Modulation (ASK, FSK, PSK, QAM), Transmission Media-Guided (Open wire, Twisted Pair, Coaxial Cable, Optical fibre), Transmission Media-Unguided (Rp Propagation, (Ground, Ionospheric & Line of Sight propagation), Microwave, Satellite Propagation. Signal Impairments

UNIT-III

Multiplexing & multiple access techniques, FDM, TDMA, CDMA, OFDM, FDM channel groups, TDM- T1 carrier system, telephone system, AMPS, Software defined Radio (SDR), Cognitive radio (brief idea),

UNIT-IV

Error detection and Correction techniques- parity coding, linear block coding, VRC & HRC, cyclic redundancy check. Secure message communication, Active and passive attacks, Cryptography, Transposition cipher, substation cipher, product cipher and Data encryption standard, public key and private key encryption, Scramblers & Descramblers.

UNIT-V

LAN, MAN, WAN, Value Added Networks, High speed Networks, Public Switched Networks, Network Topologies *(Bus Topology, Star Topology, Ring Topology, Tree Topology)*, Data Communication Codes, Data Communication Modes *(Simplex, Half Duplex and Full Duplex)*, Communication Hardware, Bridges, Gateways, Routers, Network Interface Unit, Open System Interconnection (OSI) model of a Network, Internet Technology-Transmission and security, Internet service provider.

References:

1. Forouzan B, Data communication and Networking, TMH

2. Tanenbaum, Computer Networks, PHI.

3. Louis E. Frenzel, Principles of Electronic Communication system, TMH, 2008

4. Larry Hughes, Data communication, Narosa Publishing House.

Embedded Systems (ECE-703T)

L - P

4 - 0

UNIT – I

Introduction: Overview of Embedded System, Categories of Embedded System, Microcontroller and Embedded Processors, System and Processor Architecture: von Neumann, Harvard and their variants, **Microcontroller Architecture:** Overview of 8051 Microcontroller family: Architecture, basic assembly language programming concepts, The program Counter and ROM Spaces in the 8051, Data types, 8051 Flag Bits ad PSW Register, 8051 Register Banks and Stack Instruction set, Loop and Jump Instructions, Call Instructions,

UNIT – II

Timers: Time delay generations and calculations, I/O port programming Addressing Modes, accessing memory using various addressing modes, Arithmetic instructions and programs, Logical instructions, Single-bit instruction programming, Programming of 8051 Timers, Counter Programming

UNIT – III

Communication with 8051: Basics of Communication, Overview of RS-232, I^2C Bus, UART, USB, 8051 connections to RS-232, 8051 serial communication programming, 8051 interrupts, Programming of timer interrupts, Programming of External hardware interrupts, Programming of the serial communication interrupts, Interrupt priority in the 8051

UNIT - IV

Interfacing with 8051: Interfacing an LCD to the 8051, 8051 interfacing to ADC, Sensors, Interfacing a Stepper Motor, 8051 interfacing to the keyboard, Interfacing a DAC to the 8051, 8255 Interfacing with 8031/51, 8051/31 interfacing to external memory

UNIT-V

Data Converters: Data converter fundamentals, Digital-to-Analog Converter (DAC) Specifications, Analog-to-Digital Converter (ADC) Specifications, DAC architectures, ADC architectures

TEXT BOOKS:

1. Raj Kamal, “Embedded Systems”, TMH, 2004.
2. M.A. Mazidi and J. G. Mazidi, “The 8051 Microcontroller and Embedded Systems”, PHI, 2004

REFERENCES BOOKS:

1. David E. Simon, “An Embedded Software Primer”, Pearson Education, 1999.
2. K.J. Ayala, “The 8051 Microcontroller”, Penram International, 1991.
3. Dr. Rajiv Kapadia, “8051 Microcontroller & Embedded Systems”, Jaico Press
4. Dr. Prasad, “Embedded Real Time System”, Wiley Dreamtech, 2004.

Random Processing and Noise (ECE-704T)

L - P
4 - 0

Unit-1

Probability, Random variables & Operations on Random Variables:

Introduction to Probability: Probability introduced through sets; joint and conditional probability independence: Bernoulli's Trials.

The Random variable concept: distribution Function: Expectation of a Random Variable: Moments/Transformations of a Random variable.

Unit-II

Multiple Random Variables:

Vector Random Variables: joint distribution and its properties: Conditional Distribution and Density: Statistical Independence; expected value of a function of a Random variable; Distribution and Density of a sum of Random Variables.

Unit-III

Random Processes:

Random process concept: Stationarity and Independence: (First order stationary processes,second order and wide sense stationarity, Time Averages and Ergodicity): correlation function: Auto correction Function: Cross –correlation Function & covariance: Measurement of correlation Functions: Gaussian random processes: Poisons Random Process: Probability Density Function/joint probability Density.

Unit IV

Spectral Characteristics of Random Process:

Power Density Spectrum and its properties: Relationship between power spectrum and Auto correlation Function: Cross power Density Spectrum and its properties: some Noise definitions.

Unit V

Some Practical Applications of the Theory:

Linear Systems Fundamental, Random Signal Response of Linear systems, spectrum Characteristics of a system Response, Noise Bandwidth, Noise sources.

Information Theory: Entropy and Mutual information for discrete ensembles: Asymptotic equipatition property: Shannon's Noiseless Coding Theorem. Discrete memory Channels, Shannon's Noisy Coding, Noise in analog and digital modulation schemes

BOOKS RECOMMENDED:

1. A popoulis and S.U.Pilai, Probability, Random Variables and Stochastic Processes,4/e,McGraw Hill 2002
2. P.Z Peebles, Probability Random Variables and Random Signal Principles,4/e McGraw Hill,2000
3. Principles of Communication system by Herbert Taub and Donald L. Schilling, 2/e Tata McGraw Hill Publishing

Power Systems (ECE-705T)

L - P

4 - 0

UNIT I

Introduction to Power System generation, transmission & distribution, Elements of DC and AC distribution, Single fed, double fed and ring main distributor

Representation of Power System components, single line diagram, per unit system

Overhead line insulator types: pin & suspension insulators. String efficiency & methods of equalizing potential drop over string of suspension insulators

UNIT II

Transmission line parameters and their evaluations, types of overhead conductors with calculations of inductance and capacitance, Skin, proximity and Ferranti effect, Classification of cables, Cable conductors, insulating materials, insulation resistance electrostatic stress, grading of cables, capacitance calculation, losses and current carrying capacity

UNIT III

Faults, types of faults, symmetrical 3-phase balanced faults, calculation of fault currents, current limiting reactors, Symmetrical components, sequence impedances, sequence networks, unsymmetrical faults – single line to ground, line-to-line, double line to ground faults on unloaded alternators and on power systems.

UNIT IV

Power System Stability, Transient and Steady State stability, Power angle equation, Equal area criterion of Stability, Real & Reactive Power Control

UNIT V

Introduction to Power System Protection: Functions of relay & circuit breaker, Interference of Power Lines with communication Circuits: Electrostatic and Electromagnetic effects.

Books Recommended:

1) Power System Analysis, 1st Edition, John Grainger, William Stevenson, Jr., Pub: Mcgraw Hill
2) Modern Power System Analysis, 1st Edition, D.P. Kothari, Publisher: Mcgraw Hill
3) Electrical Machines, Drives and Power Systems, Theodore Wildi, Pub: Pearson Education.

Embedded Systems Lab (ECE- 706P)

L - P

0 - 2

1. Write down an ALP for 8051 to read data from port 0 and send it to port 1
2. To write programs for arithmetic and logical operations.
3. To interface ADC and DAC with 8051 Microcontroller
4. To use 8155 with 8051 microcontroller
5. To interface Stepper motor with 8051, rotating in clock wise and counter wise direction.
6. To interface LCD with 8051 microcontroller.

Data Communication Lab (ECE -709P)

L - P
0 - 2

1) To study Modem

2) To implement Scrambler and Descrambler.

3) To study Encryption and Decryption Techniques

4) To implement error detection using parity coding

5) To study Linear Block Codes (LBC) for error detection and correction.

6) Implementation of Time Division Multiplexing (TDM) and De-multiplexing

7) To generate a PN –Code sequence using a 3-stage shift register using JK Flip flops.

Semester-VIII

WIRELESS COMMUNICATION (ECE-801T)

L-4
P-0

UNIT –I

Introduction to Wireless Communication Systems, Evolution of mobile radio communication, Second generation (2G) cellular networks Third generation (3G)
wireless networks, WLL, WLAN, Bluetooth & PANS.

UNIT –II

Introduction to the cellular concepts-system design fundamentals, Frequency Reuse,
channel assignment strategies, Hand-off strategies, Interference & system capacity, Improving covering & capacity in cellular systems (CellSplitting and Sectoring), Improving Coverage& capacity in Cellular Systems, Introduction to radio-wave propagation, Large-scale path loss, small-scale fading & its types , Multipath Fading.

UNIT-III

Review of basic modulation techniques, Nyquist Criterion for ISI cancellation, Structure of wireless communication link, Modulation and demodulation –QuadraturePhase Shift Keying, Differential Quadrature Phase Shift Keying, Offset-QuadraturePhase Shift Keying, Binary Frequency Shift Keying, Minimum Shift Keying, GaussianMinimum Shift Keying, Power spectrum and Error performance in fading channels.

UNIT-IV

Spread Spectrum Systems-PN Sequence and its generation, Direct Sequence SS, Frequency Hopping Spread spectrum (FHSS), Time HoppingSpread Spectrum (THSS), Hybrid Spread Spectrum, FDMA, TDMACDMA Systems,Orthogonal Frequency Division Multiplexing.

UNIT V

Equalization, Equalizers in communication receivers : Linear and Non-Linear Equalizers, Brief idea of Algorithms for Adaptive Equalization.
Diversity Techniques, Rake Receiver,
Interleaving andIntroduction to Coding.
Introduction to Second Generation(GSM, IS–95) and Third Generation WirelessNetworks and Standards

REFERENCES:

1.Wireless communication, Principles & Practices (2ndedition) T.S Rapport,PrenticeHall,2002.
2. Andreas.F. Molisch, “Wireless Communications”, John Wiley –India, 2006.
3. Simon Haykin & Michael Moher, “Modern Wireless Communications”, Pearson Education, 2007.
4.WirelessCommunications andNetworking,J.W.Mark&W.Zhuang,Prentice HallIndia,2006
5.WirelessCommunications,Er.RISHABHAnand,S-Chandpublications,Edition2012
6.SatelliteCommunications&Networks:Systems,TechniquesandTechnology(2ndEd.),G.Maral &M.Bousquet,Wiley,1995

Wireless Communication Lab (ECE-805P)

L -0
P -2

1. To study FHSS Transceiver
2. To study DSSS-CDMA trainer kit
3. To Study FH-CDMA trainer kit
4. To study RAKEReceiver
5. To study GSM Transceiver system
6. To Study Bluetooth system kit
7. To design and implement m-sequence generator

Industrial Management and Economics (ECE-802T)

L-P
4-0

UNIT-I

Industry, meaning of Industrialization, Industrial revolution, need problems and prospectus of Industrial change in the developing countries. Industrial Evolution in India, Downfall of early Industries, Evolution of modern Industry, Effects of partition, Industrial policy and progress after independence

UNIT-II

Forms of Industrial Organisation: a) Single proprietorship b) Partnership c) Joint Stock Companies d) Co- operative and e) State Enterprises. Growth of Industry and Management, Meaning of Industrial Management, functions and tools of management, growth of management concepts

UNIT-III

Objectives of Industrial Management, Defining management objectives, Managerial activity and objectives, tests of management of objectives, primary secondary personal social objectives of management.

UNIT-IV

Management Organization, various forms of organization and departmentalization line staff, functional and committee organization, formal and non-formal organization, Management and Authority, Decision making in Management, Leadership, Definition, Traits, inborn Traits, acquired traits, analytical etc.

UNIT-V

Marketing of Industrial products and the sale manager, Persona Management, Recent changes in personal management, functions of personal departments, sections, training and placement other functions of personal department.

Books Recommended:

1. Principles of management by George R.Terry.
2. Industrial Organization and Management by Tara Chand.
3. Business organization and M Management by M.C.Suckla.
4. Management by George Junior 5.

IMAGE PROCESSING (ECE-803TE)

L - P

4 - 0

UNIT- I

DIGITAL IMAGE FUNDAMENTALS AND TRANSFORMS: Elements of visual perception – Image sampling and quantization Basic relationship between pixels – Basic geometric transformations-Introduction to Fourier Transform and DFT – Properties of 2D Fourier Transform – FFT – Separable Image Transforms -Walsh – Hadamard – Discrete Cosine Transform, Haar, Slant – Karhunen – Loeve transforms.

UNIT –II

IMAGE ENHANCEMENT TECHNIQUES: Spatial Domain methods: Basic grey level transformation – Histogram equalization – Image subtraction – Image averaging –Spatial filtering: Smoothing, sharpening filters – Laplacian filters – Frequency domain filters: Smoothing – Sharpening filters – Homomorphic filtering.

UNIT- III

IMAGE RESTORATION: Model of Image Degradation/restoration process – Noise models – Inverse filtering -Least mean square filtering – Constrained least mean square filtering – Blind image restoration – Pseudo inverse – Singular value decomposition.

UNIT –IV

IMAGE COMPRESSION: Lossless compression: Variable length coding – LZW coding – Bit plane coding- predictive coding-DPCM. Lossy Compression: Transform coding – Wavelet coding – Basics of Image compression standards: JPEG, MPEG, Basics of Vector quantization.

UNIT- V

IMAGE SEGMENTATION AND REPRESENTATION: Edge detection – Thresholding - Region Based segmentation – Boundary representation: chair codes- Polygonal approximation – Boundary segments – boundary descriptors: Simple descriptors-Fourier descriptors - Regional descriptors –Simple descriptors- Texture

REFERENCES:

1.William K Pratt, Digital Image Processing John Willey (2001)
2. Image Processing Analysis and Machine Vision – Millman Sonka, Vaclav hlavac, Roger Boyle, Broos/colic, Thompson Learniy (1999).
3. A.K. Jain, PHI, New Delhi (1995)-Fundamentals of Digital Image Processing.
4. Chanda Dutta Magundar – Digital Image Processing and Applications, Prentice Hall of India, 2000.
5. Rafael C Gonzalez, Richard E Woods 2nd Edition, Digital Image Processing - Pearson Education 2003.

Network Security (ECE-803TE)

L - P
4 - 0

UNIT-I

Introduction to network security, Secure network services, Attacks, Security, Architecture, Security Mechanism, Introduction to cryptography, Data Encryption Standard, Design and analysis, IDEA(International Data Encryption),RC4

UNIT-II

Public Key Cryptography and Authentication, Approaches to Message, Authentication, Secure Hash functions, Message Authentication Codes

Public-Key Cryptography Principles, Public-Key Cryptography Algorithms

UNIT-III

Web Security Considerations, Secure Socket Layer and Transport Layer Security

Transport Layer Security, HTTPS, Secure Shell (SSH)

UNIT-IV

Web security, Java, cookies, HTTP/HTTPS, Web objects, DNS security, Smartcards/Biometrics, Privacy, Wireless security

UNIT-V

Firewall, the Need for Firewalls, Firewall Characteristics, Types of Firewalls, Firewall Basing, Firewall Location and Configurations

REFERENCES:

1. William Stallings, "Cryptography and Network Security – Principles and Practices", Prentice Hall of India, Third Edition, 2003.
2. Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill, 2003.
3. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2001.
4. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Third Edition, Pearson Education, 2003.
5. Networking Essentials by Willium.S.Stallings

VLSI DESIGN (ECE-803TE)

L - P
4 - 0

UNIT – I

MOS Transistor Theory: nMOS Enhancement Transistor, pMOS Enhancement transistor, V-I characteristics, Threshold voltage, short channel effects: Channel length modulation (CLM), Body effect, subthreshold current, DIBL, Impact ionization, hot electron effect, drain punchthrough, FN tunnelling, CV characteristics, Introduction of CMOS circuits, quality metrics of digital design.

UNIT – II

Manufacturing CMOS Integrated Circuits: Wafer processing, photolithography: Oxidation, Epitaxy, Deposition, Ion-implantation and diffusion, Etching, simplified CMOS Process Flow, CMOS Technology, basic n-well CMOS process, p-well process.

UNIT – III

Operation of MOS transistor as a switch, CMOS Logic, The Inverter, Noise margin, β_n/β_p ratio, NAND gate, NOR Gate, combinational logic, Compound Gate, MUX, alternate circuit representations, layout. Ratioed logic, Psuedonmos inverter, saturated load inverters.

UNIT – IV

CMOS Inverters: Static Characteristics, Switching Characteristics, power consumption: static dissipation, dynamic dissipation, pass transistor logic, complementary pass transistor logic, Transmission gate, dynamic logic, Issues in dynamic design, glitching, cascading dynamic gates, Domino logic.

UNIT – V

Sequential MOS Logic Circuits: Memories, latches, CMOS subsystem design: adders, Design Methodology. CRA, CLA, Carry skip adder, Manchester chain carry adder, Carry select adder, transmission gate adder, SR flip flop.

TEXT BOOKS:

1) Neil H. E. Weste & K. Eshranghian, "Principles of CMOS VLSI design", 2nd Edition, Addison Wesley, 2003
2) J. M. Rabaey, A. Chandrakasan and B. Nikolic, *Digital Integrated Circuits: A Design Perspective*, Pearson/PH, 2003.
3) S-M. Kang and Y. Leblebici, *CMOS Digital Integrated Circuits: Analysis and Design*, McGraw-Hill.
4) Douglas A. Pucknell, "Basic VLSI Design, 3rd Edition, 2004.

CONSUMER ELECTRONICS (ECE-803TE)

L - P
4 - 0

UNIT-I

Audio System:*Microphones:* construction, working principles and applications of microphones, their types viz: a) Carbon b) moving coil, c) velocity, d) crystal, e) condenser, e) cordless etc.

Loud Speaker: Direct radiating, horn loaded woofer, tweeter, midrange, multi-speaker system, baffles and enclosures. Sound recording on magnetic tape, its principles, block diagram, and tape transport mechanism, Digital sound recording on tape and disc, CD system, Hi-Fi system, pre-amplifier, amplifier and equalizer system, stereo amplifiers

UNIT-II

Television:*Monochrome TV Communication:-* Elements of TV communication system, Scanning- its need for picture transmission, Need for synchronizing and blanking pulses, Progressive scanning- Gross structure filters, interlaced scanning, resolution and band width requirement, tonal gradation, Composite Video signal (CVS) at the end of even and odd fields. Equalizing pulses and their need, Monochrome picture tube – construction and working, comparison of magnetic and electric deflection of beam, Construction and working of camera tube: vidicon and plumbicon, Block diagram of TV camera and the transmitter chain. Block diagram of a TV receiver: function of each block and waveform at the input and output of each block. Frequency range of various VHF bands and channels used in India, Major specification of the CCIR

Concept of positive and negative modulation VSB Transmission Turner: Typical circuits of scanning and EHT stages of TV receiver, keyed AGC, function and location of brightness contrast V-hold, H-hold of centring control. Identification of faulty stage by analysing the symptoms and basic idea of a few important faults and there remedies

Colour Schemes: Introduction to PAL, NTSC, SECAM systems, advertisement and disadvantages block diagram of video camera and its explanation, Construction and working principles of trinitran and PIL types of colour picture tubes. Concept of convergence, purity of beam shifting, Block diagram of PAL TV receiver, explanation and working

UNIT -III

Colour TV: Primary colours, tristimulus values, trichromatic coefficients, concepts of additive and subtracting mixing of colours, concepts of luminance, Hue and Saturation, Representation of a colour in colour triangle, non-spectral colour, visibility curve. Compatibility of colour TV system with monochrome system. Block diagram of colour TV camera, Basic colour TV system-NTSC, SECAM, and PAL their advantages and disadvantages. Construction and working

principles of trinitron and PIL types of colour picture tubes. Concept of convergence, purity, beam shifting, Need for luminance signal and band sharing by colour signals, subcarriers frequency, colour difference signal and its need, synchronous quadratic modulation and representation of a colour by a vector, burst signal and its need, chrominance signal. Block diagram of PAL TV receiver, explanation and working

UNIT- IV

Cable Television: Block diagram and principles of working of cable TV and DTH, cable TV using internet

UNIT- V

VCR, VCD and DVD: Principle of video recording on magnetic tapes, block diagram of VCR, VHS tape transport mechanism. Study of VCD and DVD

RECOMMENDED BOOKS:

1. Colour Television-principles & practice R.R Gulati by Wiley Eastern Limited, New Delhi
2. Complete Satellite & cable Television R.R Gulati New age International Publisher
3. Colour Television Servicing by RC Vijay BPB Publication, New Delhi
4. Colour Television & Video Technology by A.K. Maini CSB Publishers
5. VCR-principles, maintenance & repair by S.P. Sharma, Tata Mc Graw Hill, New Delhi
6. Colour TV by A.Dhake
7. Service Manuals, BPB Publication, New Delhi

OBJECT ORIENTED PROGRAMMING LANGUAGE (ECE-803TE)

L - P

4 - 0

UNIT – I

Object Modeling:

Object and classes, Links & Associations, Generalization & Inheritance, Aggregation, Abstract classes, A sample object model, Multiple Inheritance, Meta data, candidate keys, constraints.

UNIT – II

Dynamic Modeling:

Events and States, Operations and Methods, Nested state diagrams, Concurrency, Relation of Object and Dynamic models, advanced dynamic model concepts, a sample dynamic model

UNIT – III

Functional Modeling:

Functional Models, Data flow diagrams, Specifying Operations, Constraints, a sample functional model

UNIT – IV

Programming in C++:

Limitations in structured programming- Characteristics of Object Oriented Language, Classes and objects in C++, Functions, Constructors , Destructors, Inheritance, Functions, overloading, Operator Overloading, I/O Operations, Real life applications, Extended Classes, Pointer, Virtual functions, Polymorphisms, Working with files, Class templates, Function templates.

UNIT – V

Translating object oriented design into an implementation, OMT Methodologies, examples and case studies to demonstrate methodology, SA/SD and JSD.

TEXT BOOKS:

1) Rambaugh Janes et al, Oriented Design and Modeling, PHI-1997
2) Bjarne Stroustrup, C++ Programming Language, Addison Wesley
3) Balagurusamy E. Object Oriented Programming with C++, TMH, 2001
4) Booch Grady, Object Oriented Analysis and Design with application 3/e, Pearson
5) Lipman, Stanley B, Jonsce Lajole, C++ Primer Reading, AWL, 1999
6) Dillon and LEE, Object Oriented Conceptual Modeling, New Delhi PHI- 1993
7) Stephen R. Shah, Introduction to Object Oriented Analysis and Design, TMH

8) Berzin Joseph, Data Abstraction : The object Oriented approach using C++, McGraw Hill
9) Mercer, Computing Fundamental with C++, Palgrave Macmillan

Radar system and Engineering (ECE-804TE)

L - P
4 - 0

UNIT-I

Simple pulse radar: Radar equation, , range performances and minimum detectable signal, receiver noise SNR; integration of radar pulses; integration efficiency and loss; radar cross section of targets with examples of simple targets; PRF & range ambiguity, Radar system losses; radar frequencies;

UNIT-II

Continuous wave radar: Doppler's shift; CW Radar with IF amplification; FM radar; Conventional pulse Radar with Super-Heterodyne receiver, multiple frequency CW radar (block diagram and description), Operation and performance etc.

UNIT-III

Moving target indication (MTI) & pulse Doppler radar (PDR): Doppler's shift applied to pulse radar; butterfly effects, delay line cancellers; MTI with power amp, Pulsed Doppler Radar with operational Block functions, Frequency Modulated CW Radar

UNIT-IV

Radar tracking: Introduction and types of tracking Radar, Block diagram and functions of Tracking Radar, Radar Tracking systems

UNIT-V

Radar Beacons: Introduction to Synthetic aperture radar (SAR), applications of SAR, Radar displays, Radar RF Sources, Radar RF Modulators, Radar Transmitters

References:

1. Skolnik MI, Radar Systems, Pearson Publications,3rd Ed.,
2. Raju GSN, Radar engineering,
3. Kulkarni M, Radar Engineering, Umesh Publications, New Delhi
4. Sharma, KK., Radar, Sonar and Navigation engineering, Katsons Publications, New Delhi

Television and Video Engineering (ECE-803TE)

L - P

4 - 0

UNIT-I

Video and audio transmission, horizontal and vertical scanning, Linear and Interlaced scanning, Flicker, Horizontal and Vertical resolution, Video bandwidth, Components of Composite Video Signal *(Front Porch, Back Porch, SYNC and Blanking signals)*

UNIT-II

Video signal development in camera tubes, Types of TV camera tubes *(*Plumbicon, Image orthicon, Vidicon, Solid- state image scanners, (CCD couplers), TV recording *(Kinescope recording, Electronic video recording, Magnetic video tape recording and Video disc recording)*

UNIT- III

Black and white transmission, block diagram of transmitter and B/W receiver. Description of tuner, IF section, sync. Section, video section, audio section and AGC section of B/W TV receiver. TV antennas and impedance matching circuits.

UNIT- IV

Color fundamentals, Mixing of colors, Brightness, Hue and Saturation, Color circle, Color TV camera and picture tubes, Color TV transmission and reception, I and Q signals, NTSC system and PAL system for color TV transmission and reception.

UNIT- V

Propagation of TV signals: Radio-wave characteristics, Propagation phenomenon, Space-wave Propagation, Line-of-sight Propagation; Distant reception, Shadow zones, Co-channel interference and Ghost images; Introduction to TV via satellite

References:

01. Television Engineering by R. R. Gulati, Wiley Eastern Co.
02. Introduction to Television by Grobe, Wiley Eastern Ltd.
03. Television Engineering by A. M. Dhake

Artificial Neural Networks and Fuzzy Logic (804TE)

L - P

4 - 0

UNIT – I: Introduction to Neural Networks
Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and artificial Neuron Models, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential applications of ANN.

UNIT–II: Essentials of Artificial Neural Networks
Artificial Neuron Models, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN – Connectivity, Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules.

UNIT–III: Single and multilayer Feed Forward Neural Networks
Introduction, Perception Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perception Networks, Limitations of the Perception Model. Generalized Delta Rule, Derivation of Back propagation (BP) Training, Summary of Back propagation Algorithm, Learning Difficulties and Improvements

UNIT-IV:Associative Memories
Paradigms of Associative Memory, Hebbian Learning, General Concepts of Associative Memory, Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, Architecture of Hopfield Network, Storage and Recall Algorithm, Stability Analysis.

UNIT – V: Classical & Fuzzy Sets
Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions. Fuzzification, Membership value assignment, development of rule base and decision making system neural network applications in Process identification and fault diagnosis.

TEXT BOOK:

1. S. Rajasekharan and G. A. Vijayalakshmi pai, “Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications”, PHI Publication, 2004.
2. John Yen and Reza Langan, “Fuzzy Logic: Intelligence, Control and Information”, Pearson Education, 2004.
3. Mohamad H. Hassoun, “Fundemanatals of Artificial Neural Networks”, MIT Press.
4. Jian-Kang Wu, “Neural Networks and Simulation methods”, CRC Press.

Medical Electronics (ECE-804TE)

L - P
4 - 0

UNIT-I: Electro-physiology and bio-potential recording
The origin of Bio-potentials; bio-potential electrodes, biological amplifiers, ECG, EEG, EMG, PCG, EOG, lead systems and recording methods, typical waveforms and signal characteristics.

UNIT –II: Bio-chemical and non-electrical parameter measurement
PH, PO2, PCO2, PHCO3, Electrophoresis, colorimeter, photometer, Auto analyser, Blood flow meter, cardiac output, respiratory measurement, Blood pressure, temperature, pulse, Blood cell counters.

UNIT -III: Assist devices and bio-telemetry
Cardiac pacemakers, DC Defibrillator, Telemetry principles, frequency selection, Bio-telemetry, radio-pill and tele-stimulation.

UNIT –IV: Radiological equipment
Ionising radiation, Diagnostic x-ray equipment, use of Radio Isotope in diagnosis, Radiation Therapy.

UNIT –V: Recent trends in medical instrumentation
Thermograph, endoscopy unit, Laser in medicine, Diathermy units, Electrical safety in medical equipment.

Textbooks:
1. Leislie Cromwell, "Biomedical instrumentation and measurement", Prentice Hall of India, New Delhi, 2002.

References:

1. Khandpur, R.S., "Handbook of Biomedical Instrumentation", TATA McGraw-Hill, New Delhi, 1997.
2. Joseph J.Carr and John M.Brown, "Introduction to Biomedical equipment Technology", John Wiley and Sons, New York, 1997.

ECE-804TE- OPTICAL FIBRE COMMUNICATION

L - P
4 - 0

UNIT-I: Block diagram of optical fiber communication system, Advantages of optical fiber communication, Optical fiber waveguides: structure of optical wave guide, light propagation in optical fiber using ray theory, acceptance angle, numerical aperture, skew rays, wave theory for optical propagation, modes in a planar and cylindrical guide, mode volume, single mode fibers, cutoff wavelength, mode field diameter, effective refractive index and group and mode delay factor for single mode fiber.

UNIT-II: Transmission Characteristics of Optical fibre, Attenuation in optical fibres, intrinsic and extrinsic absorption, linear and nonlinear scattering losses, fibre bends losses. Dispersion and pulse broadening, intramodal and intermodal dispersion for step and graded index fibers, modal noise, over all fiber dispersion for multimode and monomode fibre, dispersion shifted fibers, modal birefringence and polarization maintaining fibers

UNIT-III: Basic concepts Einstein relations and population inversion optical feedback and threshold conditions, direct and indirect band gap semiconductors spontaneous and stimulated emission in p-n junction, threshold current density, Hetero junction & DH structure, semiconductor injection lasers structure & Characteristics of injection laser.

UNIT-IV: Optical detectors: Requirement for photo detections p-n photodiode, characteristics of photo detections, p-i-n and avalanche photodiodes, phototransistors & photoconductors, Noise in p-n, p-i-n and APD receivers, Block diagram and detection principle of coherent optical fiber system.

UNIT-V: Principal components of an optical fiber communication system, source laminations, optical
transmitter circuits, LED and laser drive circuits, optical receiver block diagram, simple circuits for pre-amplifier, automatic gain control and equalization, Regenerative repeater, BER of optical receiver, channel losses, ISI penalty and optical power budgeting for digital optical fiber system, line coding,

Reference Books:
1.Optical Communication: J. Gowar PHI, 2nd Ed.

2. Optical fiber Communication: G.E. Keiser Mc Graw-Hill, 3rd Ed.
3. Optoelectronics: Wilson & Hawkes PHI, 2nd Ed.
4. Optical fibre Communication: John M.S Senior PHI, 2nd Ed.

Image Processing Lab (806PE)

L - P
0 - 2

List of experiments:

1. Introduction to MATLAB Software and its toolboxes
2. Write a program for(a) Uploading of new image(b) Display an image (c) Perform fundamental operations on uploaded image.(Color image)
3. Write a program to (a) to add two images(b) to subtract two images(c) Complement image
4. To perform the block operation on an image using im2col and col2im commands.
5. Exercise on Image transforms – FFT, DFT etc.
6. Converting RGB Image into gray scale image & extracting the color Spaces
7. To draw the Histogram and enhance contrast using Histogram Equalization.
8. To detect the edges of the Gray scale images using various edge detectors
9. To find out the Discrete Wavelet Transform of images.
10. To perform the thresholding an image using image processing toolbox.

Network Security Lab (806PE)

L - P
0 - 2

1. Basic networking commands and Introduction of Basic Network Devices
2. Straight and Cross Cable Construction
3. IP Addressing and Sub-netting
4. Introduction to Packet Tracer and Simple Network Building
5. Hub and Switch usage
6. Switched Network
7. Building a Peer-to-Peer Network
8. Configure workstations and routers
9. Verifying layer 3 Connectivity
10. Wireless LAN Basics and Configuration
11. Static Routing
12. Router Configuration (RIP)
13. Troubleshooting RIP networks
14. Introduction to ICMP

CONSUMER ELECTRONICS LAB (ECE-806PE)

L - P
0 - 2

LIST OF PRACTICALS:

1. To plot the frequency response of a microphone

2. To plot the frequency response of a loud speaker

3. Demonstration of a tape-transport mechanism

4. Trouble shooting of tape-recorder system

5. To observe the wave forms and voltage B/W and colour T.V receiver.

6. Fault finding of colour T.V

7. Trouble shooting of C.D. Player

8. Demonstration of DVD Player.

9. Demonstration and study to VCD especially its transport mechanism.

10. Study of a TV cable network system through internet

OOPS Lab (ECE-806PE)

L - P
0 - 2

1. Program illustrating function overloading feature
2. Programs illustrating the overloading of various operators
   Ex: Binary operators, Unary operators, New and delete operators etc.
3. Programs illustrating the use of following functions:
   a) Friend functions
   b) Inline functions
   c) Static member functions
   d) Functions with default arguments
4. Programs to create singly and doubly linked lists and perform insertion and deletion operations using referential classes, new and delete operators.
5. Programs illustrating the use of destructor and various types of constructors (no arguments, constructor, constructor with arguments, copy constructor etc.)
6. Programs illustrating the various forms of inheritance, Ex: Single, Multiple, Multilevel, hierarchical inheritance etc.
7. Write a program having student as an abstract class and create many derived classes such as Eng., Science, Medical, etc. from student class. Create their objects and process them.
8. Write a program illustrating the use of virtual functions.
9. Write a program illustrating the use of virtual base class.
10. Write a program illustrating the use of class templates, ex: a) Stack class b) Queue class
11. Write a program illustrating the use of file handling operations, ex: a) Copying a text file b) Displaying the contents of the file etc.
12. Write a program illustrating the use of console I/O operations.
13. Write a program illustrating how exceptions are handled (ex: division-by-zero, Overflow and Underflow in stacks etc.)
14. Write programs to implement simple case studies with class model in C++.
15. Write programs to implement different relationships in class model like generalization, association, aggregation etc. in C++

Radar System and Engineering Lab (ECE-807PE)

L - P
0 - 2

Lab Schedule:

1. To plot the I-V response of a photo voltaic solar cell/panel.

2. To plot spectral response characteristics of a photo-voltaic cell/panel as a function of wavelength.

3. To plot short-circuit current and open-circuit voltage versus light intensity of a solar cell.

4. To study basic wind based electrical generator.

Television and Video Engineering Lab (ECE-807 PE)

L – P

0- 2

1. (i) To identify the various blocks of TV receivers and note down their function.
   (ii) To trace the TV signal through various blocks of receiver.
2. To observe a composite Video signal on an oscilloscope and note down the amplitude levels of various signal components with respect to the blanking level.
3. To observe a color bar signal on an oscilloscope and note down its various signal components. Also observe the color bar on T.V.
4. To observe a test chart signal on an oscilloscope and on the T.V receiver identify the various signal components of this signal.
5. To study the additive and subtractive color processing methods.
6. To study various blocks of a cable T.V network.

Artificial Neural Networks and Fuzzy Logic Lab (ECE-807PE)

L - P
0- 2

NOTE: Tool to be used is MATLAB Only

1. Train a perceptron to learn the **inclusive OR** function:
    a. Train the perceptron at least five times (i.e., with five different initial weight configurations). On average, how many iterations are necessary for the network to reach the stopping criterion?
    b. Describe the general shape of the learning curve over the different training sessions.
    c. Lower the stopping criteria to successively stricter criteria (e.g., .01, .001, .0001). Describe the general shape of the learning curve for each case.
2. Train a perceptron to learn the **exclusive OR** function:
    a. Train the perceptron to learn this function multiple times. Does it ever reach the stopping criterion?
3. Train a multi-layer perceptron to learn the **exclusive OR** function.
    a. Train a multi-layer perceptron to learn the **exclusive OR** function about ten times. On average, how many iterations are necessary for the network to reach the stopping criterion?
    b. What is the general shape of the learning curve over the different training sessions?
    c. Adjust the number of hidden units in the multi-layer perceptron (e.g. 1 unit, 3 units, 5 units), and retrain multiple times. Describe the behavior of the network (i.e. the average number of iterations to reach the criterion, and the general shape of the learning curve) across the different conditions.
4. Train a Network to Verify the Out Put of Following Gates:
    i) NAND
    ii) OR
    iii) EX-OR
5. Train a Network to Verify the Out Put of Following Combinational Logic Circuits:

Medical Electronics Lab (807PE)

L - P
0 - 2

List of Practicals:

1. To study the biological pre-amplifiers.
2. To record and analyze the ECG signal.
3. To record and analyze audiogram.
4. To record and analyze the EEG and EMG signal.
5. Recording of various physiological parameters using patient monitoring system and telemetry units.
6. Bio-signal processing using MATLAB
7. Medical Imaging using MATLAB
8. Study of spectra of bio signals using spectrum analyser

Optical Fibre Communication Lab (ECE-807PE)

L - P
0 - 2

1. To set up a fibre optic analog link and observe the effect of gain control and the level control on the received signal and measure the bandwidth of the link.
2. To setup a fibre optic digital link and to measure the bit rate.
3. To measure the losses in an optical fibre communication link.
4. To set up the multiplexer and demultiplexer and to observe the simultaneous transmission of several channels using time division multiplexing.
5. Generation of frame clocks, slot clocks, bit clocks and the method of insertion and removal of data from each slot.
6. To study role of marker in TDM.
7. To study Manchester encoding /decoding techniques at different bitrates.
8. To compare the effect of EMI/RFT on a copper medium and on an optical fibre medium.
9. To study the effect of pulse broadening on bandwidth of a fibre optic communication link.
10. To measure numerical aperture of an optic fibre.