DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

HARYANA COLLEGE OF TECHNOLOGY & MANAGEMENT KAITHAL

Scheme of examination for B.Tech Degree Course

First Semester Examination

Course No.	Course Title	Teaching Schedule (Hrs.)				Examination Scheduled Marks			
		L	T	P	Total	Sessional	Theory	Practical	Total
MATH-101-E	Mathematics-1	4	1	-	5	50	100	-	150
PHY-101-E	Physics-1	3	1	-	4	50	100	-	150
BT-101-E	Introduction to Bio-Technology	3	1	-	4	50	100	-	150
HUM-101-E	OR Comm. Skills in English	3	1	-	4	50	100	-	150
EL-101E ME-101-E**	Elements of Mechanical Engg./ Civil Engg./ Elements of Electronics Engg.**	3	1		4	25	75	-	100
ME-105-E	Or Engineering Graphics & Drawings	-	-	3	3	50	-	100	150
ME-103-E	Manufacturing Process	4	-	-	4	50	100	-	150
CE-101-E	Or Chemistry	3	1	-	4	50	100	-	150
CSE-101-E	Fundamentals of Computer & Prog. In C	3	2	-	5	50	100	-	150
EE-101-E	Or Electrical Tech.	3	2	-	5	50	100	-	150
ES-101E	Environmental Studies	4	-	-	4	25	75	-	100
PHY-103-E	Physics Lab-1	-	-	2	2	25	-	25	50
ME-107-E	Workshop Practice	-	-	3	3	25	-	25	50
CH-103-E	Or Chemistry Lab	-	-	2	2	25	-	25	50
CSE-103-E	Computer Prog. Lab	-	-	2	2	25	-	25	50
EE-103-E	Or Electrical Tech. Lab	-	-	2	2	25	-	25	50
ME-109-E CE-109E EL-109E	Elements of Mechanical Engg./ Civil Engg./ Electronics Engg. Lab **	-	-	2	2	25	-	25	50
Total		24/20	6/6	9/9	35/35	375/375	575/500	100/175	1050/1050

Note: 1. Students will study either group 'A' (CE-101-E**, ME-103-E, CSE-101-E, ME-107-E, CSE-103-E, ME-109-E, BT-101-E) OR group 'B' (ME-105-E, CH-101-E, EE-101-E, CH-103-E, EE-103-E, HuM-101-E) Semester-1/ Semester-II in branches to be decided by the concern

    2. Students are allowed to use single memory, non-programmable scientific calculator during examination.

    ** Any of the electives

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

HARYANA COLLEGE OF TECHNOLOGY & MANAGEMENT KAITHAL

Scheme of examination for B.Tech Degree Course

<u>Second Semester Examination</u>

Course No.	Course Title	Teaching Schedule				Allotment of Marks			
		L	T	P	Total	Sessional	Theory	Practical	Total
MATH-102-E	**Mathematics-II**	4	1	-	5	50	100	-	150
PHY-102-E	**Physics-II**	3	1	-	4	50	100	-	150
BT-101-E	**Basics of Bio-Technology**	3	1	-	4	50	100	-	150
HUM-101-E	**Or Comm. Skills in English**	3	1	-	4	50	100	-	150
EL-101E ME-101-E	**Elements of Mechanical Engg./ Civil Engg./ Electronics Engg.**	3	1	-	4	25	75	-	100
ME-105-E	**Or Engineering Graphics & Drawings**	-	-	3	3	50	-	100	150
ME-103-E	**Manufacturing Process**	4	-	-	4	50	100	-	150
CH-101-E	**Or Chemistry**	3	1	-	4	50	100	-	150
CSE-101-E	**Fundamentals of Computer & Prog. In C**	3	2	-	5	50	100	-	150
EE-101-E	**Or Electrical Tech.**	3	2	-	5	50	100	-	150
ES-101E	**Environmental Studies**	4	-	-	4	25	75	-	100
PHY-104-E	**Physics Lab-II**	-	-	2	2	25	-	25	50
ME-107-E	**Workshop Practice**	-	-	3		25	-	25	50
CH-103-E	**Or Chemistry Lab**	-	-	2	2	25	-	25	50
CSE-103-E	**Computer Prog. Lab**	-	-		2	25	-	25	50
EE-103-E	**Or Electrical Tech. Lab**	-	-	2	2	25	-	25	50
ME-109-E CE-109E EL-109E	**Elements of Mechanical Engg./ Civil Engg./ Electronics Engg.**	-	-	2	2	25	-	25	50
	Total	20/	6/6	9/9	35./35	375./375	575/500	100./175	1100./1050

Note: 1. Students will study either group 'A' (ME-101-E**, ME-103-E, CSE-101-E, ME-107-E, CSE-103-E, ME-109-E, BT-101-E)
OR group 'B' (ME-105-E, CH-101-E, EE-101-E, CH-103-E, EE-103-E, HuM-101-E) Semester-1/ Semester-II in branches to
be decided by the concer

2. Students are allowed to use single memory, non-programmable scientific calculator during examination.

** Any of the electives.

MATH-101E
MATHEMATICS-I
(COMMON FOR ALL BRANCHES)

L T P   **Theory: 100 Marks**
4 1 -   **Sessional: 50 Marks**
                                             Total: 150 Marks
                                             During of exam : 3 Hrs.

UNIT-I

Applications of Differentiation : Taylor's & Maclaurin's series, Expansion by use of known series, Expansion by forming a differential equation, Asymptotes, Curvature, Radius of Curvature for Cartesian, Parametric & polar curves, Centre of curvature & chord of curvature, Tracing of Cartesian & polar curves (standard curves).

UNIT – II

Partial Differentiation & its Applications : Functions of two or more variables Partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, change of variables.

Homogeneous functions, Euler's theorem, Jacobian, Taylor's & Maclaurin's series for functions of two variables (without proof), Errors and approximations, Maxima-minima of functions of two variables, Lagrange's method of undetermined multipliers, Differentiation under the integral sign.

UNIT – III

Multiple Integrals and their Applications : Double integral, change of order of integration Double integral in polar coordinates, Applications of double integral to find area enclosed by plane curves and volume of solids of revolution.
Triple integral, volume of solids, change of variables, Beta and gamma functions and relationship between them.

UNIT – IV

Vector Calculus : Differentiation of vectors, scalar and vector point functions Gradient of a scalar field and directional derivative, divergence and curl of a vector field and their physical interpretations, Del applied twice to point functions, Del applied to product of point functions.
Integration of vectors, line integral, surface integral, volume integral, Green's, Stoke's and Gauss divergence theorems (without proof), and their simple applications.

TEXT BOOKS:
1. Advanced Engineering Mathematics : F. Kreyszig.
2. Higher Engineering Mathematics : B.S. Grewal.

REFERENCE BOOKS:
1. Engineering Mathematics Part-I : S.S. Sastry.
2. Differential and Integral Calculus : Piskunov.
3. Advanced Engineering Mathematics : R.K. Jain and S.R.K. Iyengar
4. Advanced Engg. Mathematics : Michael D. Greenberg
   Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

PHY-101E
PHYSICS-I
(COMMON FOR ALL BRANCHES)

L T P
3   1

Theory: 100 marks
Sessional: 50 marks
Total: 150 marks
Time: 3 Hrs.

UNIT-I

PHYSICAL OPTICS

Interference: Division of wave front-Fresnel's biprism, Division of amplitude–Newton's rings, Michelson interferometer, applications.

Diffraction: Difference between Fraunhofer and Fresnel diffraction. Fraunhofer diffraction through a slit. Plane transmission diffraction grating, its dispersive and resolving powers.

Polarization: Polarised and unpolarized light, double refraction; Nicol prism, quarter and half wave plates, Polarimetry; Biquartz and Laurent's half-shade polarimeters, Simple concepts of photoelasticity.

UNIT-II

LASER: Spontaneous and stimulated emissions, Laser action, characteristics of laser beam-concepts of coherence, He-Ne and semiconductor lasers (simple ideas), applications.

FIBRE OPTICS: Propagation of light in fibres, numerical aperture, single mode and multi mode fibres, applications.

UNIT-III

WAVE AND OSCILLATIONS: Simple concepts of Harmonic Oscillator, resonance, quality factor. E.M. wave theory-review of basic ideas, Maxwell's equations, simple plane wave equations, simple concepts of wave guides and co-axial cables, Poynting vector. **DIELECTRICS:** Molecular theory, polarization, displacement, susceptibility, dielectric coefficient, permitivity & various relations between these, Gauss's law in the presence of a dielectric, Energy stored in an electric field. Behavior of dielectrics in a.c. field-simple concepts, dielectric losses.

UNIT-IV

SPECIAL THEORY OF RELATIVITY: Michelson-Moreley experiment, Lorentz transformations, variation of mass with velocity, mass energy equivalence.

NUCLEAR PHYSICS: Neutron Cross-section, Nuclear fission, Moderators, Nuclear reactors, Reactor criticality, Nuclear fusion. Interaction of radiation with matter-basic concepts, radiation detectors-ionisation chamber, G.M. Counter, Scintillation and solid state detectors, cloud chamber and bubble chamber.

TEXT BOOKS:
1. Physics of the Atom - Wehr, Richards & Adair (Narosa)
2. Perspectives of Modern Physics - Arthur Beiser (TMH)
3. Modern Engineering Physics – A.S. Vasudeva (S. Chand)

REFERENCE BOOKS:
1. Electricity and Magnetism – F.W. Sears (Narosa)
2. Physics Vol-I & II – Resnick & Halliday (Wiley Eastern)
3. A Text Book of Optics – Brij Lal & Subramanyam

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

Ist YEAR B.TECH
INTRODUCTION TO BIOTECHNOLOGY
(BT-101 E)

L   T P/D
3   1

Theory: 100 marks
Sessional : 50 marks
Total: 150 marks
Time: 3 Hrs.

UNIT - I

Introduction to life: Characteristics of living organisms. Hierarchy of organisation and factors responsible for regulating different levels of organisations. Structure of Prokaryotic and Kukaryotic cell. Basic concept of State and Homeostasis.

Introduction to Biomolecules: Definition, general classification and important functions of carbohydrates, lipids, proteins, nucleic acids and vitamins.

Enzymes as biocatalysts: General characteristics, nomenclature and classification of Enzymes. Effect of temperature, pH, enzyme and substrate concentrations on the activity of enzymes. Elementary concept of cofactors and coenzymes.

UNIT - II

Biodiversity :
   (i)   **Plant System :** Basic concepts of plant growth, nutrition, photosynthesis and nitrogen fixation. Types of Growth regulators and their physiological effects.
   (ii)   **Animal System :** Elementary Study of Digestive, Respiratory, Circulatory, Excretory systems and their functions.
   (iii) **Microbial System :** History of Microbiology, types of microbes and properties. Economic importance and control of microbes.

UNIT - III

Evolution: Theories of evolution. Mendel's laws of inheritance. Variation and speciation.

Genetic: Cell division – Mitosis and Meiosis. Evidence of nucleic acids as a genetic material. Central Dogma.

Genetic Engineering : Elementary knowledge of Recombinant DNA Technology, Bio-informatics and Genomics.

UNIT – IV

Introduction to Biotechnology : Definition, scope and achievements. Tools used in biotechnology.

Applications of Biotechnology in Agriculture, Medicine and Environment – an elementary knowledge.

Prospects and public perception of Biotechnology.

Text/ Reference Books:
1. Cell Biology and Genetics. 9th edition. Starr, C. and Taggard; R. (2001) Thomson Learning USA.
2. Life Science of Biology 6th edition Purves W.K.; Sadava, D.; Orians, G.H. and Heller, H.C. (2001). W.H. Freeman & company, USA.
3. Basic Biotechnology. Ratledge, C. and Kristiansen, B. (2001) Cambridge University Press.
4. Basic Biotechnology. Ignacimuthu, S.J. (2002) Tata McGraw-Hill Pub., New Delhi
5. Genes VII Lewis Benjamin (2002). Oxford Univ. Press Oxford.
6. Biotechnology 3rd Edition. Smith, J.E. (2003) Cambridge University Press.

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

COMMUNICATION SKILLS IN ENGLISH
B.Tech. Semester-I

L T P   **Theory: 100 marks**
3 1   **Sessional: 50 marks**
                                                  Total: 150 marks
                                                  Time: 3 Hrs.

This course is designed for the students of Engineering and Technology who need English for specific purposes in specific situations. It aims at imparting the communication skills that are needed in their academic and professional pursuits. This is achieved through an amalgamation of traditional lecture-oriented approach of teaching with the task based skill oriented methodology of learning.

Unit-I

Communicative Grammar:
Part A : Spotting the errors pertaining to nouns, pronouns, adjective and adverbs; Concord - grammatical concord, notional concord and the principle of proximity between subject and verb.
Part B : Changing the voice : from Active to Passive and Passive to Active.

Unit-II

Lexis: Idioms and phrases; Words often confused; One-Word Substitutes; Formation of words (suffixes, prefixes and derivatives);

Unit-III

Oral Communication:
Part-A: Introduction to principal components of spoken English – Transcription, Word-accent, Intonation, Weak forms in English
Part-B: Developing listening and speaking skills through various activities, such as (a) role play activities, (b) Practising short dialogues (c) Group discussion (d) Debates (e) Speeches (f) Listening to news bulletins (g) Viewing and reviewing T.V. programmes etc.

Unit-IV

Written Communication: Developing reading and writing skills through such tasks/activities as developing outlines, key expressions, situations, slogan writing and theme building exercises, dialogue writing, interpreting pictures/cartoons.

Unit-V

(For Internal Evaluation Only):
Book Review – Herein the students will be required to read and submit a review of a book (Literary or non-literary) of their own choice. This will be followed by a presentation of the same in the class

Unit-VI

Technical Writing:
(a) Business Letters, Format of Business letters and Business letter writing
(b) E-mail writing
(c) Reports, Types of Reports and Format of Formal Reports
(d) Press Report Writing

SUGGESTED READING:
1. *Language in Use (Upper intermediate Level,* Adrian Doff Christopher Jones, Cambridge University Press
2. *Common Errors in English,* Abul Hashem, Ramesh Publishing House, new Delhi.
3. *Objective English*, Tata Mc. Graw Hill Publishing Company Ltd., New Delhi.
4. *Spoken English for India,* R.K. Bansal & J.B. Harrison, Orient Longman, Delhi.
5. *The sounds of English,* Veena Kumar, Makaav Educational Software, New Delhi.
6. *English Phonetics & Phonology*, P. Roach, Cambridge University Press, London.

7. *English for Engineers and Technologists: A Skill Approach*, Vol. 2, Orient Longman, Delhi.
8. *Business Communication,* M.S. Ramesh and C.C. Pattanshetti, R.Chand and Company, Delhi
9. *Group Discussion,* Sudha Publications/Ramesh Publishing House, New Delhi.
10. English Grammar & Composition. By Rajinder Pal & Prem Lata Suri, Sultan Chand Pub. New Delhi.

SCHEME OF EXAMINATION:
All questions will be compulsory and will cover all the aspects of the syllabus **except unit V**. There will be sufficient internal choice.

Unit-I: 20 Marks
Questions No. 1 will require the students to carefully read the sentences given and trace the errors, if any, and then supply the correct alternatives/answers.

Unit-II: 20 Marks
Question No. 2 may have four or five parts testing knowledge of different items of vocabulary.

Unit-III: 20 Marks
Question No. 3 will have four parts of 5 marks each from part A of the unit.
Note: Speaking and listening skills of part B will primarily be tested orally through internal assessment.

Unit-IV: 20 Marks
Question No. 4 may have many parts. The questions will be framed to test students' composition skills on the elements prescribed in the unit. For example, the students may be required to develop a hypothetical situation in a dialogue form, or to develop an outline, key expression etc.

Unit-V is for internal assessment only.
Unit-VI: 20 Marks
Question No. 5 may have two parts. While the one part may require the students to frame either a press/news report for the print media or write the given business letter, or e-mail a message, the second part will have a theory question on the format of formal report and business letter.

ME-101E   ELEMENTS OF MECHANICAL ENGINEERING

L T P   **Theory: 75 marks**
3 1   **Sessional: 25 marks**
                                                   Total: 100 marks
                                                   Time: 3 Hrs.

Unit-I

Properties of Steam & Boilers: Formation of steam at constant pressure, Thermodynamics properties of steam, Condition of steam, Steam tables, Measurement of dryness fraction by throttling calorimeter, Classification of boilers, Comparison of water and fire tube boilers mounting and accessories with their functions, Constructional and operational details of Cochran and Babcock and Wilcox boilers, Problems.

Steam Turbines and Condensers: Classification of turbines, Working principle of impulse and reaction turbine, Compounding of impulse turbine, Comparison of impulse and reaction turbines, Types of condensers, Cooling ponds and cooling towers, Condenser and vacuum efficiencies.

Unit-II

I.C. Engines and Gas Turbines: Introduction, Classification, Constructional details and working of two-stroke and four-stroke diesel and petrol engines, Otto, Diesel and Dual cycles, Working principle of gas turbine, Constant pressure gas turbine cycle.

Water Turbines, Pumps and Hydraulic Devices: Introduction, Classification, Construction details and working of Pelton, Francis and Kaplan turbines, Specific speed and selection of turbines, Classification of water pumps and their working, Hydraulic jack and lift.

Unit-III

Simple Lifting Machines: Definition of machine, Velocity ratio, Mechanical advantage, Efficiency, Laws of machines, Reversibility of machine, Wheel and axle, Differential pulley block, Single, double and triple start worm and worm wheel, Single and double purchase winch crabs, Simple and compound screw jacks. Problems.

Power Transmission Methods and Devices: Introduction to Power transmission, Belt drive, Rope drive, Chain drive, Pulley, Gear drive, Types of gears, Gear train, Clutches, Types and function of clutches, Types and function of brakes, Power measurement by dynamometer, Types of dynamometers.

Unit-IV

Stresses and Strains: Introduction, Concept & types of Stresses and strains, Poison's ratio, stresses and strains in simple and compound bars under axial loading, Stress-strain diagrams, Hooks law, Elastic constants & their relationships, Principle stresses & strains and principal- planes, Mohr's circle of stresses. Numerical problems.

Bending Moment & Shear Force: Definitions, SF and BM diagrams for cantilever and simply supported beam. Calculation of maximum SF, BM and point of contra-flexure under the loads of (i) concentrated load (ii) uniformly distributed load (iii) combination of concentrated and uniformly distributed loads. Problems.

Text Books:
1. Strength of Materials - G.H. Ryder, Pub.- ELBS.
2. Hydraulic and Fluid Mechanics – Modi and Seth, Pub. – Standard Book House, New Delhi
3. Engineering Thermodynamics – C.P. Arora, Pub. - TMH, New Delhi
4. Thermal Engineering – A.S. Sarad, Pub. - Satya Prakashan, New Delhi.
5. Engineering Mechanics – K.L. Kumar, Pub. - TMH, New Delhi.
6. Theory of Machines – S.S. Rattan, Pub. – TMH, New Delhi.

Reference Books:
1.Strength of Materials – Popov, Pub. - PHI, New Delhi.
2. Hydraulic Machines – Jagdish Lal, Pub.- Metropolitan, Allahabad.
3. Thermal Science and Engineering – D.S. Kumar, Pub. – Kateria & Sons, New Delhi.

ELEMENTS OF CIVIL ENGINEERINGS

L T P   **Sessional: 25 Marks**
3 1 -   **Exam.:   75 Marks**
                                                    Total: 100 Marks
                                                    Time: 3 Hrs.

UNIT-I

Building Materials & Construction: Cement, sand, aggregate, bricks, reinforcing bars, structural steel sections.

Brick masonry: Bonds in brick work, reinforced brick work, load bearing walls, damp-proofing and water proofing, doors and windows

Making of concrete, reinforced concrete: columns, beams, lintels, floors and roofs, staircases, water retaining structures, foundations.

UNIT-II

Structural Steel: Properties, design of tension and compression members, beams and roof Trusses, constructions- rewetted bolted and welded, industrial buildings and towers

UNIT-III

Soils and Foundations: Types of soils, bearing capacity of soils, improving the bearing capacity, earth pressure, foundation for walls, columns, machines and transmission towers, pile foundation.

UNIT-IV

Water supply and treatment: Water needs, estimation of water demand, impurities in water and their sanitary significance, water quality standards, water treatment systems, distribution systems-gravity, pumping and dual system, need for sanitation, systems of sanitation-water borne and conservancy methods of sanitation, sewerage systems-partial, combined and separate systems.

References:
1. Building Construction by Sushil Kumar, Standard Pub., New Delhi.
2. Reinforced Concrete by I.C.Syal & A.K.Goyal, A.H Wheeler & Co., Delhi
3. Design of steel Structures by A.S.Arya & J.L.Ajonani Nem Chand & Bros.
4. Basics & Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age Int. Pub., New Delhi
5. Water Supply Enggi. By S.K. Garg.

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

EL-101E
ELEMENTS OF ELECTRONICS ENGINEERING

L T P
3 1 -

Sessional: 25 Marks
Exam.:   75 Marks
Total: 100 Marks
Time: 3 Hrs.

UNIT-I

Semiconductors p-type, n-type, pn junction diodes, pn junction as a circuit element, its characteristics, half wave and full wave and bridge type rectifier circuits basic filter circuits, Doide as voltage multiplier, clipper & clamper circuit. Zener diode as a voltage regulator. LED its characteristics construction & applications

UNIT-II

Characteristics of transistors in different configuration. Concept of d.c. and a.c. load line and operating point selection. Various amplifiers configurations their h-parameter equivalent circuits determination of voltage gain current gain input resistance and output resistance & power gain. Concept of feedback in amplifiers, different oscillators circuits (without analysis)

UNIT-III

Differential amplifier and its transfer characteristics. IC Op-Amps, its ideal & practical specifications and measurement of parameters. Op-Amp in different modes as inverting amplifier non inverting amplifier scale changer, differentiator & integrator.

UNIT-IV

Characteristics of JFET, MOSFET, Various amplifier configurations using FET. Characteristics and Construction of SCR, TRIAC, UJT Their basic areas applications.

Reference :

1. Electronic Devices & Circuits - Boylstad & Nashelsky.
2. Integrated Electronics By Millman & Halkias.
3. Electronic Principles – Malvino
4. Principles of Electronics – V.K. Mehta, Shalu Melta.
5. Electronic Circuits – Donald L. Shilling & Charles Belowl

 Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

ME-105E

ENGINEERING GRAPHICS AND DRAWING

L T P
- 3

Examination : 100 marks
Sessional: 50 marks
Total: 150 marks
Time: 3 Hrs.

Unit-I

Various types of projections, First and Third angle systems of orthographic projections. Projections of points in different quadrants. Projections of straight lines – parallel to one or both reference planes, contained by one or both planes, perpendicular to one of the planes, inclined to one plane but parallel to the other plane, inclined to both the planes, true length of a line and its inclinations with reference planes, traces of a line.

Unit-II

Projections of Polyhedra Solids and solids of Revolution – in simple positions with axis perpendicular to a plane, with axis parallel to both planes, with axis parallel to one plane and inclined to the other. Development of surface of various simple solids such as cubes, cylinders, prisms, pyramids etc. orthographic views, orthographic drawings of Bolts, Nuts, Bolted joints, screw threads, screwed joints.

Note : Some simple exercise may be attempted with AUTOCAD.

Text Book

1. Engineering Drawing Plane and Solid Geometry : N.D. Bhatt and V.M.Panchal, Forty-Fourth Edition 2002, Charotar Publishing House.

Reference Books

1. Engineering Graphics and Drafting : P.S. Gill, Millennium Edition, S.K. Kataria and Sons.
2. A Text Book of Engineering Drawing : S.B. Mathur, Second Revised and Enlarged Edition 2000, Vikas Publishing House.
3. Engineering Graphics using AUTOCAD 2000 : T. Jeyapoovan, First Edition 2002, Vikas Publishing House.

ME- 103E
MANUFACTURING PROCESSES

L T P   Theory   : 100 marks
4   Sessional : 50 marks
                                                           Total: 150 marks
                                                           Time: 3 Hrs.

Unit-I

Introduction: Introduction to Manufacturing Processes and their Classification. Industrial Safety; Introduction, Types of Accidents, Causes and Common Sources of Accidents, Methods of Safety, First Aid.

Engineering Materials: General Properties and Applications of Engineering Materials, Mild Steel, Medium Carbon Steel, High Carbon Steel, High Speed Steel and Cast Iron.

Unit-II

Foundry: Introduction to Casting Processes, Basic Steps in Casting Process, Pattern, Types of Patterns, Pattern Allowances, Risers, Runners, Gates, Moulding Sand and its composition, Sand Preparation, Molding Methods, Core Sands and Core Making, Core Assembly, Mold Assembly, Melting (Cupola) and Pouring, Fettling, Casting Defects and Remedies.

Unit-III

Cold Working (Sheet Metal Work): Sheet Metal Operations, Measuring, Layout Marking, Shearing, Punching, Blanking, Piercing, Forming, Bending and Joining Advantages and Limitations.

Hot Working Processes: Introduction to Hot Working, Principles of Hot Working Processes, Forging, Rolling, Extrusion, Wire Drawing. Plant Layout, Objectives of Layout, Types of Plant Layout and their Advantages.

Unit-IV

Introduction to Machine Tools: Specifications and Use of commonly used Machine Tools in a Workshop such as Lathe, Shaper, Planer, Milling, Drilling, Slotter, Introduction to Metal Cutting. Nomenclature of a Single Points Cutting Tool and Tool Wear. Mechanics of Chips Formations, Type of Chips , Use of Coolants in machining.

Welding: Introduction to Welding, Classification of Welding Processes, Gas Welding: Oxy-Acetylene Welding, Resistance Welding: Spot and Seam Welding, Arc Welding: Metal Arc, TIG & MIG Welding, Welding Defects and Remedies, Soldering & Brazing.

Text Books :
1. Workshop Technology Vol. I &II - Hazra & Chaudhary, Asian Book Comp., New Delhi.
2. Process and Materials of Manufacture-Lindberg, R.A. Prentice Hall of India, New Delhi.
3. Principles of Manufacturing Materials and Processes- Campbell, J.S.- McGraw- Hill.

Reference Books:
1. Manufacturing Science-Amitabha Ghosh & Ashok Kumar Malik, - East-West Press.
2. Manufacturing Process and Systems - Ostwald, Munoz , John Wiley.
3. Workshop Technology, Vol. 1, 2 & 3 – Chapman, WAJ, Edward Arnold.

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

CH-101E
CHEMISTRY
(COMMON FOR ALL BRANCHES)

L T P
3 1 -

Sessional : 50 Marks
Exam.:   100 Marks
Total: 150 Marks
Time: 3 Hrs.

Unit-1

Thermodynamics - Second law, concept of Entropy, Entropy change for an ideal gas, free energy and work functions, Free energy change, Chemical Potential, Gibb's Helmholtz equation, Clausius - Clapeyron equation, Related numerical problems with above topics. Phase-Rule - Terminology, Derivation of Gibb's Phase Rule Equation, One Component System (H_2O System), Two Components systems, Eutectic system (Pb-Ag), system with congruent m.pt. (Zn-Mg), systems with incongruent m.pt. (Na-K), Applications of above Systems.

Unit-2

Water & its treatment : Part I – Sources of water, impurities in water, hardness of water and its determination, units of hardness, alkalinity of water and its determination, Related numerical problems, scale and sludge formation (composition properties and methods of prevention). Water and its treatment : Part II – Treatment of water for domestic use, coagulation, sedimentation, filtration and dis-infection, water softening, Ion-exchange process, mixed bed demineralisation, Desalination (reverse osmosis) (electrodialysis).

Unit-3

Corrosion and its prevention - Galvanic & concentration cell, Dry and wet corrosion, Electrochemical theory of corrosion, Galvanic corrosion, pitting corrosion, water-line corrosion, differential aeration corrosion, stress corrosion, factors affecting corrosion, Preventive measures (proper design, Cathodic protection, protective coatings).
Lubrication and Lubricants-Friction, mechanism of lubrication, classification and properties of lubricants, Additives for lubricants, synthetic lubricants, Greases – Preparation & properties (consistency, drop point) and uses.

Unit-4

Polymers and Polymerization-Organic polymers, polymerisation, various types of polymerisation, effect of structure on properties of polymers, preparation properties and technical applications of thermo-plastics (PVC,PVA), thermosets (PF,UF), and elastomers (SBR,GR-N), Silicones, Introduction to polymeric compsites. Analytical methods;its needs and different methodes;Spectroscopy; its defination and scope;salient features of spectrophotometer,brief introduction of titrimetric methods,Elementry discussion on flame photometry

TEXT BOOKS:

1. Engineering Chemistry, P.C. Jain, Monica Jain (Dhanpat Rai & Co.).
2. Chemistry in Engineering & Tech., Vol.I & II, Rajaram, Kuriacose (TMH).

REFERENCE BOOKS:

1. Instrumental methods of Chemical Analysis, MERITT & WILLARD (East-West Press).
2. Physical Chemistry, P.W. Atkin (ELBS, Oxford Press).
3. Physical Chemistry, W.J. Moore (Orient-Longman).

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

CSE -101E
FUNDAMENTALS OF COMPUTERS & PROGRAMMING IN C

L T P
3 2

Theory: 100 marks
Sessional : 50 marks
Total: 150 marks
Time: 3 Hrs.

Unit-1

An Overview of Computer System: Anatomy of a digital Computer, Memory Units, Main and Auxiliary Storage Devices, Input Devices, Output Devices, Classification of Computers. Radix number system: Decimal, Binary, Octal, Hexadecimal numbers and their inter-conversions; Representation of information inside the computers. Operating System Basics: Introduction to PC operating Systems: DOS, Unix/Linux, Windows 2000.

Unit-2

Programming Languages: Machine-, Assembly-, High Level- Language, introduction to Assembler, Compiler, Interpreter, Debuggers, Linker and Loader. Programming fundamentals: problem definition, algorithms, flow charts and their symbols.
Internet basics: How Internet works, Major features of internet, Emails, FTP, Using the internet.

Unit-3

C Programming language: C fundamentals, formatted input/ output, expressions, selection statements, loops and their applications; Basic types, arrays, functions, including recursive functions, program organization: local and external variables and scope & arrays.

Unit-4

Strings: strings literals, string variables, I/O of strings, arrays of strings; applications. Structures, Unions and Enumerations: Structure variables and operations on structures; Structured types, nested array structures; unions; enumeration as integers, tags and types. Standard library: Input / output; streams, file operations, formatted I/O, character I/O, line I/O, block, string I/O, Library support for numbers and character data, error handling:

Text Books:
1.   Using Information Technology, 5th Edi, Brian K Williams & Stacey C. Sawyer, 2003, TMH
2.   The C Programming Language by Dennis M Ritchie, Brian W. Kernigham, 1988, PHI.
3.   C Programming – A modern approach by K.N. King, 1996, WW Norton & Co.

Reference Books:
1.   Information technology, Dennis P. Curtin, Kim Foley, Kunal Sen, Cathleen Morin, 1998, TMH
2.   Theory and problem of programming with C, Byron C Gottfried, TMH
3.   Teach yourself all about computers by Barry Press and Marcia Press, 2000, IDG Books India.
4.   Using Computers and Information by Jack B. Rochester, 1996, Que Education & Training.

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

EE-101E
ELECTRICAL TECHNOLOGY

L T P
3 2

Theory: 100 marks
Sessional : 50 marks
Total: 150 marks
Time: 3 Hrs.

UNIT-I
D.C. CIRCUITS: Ohm's Law, Kirchoff's Laws, D.C. Circuits, Nodal and Loop methods of analysis. A.C. CIRCUITS: Sinusoidal signal, instantaneous and peak values, RMS and average values, phase angle, polar & rectangular, exponential and trigonometric representations; R,L and C components, behaviors of these components in A.C. circuits. Concept of complex power, power factor.

UNIT-II
TRANSIENT RESPONSE: Transient response of RL, RC and RLC Circuits with step input. NETWORK THEOREMS: Thevenin's theorem, Norton's theorem, superposition theorem, maximum power transfer theorem, Star to Delta & Delta to Star transformation. SERIES AND PARALLEL A.C. CIRCUITS: Series and parallel A.C. circuits, series and parallel resonance, Q factor, cut-off frequencies and bandwidth.

UNIT-III
THREE PHASE CIRCUITS: Phase and line voltages and currents, balanced star and delta circuits, power equation, measurement of power by two wattmeter method, Importance of earthing. TRANSFORMERS: Principle, construction, working of transformer, Efficiency and regulation.

UNIT-IV
ELECTRICAL MACHINES: **D.C. Machine:** Principle, construction, EMF equation, Torque Equation, Types of Machine, internal & external characterstics, speed control. **Induction motor:** Principle, construction, EMF equation, Types of motors, slip concept, **Synchronous motor:** Principle, construction, Types of motors

TEXT BOOKS:
1. Basic Electrical Engg (2nd Edition) : Kothari & Nagarath, TMH
2. Electrical Technology (Vol-I) : B.L Theraja & A K Theraja, S.Chand

REFERENCE BOOKS:
1. Electrical Engineering Fundamentals : Deltoro, PHI
2. Network Analysis :Valkenburg, PHI

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

ENVIRONMENTAL STUDIES
(For Under-Graduate Students)

Unit 1 : The Multidisciplinary nature of environmental studies

Definition, scope and importance.

Need for public awareness.

Unit 2 : Natural Resources

Renewable and non-renewable resources :

Natural resources and associated problems.

a) Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b) Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) Mineral resources : Use and exploitation, environmental effects of extracting and mineral resources, case studies.

d) Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources : Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.

f) Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Unit 3 : Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem :
  a) Forest ecosystem
  b) Grassland ecosystem
  c) Desert ecosystem
  d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Unit : 4 Biodiversity and its conservation

- Introduction – Definition : genetic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of biodiversity : in-situ and ex-situ conservation of biodiversity.

Unit 5 : Environmental Pollution

Definition

- Causes, effects and control measures of :
  a) Air pollution
  b) Water pollution

c) Soil pollution
d) Marine pollution
e) Noise pollution
f) Thermal pollution
g) Nuclear hazards
- Solid waste Management : Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster management : floods, earthquake, cyclone and landslides.

Unit 6 : Social Issues and the Environment
- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and Control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation
- Public awareness.

Unit 7 : Human Population and the Environment
- Population growth, variation among nations
- Population explosion – Family Welfare Programme
- Environment and human health.
- Human Rights.
- Value Education.
- HIV/AIDS
- Women and Child Welfare.
- Role of Information Technology in Environment and human health.
- Case Studies.

Unit 8 : Field Work
- Visit to a local area to document environmental assets-river / forest / grassland / hill / mountain.
- Visit to a local polluted site – Urban / Rural / Industrial / Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems – pond, river, hill slopes, etc.

Examination Pattern : The question paper should carry 100 marks
The structure of the question paper being.

PART – A	:	Short Answer Pattern	25 Marks
PART – B	:	Essay type with inbuilt choice	50 Marks
PART – C	:	Field Work	25 Marks

INSTRUCTIONS FOR THE EXAMINERS

Part – A   Question 1 is compulsory and will contain ten short-answer type question of 2.5 marks each covering the entire syllabus.

Part – B   Eight essay type questions (with inbuilt choice) will be set from the entire syllabus and the candidates will be required to answer, any four of them. Each essay type question will be of the 12½ marks.

The examination will be conducted by the college concerned at its own level earlier than the annual examination and each student will be required to score minimum of 35% marks each in theory and Practical. The marks obtained in this qualifying paper will not be included in determining the percentage of marks obtained for the award of degree. However, these will be shown in the detailed marks certificate of the student.

PHYSICS LAB.-I
(COMMON FOR ALL BRANCHES)

L T P   **Sessional Work:25 Marks**
- - 2   **Examination: 25 Marks**
                                                    Total: 50 Marks
                                                    Duration of Exam: 3 Hrs.

Note: Students will be required to perform atleast 10 experiments out of the list in a semester.

LIST OF EXPERIMENTS

The experiments in Ist semester will be based mainly upon optics, electrostatics, wave and oscillations which are the parts of the theory syllabus of Ist semester.

1. To find the wavelength of sodium light by Newton's rings experiment.
2. To find the wavelength of sodium light by Fresnel's biprism experiment.
3. To   find the wavelength of various colours of white light with the help of a plane transmission diffraction grating.
4. To verify Newtons formula and hence to find the focal lenth of convex lens
5. To find the wavelength of sodium light by Michelson interferometer.
6. To find the resolving power of a telescope.
7. To find the specific rotation of sugar solution by using a polarimeter.
8. To compare the capacitances of two capacitors by De'sauty bridge and hence to find the dielectric constant of a medium.
9. To find the frequency of A.C. mains by using sonometer.
10. To find low resistance by carrey foster Bridge
11. To find the resistance of a galvenometer by Post office Box
12. To Find Value of high Resistance by substitution method
13. To Find the value of high resistance by leakage method
14. To Convert a galveno meter in to an Ammeter of given range.

RECOMMENDED BOOKS:
1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH)
2. Practical Physics – S.L.Gupta & V.Kumar (Pragati Prakashan).
3. Advanced Practical Physics Vol.I & II – Chauhan & Singh (Pragati Prakashan).

<div align="center">

ME-107E
WORKSHOP PRACTICE

</div>

L T P   **Sessional Work:25 Marks**
- - 3   **Examination: 25 Marks**
                                       Total: 50 Marks
                                       Duration of Exam: 3 Hrs.

NOTE :
1. At least ten experiments/ jobs are to be performed/ prepared by students in the semester.
2. At least 8 experiments/ jobs should be performed / prepared from the above list, remaining two may either be performed/ prepared from the above list or designed & set by the concerned institution as per the scope of the syllabus of Manufacturing Processes   and facilities available in the Institute.

<u>List of Experiments / Jobs</u>
1. To study different types of measuring tools used in metrology and determine least counts of vernier calipers, micrometers and vernier height gauges.
2. To study different types of machine tools (lathe, shape or planer or slotter, milling, drilling machines)
3. To prepare a job on a lathe involving facing, outside turning, taper turning, step turning, radius making and parting-off.
4. To study different types of fitting tools and marking tools used in fitting practice.
5. To prepare lay out on a metal sheet by making and prepare rectangular tray, pipe shaped components e.g. funnel.
6. To prepare joints for welding suitable fo r butt welding and lap welding.
7. To perform pipe welding.
8. To study various types of carpentry tools and prepare simple types of at least two wooden joints.
9. To prepare simple engineering components/ shapes by forging.
10. To prepare mold and core assembly, put metal in the mold and fettle the casting.
11. To prepare horizontal surface/ vertical surface/ curved surface/ slots or V-grooves on a shaper/ planner.
12. To prepare a job involving slot and face milling on a milling machine.

L T P   **Sessional Work:25 Marks**
-   -   2   **Examination: 25 Marks**
                                                          Total: 50 Marks
                                                          Duration of Exam: 3 Hrs.

Note: At least ten experiments are to be performed by the students.

LIST OF EXPERIMENTS
1. Determination of Ca^{++} and Mg^{++} hardness of water using EDTA solution.
2. Determination of alkalinity of water sample.
3. Determination of dissolved oxygen (DO) in the given water sample.
4. To find the melting & eutectic point for a two component system by using method of cooling curve.
5. Determination of viscosity of lubricant by Red Wood viscometer (No. 1 & No. 2).
6. To determine flash point & fire point of an oil by Pensky -Marten's flash point apparatus.
7. To prepare Phenol-formaldehyde and Urea formaldehyde resin.
8. To find out saponification No. of an oil.
9. Estimation of calcium in lime stone and dolomite.
10. 10. Determination   of concentration of $KMnO_4$ solution spectrophotomet-erically.
11. Determination of strength of HCl solution by titrating   it against NaOH solution conductometerically.
12. To determine amount of sodium and potassium in a, given water sample by flame photometer.
13. Estimation of total iron in an iron alloy.

SUGGESTED BOOKS :
1. A Text Book on Experimental and Calculation – Engineering Chemistry, S.S. Dara, S. Chand & Company (Ltd.)
2. Essential of Experimental Engineering Chemistry, Shashi Chawla, Dhanpat Rai Publishing Company.
3. Theory & Practice Applied Chemistry – O.P. Virmani, A.K. Narula (New Age)

<div align="center">

EE-103E
ELECTRICAL TECHNOLOGY LAB

</div>

L T   P   **Sessional Work:25 Marks**
-   -   2   **Examination: 25 Marks**
                                                     Total: 50 Marks
                                                     Duration of Exam: 3 Hrs.

LIST OF EXPERIMENTS

1. To verify KCL and KVL.

2. To verify Thevenin's & Norton's Theorems.

3. To verify Superposition theorems.

4. To study frequency response of a series R-L-C circuit and determine resonant frequency& Q- factor for various Values of R,L,C.

5. To study frequency response of a parallel R-L-C circuit and determine resonant frequency & Q -Factor for various values of R,L,C.

6. To perform direct load test of a transformer and plot efficiency Vs load characteristic.

7. To perform O.C. and S.C. tests on transformer.

8. To perform speed control of DC motor.

9. To perform O.C. and S.C. tests of a three phase induction motor.

10. Measurement of power in a 3 phase system by two watt meter method.

COMPUTER PROGRAMMING LAB.

L T P   **Sessional Work:25 Marks**
- - 2   **Examination: 25 Marks**
                                               Total: 50 Marks
                                               Duration of Exam: 3 Hrs.

Note: At least 5 to 10 more exercises to be given by the teacher concerned.

Representative programming problems:-

1. Write a program to find the largest of three numbers. (if-then-else)

2. Write a program to find the largest number out of ten numbers (for-statement)

3. Write a program to find the average mail height & average female heights in the class (input is in form of sex code, height).

4. Write a program to find roots of quadratic equation using functions and switch statements.

5. Write a program using arrays to find the largest and second largest no. out of given 50 nos.

6. Write a program to multiply two matrices

7. Write a program to read a string and write it in reverse order

8. Write a program to concatenate two strings

9. Write a program to sort numbers using the Algorithm.

10. Represent a deck of playing cards using arrays.

11. Write a program to check that the input string is a palindrome or not.

EL-109E
ELEMENTS OF ELECTRONICS ENGINEERING LAB.

L T P   **Sessional Work:25 Marks**
- - 2   **Examination: 25 Marks**
                                                     Total: 50 Marks
                                                     Duration of Exam: 3 Hrs.

LIST OF EXPERIMENTS:

1.   To study the half wave & full wave rectifier.

2.   To study the effect of various filters circuits.

3.   To study the characteristics of pnp & npn transistor in common amitter & determine H-parameter from characteristics

4.   To study the characteristics of pnp & npn transistor in CB & determine h-parameter from characteristics

5.   To determine the Av, Ai of RC coupled CE transistor amplifier

6.   Determine the frequency of oscillation in herteley oscillator

7.   Determine the frequency of oscillation in phase shift oscillator

8.   Determine the effect of negative feedback on bandwidth & gain in CE, RC coupled amplifier

9.   Study TC Op-Amp as a inverting amplifier & scale changer

10.   Study IC Op-Amp as a non inverting amplifier

11.   Study IC Op-Amp as an integrator

12.   Study IC Op-Amp as a differentiator

ELEMENTS OF MECHANICAL ENGINEERING LAB.

L T P   **Sessional Work:25 Marks**
- - 2   **Examination: 25 Marks**
                                           Total: 50 Marks
                                           Duration of Exam: 3 Hrs.

Note:
1. Total ten experiments are to be performed in the Semester.
2. At least seven experiments should be performed from the above list. Remaining   three experiments should be performed as designed & set by the concerned Institution as per the scope of the syllabus.

LIST OF EXPERIMENTS
1. To study Cochran & Babcock & Wilcox boilers.

2. To study the working & function of mountings & accessories in boilers.

3. To study 2-Stroke & 4-Stroke diesel engines.

4. To study 2-Stroke & 4-Stroke petrol engines.

5. To calculate the V.R., M.A. & efficiency of single, double & triple start worm & worm wheel.

6. To calculate the V.R., M.A. & efficiency of single & double purchase winch crabs.

7. To find the percentage error between observed and calculated values of stresses in the members of a Jib crane.

8. To draw the SF & BM diagrams of a simply supported beam with concentrated loads.

9. To study the simple & compound screw jacks and find their MA, VR & efficiency.

10. To study the various types of dynamometers.

11. To the constructional features & working of Pelton/Kaplan/Francis.

12. To prepare stress-strain diagram for mild steel & cast iron specimens under tension and compression respectively on a Universal testing machine.

13. To determine the Rockwell / Brinell /Vickers hardness no. of a given specimen on the respective machines.

MATH-102E
MATHEMATICS-II
(COMMON FOR ALL BRANCHES)

L T P   **Theory**   **: 100 marks**
4 1   **Sessional**   **: 50 marks**
               Total   **: 150 marks**
               Duration of exam   **: 3 Hrs.**

UNIT-I

Matrices & its Applications : Rank of a matrix, elementary transformations, elementary matrices, inverse using elementary transformations, normal form of a matrix, linear dependence and in dependence of vactors, consistency of linear system of equations, linear and orthogonal transformations, eigen values and eigen vectors, properties of eigen values, Cayley - Hamilton theorem and its applications.

UNIT-II

Ordinary Differential Equations & its Applications : Exact differential equations. Equations reducible to exact differential equations. Applications of Differential equations of first order & first degree to simple electric circuits, Newton's law of cooling, heat flow and orthogonal trajectories.
Linear differential equations of second and higher order. Complete solution, complementary function and particular integral, method of variation of parameters to find particular Integral, Cauchy's and Legender's linear equations, simultaneous linear equations with constant co-efficients. Applications of linear differential equations to simple pendulum, oscillatory electric circuits.

UNIT-III

Laplace Transforms and its Applications : Laplace transforms of elementary functions, properties of Laplace transforms, existence conditions, transforms of derivaties, transforms of integrals, multiplication by t, division by t. Evaluation of integrals by Laplace transforms. Laplace transform of Unit step function, unit impulse function and periodic function. Inverse transforms, convolution theorem, application to linear differential equations and simultaneous linear differential equations with constant coefficients.

UNIT-IV

Partial Differential Equations and Its Applications : Formation of partial differential equations, Lagrange's linear partial differential equation, First order non-linear partial differential equation, Charpit's method. Method of separation of variables and its applications to wave equation and one dimensional heat equation, two dimensional heat flow, steady state solutions only.

TEXT BOOKS:
1. Advanced Engg. Mathematics F Kreyszig
2. Higher Engg. Mathematics B.S. Grewal

REFERENCE BOOKS :
1. Differential Equations – H.T.H. Piaggio.
2. Elements of Partial Differential Equations – I.N. Sneddon.
3. Advanced Engineering Mathematics – R.K. Jain, S.R.K.Iyengar.
4. Advanced Engg. Mathematics – Michael D. Greenberg.

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

PHY-102E
PHYSICS-II
(COMMON FOR ALL BRANCHES)

L T P   **Theory: 100 marks**
3 1   **Sessional: 50 marks**
                                            Total: 150 marks
                                            Time: 3 Hrs.

UNIT-I

CRYSTAL STRUCTURE: Space Lattice, unit cell and translation vectors, Miller indices, simple crystal structure, Bonding in solids, Experimental X-ray diffraction method, Laue method, powder Method, Point defects in solids, Elementary idea of quarks and gluons.

UNIT-II

QUANTUM PHYSICS: Difficulties with Classical physics, Introduction to quantum mechanics-simple concepts, discovery of Planck's constant, Group velocity and phase velocity, Schrodinger wave equations - time dependant and time independent Schrodinger equations, Elementary ideas of quantum statistics.

FREE ELECTION THEORY: Elements of classical free electron theory and its limitations, Drude's Theory of Conduction, quantum theory of free electrons, Fermi level, Density of states, Fermi-Dirac distribution function, Thermionic emission, Richardson's equation.

UNIT-III

BAND THEORY OF SOLIDS: Origin of energy bands, Kronig, Penney Model (qualitative), E-K diagrams, Brillouin Zones, Concept of effective mass and holes, Classification of solids into metals, Semiconductors and insulators, Fermi energy and its variation with temperature. Hall effect and its Applications.

UNIT-IV

PHOTOCONDUCTIVITY AND PHOTOVOLTAICS: Photoconductivity in insulating crystals, variation with illumination, effect of traps, applications of photoconductivity, photovoltaic cells and their characteristics.

MAGNETIC PROPERTIES OF SOLIDS: Atomic magnetic moments, orbital diamagnetism, Classical theory of paramagnetism, ferro magnetism - molecular fields and domains.

SUPER CONDUCTIVITY: Introduction (experimental survey), Meissner effect, London equation.

TEXT BOOKS:
1. Introduction to Solid State Physics (VII Ed.) - Charles Kittel (John Wiley).
2. Quantum Mechanics – Powell and Crasemann (Oxford & IBH)
3. Fundamentals of Solid State Physics – B.S.Saxena, R.C.Gupta and P.N.Saxena (Pragati Prakashan).

REFERENCE BOOKS:
1. Sold State Physics – Pillai (New Age).
2. A text book of Engg. Physics – Avadhanulu and Kshirsagar (S.Chand)
3. Quantum Mechanics – Ghatak & Loknathan.

Note: The Examiners will set eight questions, taking two from each unit. The students are required to attempt five questions in all selecting at least one from each unit. All questions will carry equal marks.

PHY-104E
PHYSICS LAB.-II
(COMMON FOR ALL BRANCHES)

L   T   P   **Sessional Work:25 Marks**
-   -   2   **Examination: 25 Marks**
                                 Total: 50 Marks
                                 Duration of Exam: 3 Hrs.

Note: Students will be required to perform at least10 experiments out of the list in a semester.

LIST OF EXPERIMENTS

The experiments in Second semester will be based upon electricity, Magnetism, Modern Physics and Solid State Physics, which are the parts of theory syllabus.

1. To study He Ne laser

2. Tofind the frequency of ultrasonic waves by piezo eletric methods

3. To find the value of e/m for electrons by Helical method.

4. To find the ionisation potential of Argon/Mercury using a thyratron tube.

5. To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee's apparatus.

6. To study the characteristics of (Cu-Fe, Cu-Constantan) thermo couple.

7. To find the value of Planck's constant by using a photo electric cell.

8. To find the value of co-efficient of self-inductance by using a Rayleigh bridge.

9. To find the value of Hall Co-efficient of semiconductor.

10. To study the V-I characteristics of a p-n diode.

11. To find the band gap of intrinsic semi-conductor using four probe method.

12. To calculate the hysteresis loss by tracing a B-H curve.

13. To verify richerdson thermionic equation

14. To find the flashing and quenching potential of Argon and to find the cap. of unknown capacitor

15. To find the temp coeff. of resistance by using Pt resistance therometer by post office box

RECOMMENDED BOOKS :
1. Advanced Practical Physics – B.L. Worshnop and H.T. Flint (KPH)
2. Practical Physics – S.L. Gupta & V. Kumar (Pragati Prakashan).
4. Advanced Practical Physics Vol. I & II – Chauhan & Singh (Pragati Prakashan).

Bachelor of Technology (Electronics & Communication, Electronics, Electronics & Instrumentation)
Common for (ECE, EC, E&I)
Scheme of studies / Examination
(Semester- 3)

Sl. No	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P	Total	Theory	Sessional	Practical	Total	
1	MATH-20IE / HUM-20IE	Mathematics-Ill / Basics of Industrial Sociology, Economics & Management.	3	1	-	4	100	50	-	150	3
2	EE-203E	Network Analysis & Synthesis	3	1	-	4	100	50	-	150	3
3	ELE-201E	Electromechanical Energy Conversion	3	1	-	4	100	50	-	150	3
4	CSE-203E	Data Structures	3	1	-	4	100	50	-	150	3
5	ECE-201E	Semiconductor Devices & Circuits	3	1	-	4		50	-	150	3
6	ECE-203 E	Analog Communication	3	1	-		100	50	-	150	3
7	ELE-203E	Electrical Machines Lab	-	-	3	3	-	50	25	75	3
8	ECE-205E	Semiconductor Devices & Circuits Lab	-	-		3	-	25	25	50	3
9	ECE-207E	Analog Communication Lab		-	2	2	-	25	25	50	3
10	CSE-211E	Data Structures Lab		-	3	3	-	50	25	75	3
TOTAL			18	6	11	35	600	450	100	1150	

B.Tech 3rd Semester
MATH-201 E   **MATHEMATICS - III**

L	T	P
3	1	-

Theory   :   100   Marks
Sessional   :   50   Marks
Total   :   150   Marks
Duration of Exam   : 3 Hrs.

UNIT – I

Fourier Series :   Euler's Formulae, Conditions for Fourier expansions, Fourier expansion of functions having points of discontinuity, change of interval, Odd & even functions, Half-range series.

Fourier Transforms : Fourier integrals, Fourier transforms, Fourier cosine and sine transforms. Properties of Fourier transforms, Convolution theorem, Perseval's identity, Relation between Fourier and Laplace transforms, Fourier transforms of the derivatives of a function, Application to boundary value problems.

UNIT-II

Functions of a Complex Variables : Functions of a complex variable, Exponential function, Trigonometric, Hyperbolic and Logarithmic functions, limit and continuity of a function, Differentiability and analyticity.

Cauchy-Riemann equations, Necessary and sufficient conditions for a function to be analytic, Polar form of the Cauchy-Riemann equations, Harmonic functions, Application to flow problems, Conformal transformation, Standard transformations (Translation, Magnification & rotation, inversion & reflection, Bilinear).

UNIT-III

Probability Distributions : Probability, Baye's theorem, Discrete & continuous probability distributions, Moment generating function, Probability generating function, Properties and applications of Binomial, Poisson and normal distributions.

UNIT-IV

Linear Programming : Linear programming problems formulation, Solution of Linear Programming Problem using Graphical method, Simplex Method, Dual-Simplex Method.

Text Book

1.   Higher Engg. Mathematics : B.S. Grewal
2.   Advanced Engg. Mathematics : E. Kreyzig

Reference Book

1.   Complex variables and Applications : R.V. Churchil; Mc. Graw Hill
2.   Engg. Mathematics Vol. II: S.S. Sastry; Prentice Hall of India.
3.   Operation Research : H.A. Taha
4.   Probability and statistics for Engineer : Johnson. PHI.

Note : Examiner will set eight question, taking two from each unit. Students will be required to attempt five questions taking at least one from each unit.

EE-203-E   **NETWORK   ANALYSIS & SYNTHESIS**

L T P   Sessional   :   50   Marks
3 1 0   EXAM   :   100   Marks
                                             TOTAL :   150   Marks
                                             DURATION OF EXAM   :   3 HRS

UNIT I

TOPOLOGY :
Principles of network topology , graph matrices, network analysis using graph theory.

TRANSIENT RESPONSE :
Transient Response of RC, RL, RLC Circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using laplace transform.

UNIT 2

NETWORK FUNCTIONS :
Terminal pairs or Ports, Network functions for one-port and two-port networks, poles and zeros of Network functions, Restrictions on pole and zero Locations for driving point functions and transfer functions, Time domain behavior from the pole-zero plot.

UNIT 3

CHARACTERISTICS AND PARAMETERS OF TWO PORT NETWORKS :
Relationship of two-port variables, short-circuit Admittance parameters, open circuit impedance, parameters, Transmission parameters, hybrid parameters, relationships between parameter sets, Inter-connection of two port networks.

UNIT 4

TYPES OF FILTERS AND THEIR CHARACTERISTICS :
Filter fundamentals, high-pass, low-pass, band-pass, and band-reject Filters.

NETWORK SYNTHESIS :
Positive real functions, synthesis of one port and two port networks, elementary ideas of Active networks.

TEXT BOOKS:
1. Network Analysis & Synthesis : Umesh Sinha; Satya Prakash Pub.
2. Network Analysis & Synthesis : F.F.Kuo; John Wiley & Sons Inc.

REFERENCE BOOKS:
1. Introduction to modern Network Synthesis : Van Valkenburg; John Wiley
2. Network Analysis: Van Valkenburg; PHI
3. Basic circuit theory:Dasoer Kuh; McGraw Hill.
4. A Course in Electrical Circuit Analysis by Soni & Gupta; Dhanpat Rai Publication.
5. Circuit Analysis : G.K. Mithal; Khanna Publication.
6. Networks and Systems : D.Roy Choudhury; New Age International.

NOTE : Eight questions are to be set in total covering entire course selecting two questions from each unit. Each question will be of equal marks. Students will be required to attempt five questions in all, selecting at least one question from each unit.

ELE : 201 E   ELECTROMECHANCIAL ENERGY CONVERSION

L	T	P
3	1	-

Theory	:	100
Sessional	:	50
Total	:	150
Duration of Exam	:	3 Hrs.

UNIT – I

MAGNETIC CIRCUITS AND INDUCTION

Magnetic Circuits, Magnetic Materials and their properties, static and dynamic emfs and force on current carrying conductor, AC operation of Magnetic Circuits, Hysteresis and Eddy current losses, frictional & copper losses.

TRANSFORMERS :

Basic theory, construction, operation at no-load and full-load, equivalent circuit, phasor diagram, O.C. tests for parameters determination, efficiency and regulation, auto-transformer, introduction to three-phase transformer; Scott connection, parallel operation of transformer.

UNIT – II
PRINCIPLES OF ELECTROMECHANCIAL ENERGY CONVERSIONS

Force and torque in magnetic field system, energy balance, energy and force in singly excited magnetic field system, concept of co-energy, forces and torques is system with permanent magnets, dynamic equation.

DC MACHINES

Basic theory of DC generator, brief idea of construction, emf equation, load characteristics, basic theory of DC motor, concept of back emf, torque and power equations, load characteristics, starting and speed control of DC motors, Types of DC generator & motors Armature reaction, communication, characteristics of DC machines.

UNIT – III
INDUCTION MOTOR

Basic theory, construction, Phasor diagram, advantage of IM over other conventional machines Equivalent circuit, Torque equation, Load characteristics, starting speed control of induction motor, Introduction to single phase Induction motor double field revolving theory, types of single phase IM and its applications, open circuit & block rotor test.

UNIT-IV
SYNCHRONOUS MACHINES

Construction and basic theory of synchronous generator, emf equation, advantages of stationary armature, Regulation, Basic theory of synchronous motor, v-curves, starting of synchronous motor, comparison between synchronous & induction, open circuit & block rotor teat of 3 phase and 1 phase motor.

Text Book :
1.   Electrical Machines : P.S. Bimbhra; Khanna

Reference :
1.   Electrical Machines : Nagarath and Kothari; TMH
2.   Electrical Machines : Mukherjee and Chakravorti; Dhanpat Rai & Sons.
3.   Electrical Technology (Vol-II) : B.L. Theraja; S. Chand.

NOTE : Eight questions are to be set in all by the examiner taking at least one question from each unit. Students will be required to attempt five questions in all.

B.TECH IIIRD SEMESTER
DATA STRUCTURES CSE-203 E

L	T	P				
3	1	-				

THEORY : 100 Marks
SESSIONAL : 50 Marks
TOTAL : 150 Marks
TIME : 3 Hrs.

Unit-1: Introduction : Introduction to Data Structures: Definition & abstract data types, Static and Dynamic implementations, Examples and real life applications; built in and user defined data structures, Ordered list and Operations on it. **Arrays**: Definition, implementation, lower bound, upper bound, addressing an element at a particular index for one dimensional arrays, Two dimensional arrays and Multi-dimensional arrays. Implementation of Data Structures like structure/ Record, Union, Sparse matrices : implementation of transpose.

Stacks : Sequential implementation of stacks, operations, Polish-notations, Evaluation of postfix expression, Converting Infix expression to Prefix and Postfix expression, Applications.

Unit-2: Queues: Definition, Sequential implementation of linear queues, Operations. Circular queue: implementation (using arrays), Advantage over linear queue, Priority queues & Applications.

Linked Lists : Need of dynamic data structures, continuous & linked implementation of lists. Operations on lists. Dynamic implementation of linked lists, Operations. Comparison between Array and Dynamic Implementation of linked list. Linked implementation of stacks and queues. Circular lists, implementation of primitive operations. Doubly linked lists : continuos & dynamic implementation, operations.

Unit-3: Trees : Definition, Basic terminology, Binary tree, Array and Dynamic Implementation of a binary tree, primitive operations on binary trees. External and internal nodes. Binary tree traversals : preorder, inorder and postorder traversals. Representation of infix, postifix and prefix expressions using trees. Representation of lists as binary trees. Introduction to Binary Search Trees, B trees, B+ trees , AVL Trees, threaded trees, balanced multi way search tree.

Unit- 4 : Graphs : Definition of undirected & Directed Graphs & Networks, Basic terminology, Representation of graphs,. Graph traversals and spanning forests, minimum-spanning trees, computer representation of graphs. **Tables** : Definition, Hash Functions, Implementation & Applications.

Sorting & Searching : Basic Searching techniques (Linear & binary), Introduction to Sorting. Sorting using selection, insertion, bubble, merge, quick, radix, heap sort.

Text Book:
- Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub.

Reference Books:
- Data Structures and Algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition.
- Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub, 1983,AW
- Fundamentals of computer algorithms by Horowitz Sahni and Rajasekaran.
- Data Structures and Program Design in C By Robert Kruse, PHI,
- Theory & Problems of Data Structures by Jr. Symour Lipschetz, Schaum's outline by TMH
- Introduction to Computers Science -An algorithms approach , Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H.
- Data Structure and the Standard Template library – Willam J. Collins, 2003, T.M.H
- **ote:** Eight questions will be set in all by the examiners taking at least two questions from each unit .Students will be required to attempt five questions in all at least one from each unit.

B.TECH IIIRD SEMESTER
SEMICONDUCTOR DEVICES AND CIRCUITS
(ECE-201E)

L   T   P
3   1   -

THEORY   : 100 Marks
SESSIONAL : 50   Marks
TOTAL   : 150 Marks
TIME   : 3 Hrs.

UNIT-I

P-N JUNCTION DIODE: - P-N junction and its V-I characteristics, P-N junction as rectifier, diode as a circuit element, the load line concept, half-wave and full-wave rectifiers, filter circuits. Photoelectric devices & their applications.

REGULATED POWER SUPPLIES: - Series and shunt voltage regulators, power supply parameters, three terminal IC regulators, SMPS.

UNIT-II

TRANSISTORS: - Review of BJT and its Hybrid model, analysis of a transistor amplifier circuit using h-parameters, Emitter follower, Miller's theorem, Frequency response of R-C coupled amplifier, Multistage amplifier, classification of amplifiers, Transistor Biasing; Operating point, Bias stability, Collector to Base bias, Self-bias, emitter bias, bias compensation, Thermistor and sensitor compensation, High frequency limitations on BJT'S

UNIT-III

FEEDBACK OSCILLATORS AND POWER AMPLIFIERS: - Feedback in amplifiers: Basic feedback topologies. Oscillators: Barkhausen's criterion, sinusoidal oscillators, Phase shift oscillators, Resonant circuit oscillator, a general form of oscillator, the Wein Bridge oscillator, Crystal oscillator. Introduction to power amplifiers and its various types with applications.

UNIT-IV

FIELD EFFECT TRANSISTORS: - JFET, pinch-off voltage, Volt-ampere characteristics, small signal model, MOSFET-Enhancement & Depletion mode, V-MOSFET, JFET & MOSFET amplifiers, Biasing of JFETS and MOSFETS.

TEXT BOOKS:
1. Integrated Electronics: Millman & Halkias; Mc Graw Hill.
2. Electronic circuit analysis and design (Second Edition): D.A. Neamen; TMH

REFERENCE BOOKS:
1. Electronics Principles: Malvino; Mc Graw Hill.
2. Electronics circuits: Donald L. Schilling & Charles Belove: Mc Graw Hill.
3. Electronics Devices & Circuits: Boylestad & Nashelsky; Pearson.

NOTE

Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all.

<u>**ANALOG COMMUNICATION**</u>

(ECE-203E)

L	T	P		THEORY	:	100	Marks
3	1	-		SESSIONAL	:	50	Marks
				TOTAL	:	150	Marks
				TIME	:	3 Hrs.	

UNIT – I

NOISE: Classification of Noise, Various sources of Noise, Methods of Noise Calculation in networks and inter connected networks. Addition of noise due to several sources; noise in amplifiers in cascade, noise in reactive circuits, Noise figure, its calculation and measurement. Noise temperature, Mathematical representation of random noise, narrow band noise and its representation. Transmission of noise through linear systems, signal to noise ratio, noise bandwidth.

UNIT-II

MODULATION TECHNIQUES: Basic constituents of Communication Systems, need of modulation, Amplitude modulation, spectrum of AM wave, modulation index, DSBSC modulation, SSB Modulation, Collector modulation, Square law modulation methods, Methods of generating SSB Signals, vestigial side band modulation, Detection of AM Signal; Diode detector, Square Law Detector. Time Constant RC in diode detector. Diode detector with filter. FDM, Power relations in AM wave.

UNIT-III

ANGLE MODULATION: frequency and phase modulation, spectrum of FM Wave, modulation index and Bandwidth of FM Signal, NBFM and WBFM, Comparison between FM and PM Signals, FM and AM signals, AM and NBFM Signals, FM generation methods, Demodulation methods; slope detector, ratio detector, Foster-Seeley discriminator. Pre-emphasis & De-emphasis, effect of noise on carrier; noise triangle.

UNIT-IV

TRANSMITER AND RECEIVER: Classification of radio transmitters, Block diagram of AM transmitter, Frequency Scintillation, Frequency drift, Radio broadcast transmitter, Radio telephone transmitter, Privacy devices, Armstrong FM transmitter, Simple FM transmitter using Reactance modulator.
Classification of radio receivers, TRF receives, superheterodyne receivers, Image Signal rejection, frequency mixers. Tracking and alignment of receivers, Intermediate frequency, AGC, AFC, SSB receiver.

REFERENCE BOOKS:
1. Taub & Schilling, Principles of Communication Systems, TMH.
2. Mithal G K, Radio Engineering, Khanna Pub.
3. Sirnon Haykin, Communication Systems, John Wiley.
4. Dungan F.R., Electronics Communication System, Thomson-Delmar
5. Electronics Communication System: Kennedy; TMH

NOTE:
Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all.

ELE – 203E   **ELECTRICAL MACHINES LAB**

L	T	P
0	0	3

Theory   :   50
Sessional :   25
Total   :   75
Duration of Exam : 3 Hrs.

LIST OF EXPERIMENTS

1. To perform open and short circuit tests on 1-phase transformer and to calculate efficiency.
2. To perform Sumpner's back to back test on-phase transformer.
3. Parallel operation of two 1-phase transformers.
4. Study of construction of a DC machine.
5. To plot magnetizing of a DC SE Generator and find its critical resistance & critical speed.
6. Speed Control of a DC motor by armature control & field control methods.
7. Open circuit & Block test of 1-phase induction motor.
8. Light running & block rotor test of 3-phase I.M. with starting.
9. To plot V curve of a synchronous motor.
10. To study scott connection of transformer.
11. To study starting running & reversal of direction of 3-phase I.M.
12. To perform load test on a 3-phase I.M. D.C. generator set & to determine the efficiency of I.M.

NOTE : Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus.

B.TECH IIIRD SEMESTER
SEMICONDUCTOR DEVICES & CIRCUITS LAB
(ECE-205E)

L   T   P   Sessional : 25 Marks
-   -   3   Viva   : 25   Marks
                                                    Total   : 50   Marks
                                                    Time   : 3hrs.

LIST OF EXPERIMENTS: -

1. Measurement & study of P-N junction diode-I-V and C-V characteristics.
2. Study of Half-wave and Full-wave rectifier.
3. Measurement and study of solar cell –I-V characteristics.
4. Study of Active filters.
5. Study of diode as Clipper and Clamper.
6. Study of Zener diode as Voltage Regulator.
7. Measurement and study of Input and Output characteristics of a BJT.
8. Study of CE amplifier-Current & Power gains and Input, Output Impedances.
9. To study the frequency response of RC coupled amplifier.
10. Measurement and study of Output characteristics of JFET.
11. Measurement and study of Output characteristics of MOSFET.
12. Study of SCR/Thyristor characteristics.
13. Study of UJT characteristics.
14. Study of Push-Pull amplifier.

NOTE:
At least ten experiments are to be performed from above list.

B.TECH IIIRD SEMESTER

ANALOG COMMUNICATION LAB
(ECE-207E)

L T P	Sessional : 25	Marks
- - 2	Viva : 25	Marks
	Total : 50	Marks
	Time : 3hrs.	

LIST OF EXPERIMENTS: -

1.   Study of AM Modulation/Demodulation
2.   Study of FM Modulation/Demodulation.
3.   Study of Diode detector and AGC.
4.   To study Sampling theorem.
5.   Sensitivity of a superhet Receiver.
6.   Selectivity of a superhet Receiver.
7.   Fidelity of a superhet Receiver.
8.   Study of Pulse Amplitude Modulation/Demodulation.
9.   Study of Pulse Width Modulation/Demodulation.
10.   Study of Pulse Position Modulation/Demodulation.

NOTE:

At least seven experiments are to be performed from above list and the concerned institution as per the scope
of the syllabus can set remaining three.

B.TECH IIIRD SEMESTER
DATA STRUCTURES LAB
(CSE-211E)

```
L    T    P                           Sessional :   50  Marks
–    –    3                           Exam :        25  Marks
                                      Total:        75Marks
                                      Duration of Exam: 3 Hrs.
```

1. Write a program to search an element in a two-dimensional array using linear search.
2. Using iteration & recursion concepts write programs for finding the element in the array using Binary Search Method
3.. Write a program to perform following operations on tables using functions only
   a) Addition   b) Subtraction c) Multiplication d) Transpose
4.. Write a program to implement Queue.
5. Write a program to implement Stack.
6. Write a program to implement the various operations on string such as length of string concatenation, reverse of a string & copy of a string to another.
7. Write a program for swapping of two numbers using 'call by value' and 'call by reference strategies.
8. Write a program to implement binary search tree.
   (Insertion and Deletion in Binary search Tree)
9. Write a program to create a linked list & perform operations such as insert, delete,   update, reverse in the link list
10 . Write the program for implementation of a file and performing operations such as insert, delete, update a record in the file.
11. Create a linked list and perform the following operation on it
    a) add a node   b) Delete a node
12. Write a program to simulate the various searching & sorting algorithms and compare   their timings for a list of 1000 elements.
13. Write a program to simulate the various graph traversing algorithms.
14 Write a program which simulates the various tree traversal algorithms.
15 Write a program to implement various Searching Techniques.
16 Write a program to implement Sorting Techniques.

   Note: At least 5 to 10 more exercises to be given by the teacher concerned.

Bachelor of Technology (Electronics & Communication, Electronics, Electronics & Instrumentation)
Common for (ECE, EC, E&I)
Scheme of studies / Examination
(Semester- 4)

Sl. No.	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P	Total	Theory	Sessional	Practical	Total	
1	MATH- 201E / HUM-201E	Mathematics III / Basics of Industrial Sociology, Economics & Management.	3	1	-	4	100	50	-	150	3
2	MAT-204E	Computational Techniques	3	1	-	4	100	50	-	150	3
3	ECE-202E	Electronics Instrumentation & Measurements	3	1	-	4	100	50	-	150	3
4	ECE-204E	Digital Electronics	3	1	-	4	100	50	-	150	3
5	EE-208E	Signals & Systems	3	1	-	4	100	50	-	150	3
6	ECE-206E	Fields & Waves	3	1	-	4	100	50	-	150	3
7	ECE-208E	Electronics Measurements Lab.	-	-	3	3	-	50	50	100	3
8	ECE-210E	Digital Electronics Lab.	-	-	3	3	-	50	25	75	3
9	MAT-206E	Computational Techniques Lab.	-	-	3	3	-	50	25	75	3
		TOTAL	18	6	9	33	600	450	100	1150	-

www.uniqueinstitutes.org

BASICS OF INDUSTRIAL SOCIOLOGY, ECONOMICS & MANAGEMENT

HUM – 201 E
L   T   P
3   1   -

Sessional   :   50   Marks
Theory   :   100   Marks
Total   :   150   Marks
Duration of Exam. :   3 Hrs.

UNIT-I

Meaning of social change, nature of social change, theories of social change. The direction of social change, the causes of social change, the process of social change. Factors of social change – the technological factors, the cultural factors, effects of technology on major social institutions, social need of status system, social relations in industry.

UNIT-II

Meaning of Industrial Economic, Production Function, its types, Least Cost Combination, Law of Variable Proportion, Laws of Return – Increasing, Constant & Diminishing.

Fixed & variable costs in short run & long run, opportunity costs, relation between AC & MC, U-shaped short run AC Curve.

Price & Output Determination under Monopoly in short run & long run. Price Discrimination, Price Determination under Discriminating Monopoly. Comparison between Monopoly & Perfect Competition.

UNIT – III

Meaning of Management, Characteristics of Management, Management Vs. Administration, Management – Art, Science & Profession, Fayol's Principles of Management.

Personnel Management – Meaning & Functions, Manpower – Process of Manpower Planning, Recruitment & Selection – Selection Procedure.

Training – Objectives & Types of Training, Various Methods of Training. Labour Legislation in India – Main provisions of Industrial disputes Act 1947;

UNIT – IV

Marketing Management – Definition & Meaning, Scope of Marketing Management, Marketing Research – Meaning, Objectives.

Purchasing Management – Meaning & Objectives, Purchase Procedure, Inventory Control Techniques.

Financial Management – Introduction, Objectives of Financial decisions, Sources of Finance.

Note : Eight questions are to be set taking two from each unit. The students are required to attempt five questions in all, taking at least one from each unit.

TEXT BOOKS :

1. "Modern Economic Theory" Dewett, K.K., S. Chand & Co.
2. "Economic Analysis" K.P. Sundharam & E.N. Sundharam (Sultan Chand & Sons).
3. "Micro Economic Theory" M.L. Jhingan (Konark Publishers Pvt. Ltd.).
4. "Principles of Economics" M.L. Seth (Lakshmi Narain Aggarwal Educational Publishers – Agra).
5. "An Introduction to Sociology", D.R. Sachdeva & Vidya Bhusan.
6. "Society – An Introductory Analysis", R.M. Maclver Charles H. Page.
7. "Principles and Practices of Management : R.S. Gupta; B.D. Sharma; N.S. Bhalla; Kalyani.

REFERENCE BOOKS

1. "Organization and Management : R.D. Aggarwal, Tata McGraw Hill.
2. Business Organization and Management : M.C. Shukla

L   T   P
3   1   -

THEORY   : 100   Marks
SESSIONAL : 50   Marks
TOTAL   :   150   Marks
TIME   : 3Hrs.

Part – A

1. Matrix Inversion: -

Gauss Elimination Method, Gauss Jordan Method, Crout's Method, Doolittle Method, Choleski's Method, Improvement in the accuracy of an inverse, The Escalator Method for Matrix Inversion, Inverse of a complex matrix.

2. Operational Research: -

Linear Programming Problems formulation, Solving linear programming problems using Graphical Method, Simplex Method, Dual Simplex Method.

Part –B Numerical Methods with Programming in Language 'C'

3. Numerical Solution of Algebraic & Transcendental equation: -

Bisection Method, Regula Falsi Method, Newton Raphson Method, Secant Method, Convergence of Secant Method, Rate of Convergence of Newton's Method & Condition of Convergence of Newton Raphson's Method.

4. Solution of Simultaneous Equations: -

Crout's Triangularisation Method, Jacobi's Iteration Method, Gauss Seidal Iteration Method, Relaxation Method, Newton's Method for Non Linear System of equation & Iterative Methods.

5. Numerical Solution of Ordinary Differential Equation: -

Picard's Method, Euler's Method, Modified Euler Method, Euler's Improved Method, Runge-Kutte Method, Milne's & Adams-Bashforth Predictor-Corrector Method.

Part – C

6. Finite Differences: -

Difference Operators, Newton Forward & Backward Interpolation formula, Gauss central difference formulae, Bessel & Stirling formulae, Lagrange's & Newton Divided Difference, Interpolation formula for unequal intervals, Numerical Differentiation,

Numerical **I**ntegration – Trapezoidal rule, Simpson's $1/3^{rd}$ Rule & $3/8^{th}$ rule, Weddle's Rule.

7. Difference Equations: -

Formation of Difference Equation, Solution of Linear Difference Equations.

NOTE:

Question paper is to be set in three parts taking at least two questions from each part of the syllabus. There will be a total of eight questions in all. Students will be required to attempt five questions selecting at least one question from each part.

Books Recommended: -

1. Numerical Methods for Scientific & Engineering Computation by M K.
   Jain, R.K. Jain, S.R.K. Iyengar, New Age Publications.
2. Numerical Analysis By Goel & Mittal, Pragati Prakashan.
3. Higher Engg. Mathematics by B. S. Grewal.
4. Mathematical Analysis in Engg. By Cang C. Mai
5. Numerical Mathematical Analysis by James B. Scarborough.

B.TECH IVTH SEMESTER
ELECTRONICS INSTRUMENTATION AND MEASUREMENTS
(ECE-202E)

L T P
3 1 -

THEORY   : 100 Marks
SESSIONAL : 50
TOTAL   : 150
TIME   : 3Hrs.

UNIT-I:
MEASUREMENT AND ERROR: Functional elements arid generalized configuration of a measuring Instrument, Characteristics of instruments, errors in measurements and their statistical analysis.
MEASUREMENT OF RESISTANCE: Wheat stone bridge, Carey-Foster Bridge, Kelvin double bridge, Measurement of Insulation resistance.

UNIT-II:
A-C BRIDGES: Maxwell Inductance bridge. Maxwell Inductance Capacitance Bridge, Anderson's Bridge, Hay's Bridge, De-Sauty's Bridge, Schering's bridge and Wein's bridge.
VOLTAGE INDICATING AND RECORDING DEVICES: Analog voltmeters and Potentiometers, Self balancing potentiometer and X-Y recorders, Galvanometers - Oscillographs, Cathode - Ray Oscilloscopes, Magnetic Tape Recorders.

UNIT-III:
ELECTRONIC INSTRUMENTS: Wave analyzer, Distortion meter: Q-meter, Measurement of Op-Amp parameters.
DIGITAL INSTRUMENTS: Digital Indicating Instruments, Comparison with analog type, digital display methods, digital methods of time and frequency measurements, digital voltmeters.

UNIT-IV:
TRANSDUCERS: Classification of Transducers, Strain Gauge, Displacement Transducers - Capacitive Transducers, LVDT, Piezo-electric Transducers, Temperature Transducers - resistance thermometer, Thermocouples and Thermistors, Liquid level measurement Low pressure (vacuum) measurement.
DATA ACQUISITION SYSTEMS: A to D and D to A converters, Analog and Digital Data Acquisition Systems, Multiplexing, Spatial Encoders, Telemetry.

TEXT BOOK:
A Course in Electrical and Electronics Measurements and Instrumentation: A.K. Sawhney; Dhanpat Rai & Sons.
REFERENCE BOOKS:
1. Electronics Instrumentation and Measurement Techniques: Cooper W.D & Helfrick A.D.; PHI
2. Doeblin E.O., Measurement Systems: Application & Design, Mc Graw Hill.
NOTE:
Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all.

DIGITAL ELECTRONICS
(ECE-204E)

L T P
3 1 -

THEORY	:	100	Marks
SESSIONAL	:	50	Marks
TOTAL	:	150	Marks
TIME	:3 HRS		

UNIT 1 FUNDAMENTALS OF DIGITAL TECHNIQUES:
Digital signal, logic gates: AND. OR, NOT. NAND. NOR- EX-OR, EX-NOR, Boolean algebra. Review of Number systems. Binary codes: BCD, Excess-3. Gray codes.
COMBINATIONAL DESIGN USING GATES:
Design using gates. Karnaugh map and Quine Mcluskey methods of simplification.
UNIT 2 COMBINATIONAL DESIGN USING MST DEVICES
Multiplexers and Demultiplexers and their use as logic elements. Decoders. Adders / Subtracters. BCD arithmetic Circuits. Encoders. Decoders / Drivers for display devices.
SEQUENTIAL CIRCUITS:
Flip Flops: S-R- J-K. T. D, master-slave, edge triggered, shift registers, sequence generators. Counters. Asynchronous and Synchronous Ring counters and Johnson Counter, Design of Synchronous and Asynchronous sequential circuits.
UNIT 3 DIGITAL LOGIC FAMILIES:
Switching mode operation of p-n junction, bipolar and MOS-devices. Bipolar logic families: RTL, DTL, DCTL. HTL, TTL, ECL, MOS, and CMOS logic families. Tristate logic. Interfacing of CMOS and TTL families.
UNIT 4 A/D AND D/A CONVERTERS:
Sample and hold circuit, weighted resistor and R -2 R ladder D/A Converters, specifications for
D/A converters. A/D converters: Quantization, parallel -comparator, successive approximation, counting type,
Dual-slope ADC, specifications of ADCs.
PROGRAMMABLE LOGIC DEVICES:
ROM, PLA. PAL, Introduction to FPGA and CPLDs.
TEXT BOOK:
1. Modem Digital Electronics (Edition III): R. P. Jain; TMH
REFERENCE BOOKS:
1. Digital Integrated Electronics: Taub & Schilling: MGH
2. Digital Principles and Applications: Malvino & Leach: McGraw Hill.
3. Digital Design: Morris Mano: PHI,

NOTE: Eight questions are to be set in all by the examiner taking at least one question from each unit. Students will be required to attempt five questions in all.

EE-208-E   SIGNAL AND SYSTEMS.

L   T   **Theory: 100 Marks**
3   1   Sessional: 50 Marks
                                                                 Total   : 150 Marks
                                                                 Time: 3 Hrs.

SIGNAL

UNIT-I

Types of signals:- Deterministic and Stochastic, periodic and a periodic, impulse functional sequences, analog and discrete, singular functions. Signal representation in terms of singular functions, orthogonal functions and their use in signal representation. Fourier series, Fourier and La-place transforms. Convolution theorem, geometrical interpretation and application.

UNIT-II

Probability concepts, random variable, pdf, cdf, moments, distributions, correlation functions. Characterization of stochastic signals.

Discretisation of analog signals – sampling, sampling theorem and its proof. Effect of under sampling, recovery of analog signals from sampled signal. Characterization of Discrete signals – in terms of impulse sequences, Z-transforms. Properties, inversion and applications of La-place, Fourier and Z-transforms.

SYSTEM

UNIT-III

Classification linear and non-linear, time invariant and time varying, Lumped and distributed. Deterministic and Stochastic. Casual and non causal, Analog and Discrete/Digital memory and memory less, 1 port and N – port, SISO, SIMO, MISO, MIMO.

UNIT-IV

System modeling in terms of differential, equations, state variables, difference equations and transfer functions.

Linear time invariant system properties, elementary idea of response determination to deterministic and stochastic signals. Concept of impulse response.

REF. BOOKS :

1. Fred J Taylor –"Principles of Signals and System", MGH.
2. Simon Haykins – "Signal & Systems", Wiley Eastern
3. A Papoulis – "Circuit and System" Modern Approach HRW

NOTE: Eight questions are to be set in total covering entire course selecting two questions each unit. Each question will be of equal marks Students will be required to attempt five questions in all, selecting at least one question from each unit.

<div align="center">

B.TECH IVTH SEMESTER
FIELDS & WAVES
(ECE-206E)

</div>

L T P   THEORY   : 100 Marks
3 1 -   SESSIONAL: 50 Marks
                                           TOTAL   : 150 Marks
                                           TIME   : 3 Hrs.

<div align="center">

UNIT-1

</div>

ELECTRIC FIELD AND CURRENT

Coulomb's law. Electric field intensity, field due to a continuous volume charge distribution, field of a line charge, field of a sheet of charge, electric flux density, Gauss's law and applications, electric potential, the dipole, current density, continuity of current, metallic conductors, conductor properties and boundary conditions, the method of images, the nature of dielectric materials, boundary conditions for perfect dielectric materials, capacitance of two wire line, Poisson's and Lap lace's equations, uniqueness theorem.

<div align="center">

UNIT-II

</div>

MAGNETIC FIELD AND MAXWELLI EQUATION

Biot - Savart law. Ampere's law, magnetic vector potentials, force on a moving charge, differential current element, force and torque on a closed circuit, the boundary conditions, the magnetic circuit, potential energy and forces on magnetic materials.

Faraday's law, Maxwell's equations in point form and integral form Maxwell's equations for sinusoidal variations, retarded potentials.

<div align="center">

UNIT-III

</div>

THE UNIFORM PLANE WAVE

Wave motion in free space and perfect dielectrics, plane waves in lossy dielectrics. The Poynting vector and power considerations, propagation in good conductors, skin effect, reflection of uniform plane waves, SWR.

UNIT-IV

<div align="center">

TRANSMISSION LINES AND WAVEGUIDES

</div>

The Transmission line equations, graphical methods, Smith chart, time-domain and frequency-domain analysis. TE, TM, TEM waves, TE and TM modes in rectangular and circular waveguides, cut-off and guide wavelength, wave impedance and characteristic impedance, dominant modes, power flow in waveguides, excitation of waveguides, dielectric waveguides.

REFERENCES:
1 Jordan E C & Balmain K G, Electromagnetic Waves and Radiating Systems, PHI.
2 David K. Chang, Field and Waves Electromagnetics, Addison Wesley.
3   Hayt W H JR., Engineering Electromagnetics, Tata McGraw Hill, Fifth edition.

NOTE:
Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all.

B.TECH IVTH SEMESTER
ELECTRONICS MEASUREMENTS LAB
(ECE-208E)

L T P   Sessional   : 50   Marks
- - 3   Viva   : 25   Marks
                                  Total   : 75   Marks
                                  Time   : 3hrs.

LIST OF EXPERIMENTS:

1. To measure the unknown Inductance in terms of capacitance and resistance by using Maxwell's Inductance bridge.
2. To measure unknown Inductance using Hay's bridge.
3. To measure unknown capacitance of small capacitors by using Schering's bridge.
4. To measure 3-phase power with 2-Wattmeter method for balanced and unbalanced bridge.
5. To measure unknown capacitance using De-Sauty's bridge.
6. To measure unknown frequency using Wein's frequency bridge.
7. To measure unknown low resistance by Kelvin's double bridge.
8. To test the soil resistance using Meggar (Ohmmeter).
9. To calibrate Energy meter using standard Energy meter.
10. To plot the B-H curve of different magnetic materials.
11. To calibrate the Voltmeter using Crompton Potentiometer.
12. To convert the Voltmeter into Ammeter using Potentiometer.
13. Insulation testing of cables using Digital Insulation Tester.

NOTE:
Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all.

<div align="center">

B.TECH IVTH SEMESTER
DIGITAL ELECTRONICS LAB
(ECE-210E)

</div>

L	T	P				
-	-	3	Sessional	:	50	Marks
			Viva	:	50	Marks
			Total	:	100	Marks
			Time	:	3hrs.	

LIST OF EXPERIMENTS:

1. Familiarization with Digital Trainer Kit and associated equipment.
2. Study of TTL gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.
3. Design and realize a given function using K-Maps and verify its performance.
4. To verify the operation of Multiplexer and Demultiplexer.
5. To verify the operation of Comparator.
6. To verify the truth table of S-R, J-K, T, D Flip-flops.
7. To verify the operation of Bi-directional shift register.
8. To design and verify the operation of 3-bit asynchronous counter.
9. To design and verify the operation of synchronous Up/down counter using J-K flip-flops & drive a seven-segment display using the same
10. To design and verify the operation of asynchronous Decade counter.
11. Study of TTL logic family characteristics.
12. Study of Encoder and Decoder.
13. Study of BCD to 7 segment Decoder.

NOTE:
Eight questions are to be set in all by the examiner taking two questions from each unit.
Students will be required to attempt five questions in all.

L T P   Sessional   : 50   Marks
- - 3   Viva   : 25   Marks
                                           Total   : 75   Marks
                                           Time   : 3hrs.

List of Experiments

- ▪ **The Source codes for the following problems are to develop by the students & results should be verified.**

1. Solution of Non-Linear Equation in single variable using the method of successive Bisection.
2. Solution to non-linear equation in single variable using the Newton-Raphons method.
3. Solution to non linear equation in single variable using the Secant method.
4. Solution to a system of simultaneous algebraic equations using the Gaussian elimination procedure.
5. Solution to a system of simultaneous algebraic equations using the Gauss-Seidel iterative method.
6. Numerical solution to an ordinary differential equation using the Eulers method.
7. Numerical solution to an ordinary differential equation using the Range-Kutta Method.
8. Numerical solution to an ordinary differential equation using the Predictor Corrector Method.
9. Numerical Solution to the Laplace equation using the method of finite differences.
10. Solution to system of simultaneous equations using Gauss-Seidal iterative method employing the technique of successive relaxation.

NOTE:
At least eight experiments are to be performed from above list and the concerned institution as per the scope of the syllabus can set remaining two.

Bachelor of Technology (Electronics and Communication Engg.)
Scheme of Courses/Examination
(5 th SEMESTER)

Sl. No.	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P/D	Tot	Th	Sess	P/VV	Tot	
1	ECE-301E	Antenna and Wave Propagation	3	2	-	5	100	50	-	150	3
2	ECE-303E	Computer Hardware Design	3	1	-	4	100	50	-	150	3
3	ECE-305E	Information Theory and Coding	4	1	-	5	100	50	-	150	3
4	ECE-307E	Linear IC Applications	3	2	-	5	100	50	-	150	3
5	ECE-309E	Micro-Electronics	4	1	-	5	100	50	-	150	3
6	ECE-311E	Microprocessors & Interfacing	3	2	-	5	100	50	-	150	3
7	ECE-313E	Linear Integrated Circuits(Pr)	-	-	3	3	-	50	25	75	3
8	ECE-315E	Microprocessors (Pr)	-	-	3	3	-	50	25	75	3
9	ECE-317E	Training Report	-	-	-	-	-	100	-	100	3
		Total	20	9	6	35	600	500	50	1150	

B.TECH Vth SEMESTER
ANTENNA AND WAVE PROPAGATION
(ECE-301E)

L   T   P
3   2   -

Theory   :   100
Sessional :   50
Time   :   3Hrs

UNIT – I
BASIC PRINCIPLES AND DEFINITIONS: Retarded vector and scalar potentials. Radiation and induction fields. Radiation from elementary dipole (Hertzian dipole, short dipole, Linear current distribution), half wave dipole, Antenna parameters : Radiation resistance, Radiation pattern, Beam width, Gain, Directivity, Effective height, Effective aperture, Bandwidth and Antenna Temperature.

UNIT – II
RADIATING WIRE STRUCTURES AND ANTENNA ARRAYS: Folded dipole ,   Monopole, Biconical Antenna, Loop Antenna, Helical Antenna. Principle of pattern multiplication, Broadside arrays, Endfire arrays, Array pattern synthesis, Uniform Array, Binomial Array, Chebyshev Array, Antennas for receiving and transmitting TV Signals e.g. Yagi-Uda and Turnstile Antennas.

UNIT – III
APERTURE TYPE ANTENNAS: Radiation from rectangular aperture, E-plane Horns, H-plane Horns, Pyramidal Horn, Lens Antenna, Reflector Antennas .
BROADBAND AND FREQUENCY INDEPENDENT ANTENNAS : Broadband   Antennas. The frequency independent concept : Rumsey's principle, Frequency independent planar log spiral antenna, Frequency independent conical spiral antenna and Log periodic antenna.

UNIT – IV
PROPAGATION OF RADIO WAVES : Different modes of propagation, Ground waves, Space waves, Surface waves and Tropospheric waves, Ionosphere, Wave propagation in the ionosphere, critical frequency, Maximum Usable Frequency (MUF), Skip distance, Virtual height, Radio noise of terrestrial and extra terrestrial origin. Multipath fading of radio waves.

NOTE

    The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Suggested Books:

1.   Robert E.Collin, Antenna & Wave Propagation, McGraw Hill
2.   John D. Kraus, Antennas, McGraw Hill.
3.   E.C.Jordan and K.G.Balmain, Electromagnetic Waves and Radiating Systems, PHI

B.TECH Vth SEMESTER
COMPUTER HARDWARE DESIGN
(ECE-303E)

L   T   P
3   1   -

Theory   :   100
Sessional :   50
Time   :   3Hrs

UNIT-I
BASIC STRUCTURE OF COMPUTER HARDWARE AND SOFTWARE :
Functional Units, historical Perspective, Register transfer and micro-operations.   Information representation, Instruction format, Instruction types, Addressing   modes, Machine and Assembly Language programming, Macros and Subroutines.

UNIT-II
PROCESSOR DESIGN: Fixed – point and floating-point arithmetic addition, subtraction, Multiplication and division, Decimal arithmetic unit – BCD adder, BCD subtraction, decimal arithmetic operations, ALU design, Forms of Parallel processing classification of Parallel structures, Array Processors, Structure of general purpose Multiprocessors.
CONTROL DESIGN:
Hardwired Control: design methods, Multiplier Control Unit, CPU Control unit, Microprogrammed Control: basic concepts, Multiplier Control Unit, Microprogrammed Computers, CPU Control unit.

UNIT-III
MEMORY   ORGANIZATION: Memory   device   characteristics, Random   access   memories: semiconductor RAMS, Serial – access Memories – Memory organization, Magnetic disk memories, Magnetic tape memories, Optical memories, Virtual memory, Main Memory Allocation, Interleaved memory, Cache Memory, Associative Memory.

UNIT-IV
SYSTEM ORGANIZATION: Input-Output Systems, Programmed IO, DMA and Interrupts,   IO Processors,   Interconnection networks – single bus,   crossbar   networks,   multistage   networks, hypercube networks, mesh networks, Tree networks, ring networks, Pipelining – basic concept.

NOTE

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Suggested Books:
1.   J.P.Hayes, Computer Architecture and Organization, Mc Graw Hill.
2.   M.M. Mano , Computer System Architecture, PHI.
1.   V.C.Hamacher, Z.G.Vianesic & S.G.Zaky, Computer Organization , Mc-Graw Hill.

B.TECH Vth SEMESTER
INFORMATION THEORY AND CODING
(ECE-305E)

L   T   P
4   1   -

Theory   :   100
Sessional :   50
Time   :   3

hrs.

UNIT – I

PROBABILITY AND RANDOM PROCESSES : Probability, random variables, Probability distribution and density functions, Joint Statistics, Conditional Statistics, independence, Functions of random variables & random vectors, Expectation, moments, Characteristic Functions, Convergence of a sequence of random variables, Central Limit Theorem, Random Processes, mean and Auto Correlation, Stationary ergodicity, Power Spectral density, Response of memory- less and linear systems, Gaussian Poisson, Markov processes.

UNIT – II

ELEMENTS OF INFORMATION THEORY AND SOURCE CODING: Introduction, information as a measure of uncertainty, Entropy, its properties, Discrete memoryless channels, Mutual information, its properties, BSC, BEC. Channel capacity, Shanon's theorem on coding for memoryless noisy channels. Separable binary codes, Shanon–Fano encoding, Noiseless coding, Theorem of decodability, Average length of encoded message, Shanon's binary encoding, Fundamental theorem of discrete noiseless coding, Huffman's minimum redundancy codes.

UNIT – III

LINEAR BLOCK CODES: Introduction to error control coding, Types of codes, Maximum Likelihood decoding, Types of errors and error control strategies, Galois fields, Linear block codes, Error detecting and correcting capabilities of a block code, Hamming code, cyclic code, B.C.H. codes.

UNIT – IV

CONVOLUTIONAL CODES AND ARQ: Transfer function of a convolutional code, Syndrom decoding, Majority logic decodable codes, Viterbi decoding, distance properties of binary convolutional codes, Burst error correcting convolutional codes, general description of basic ARQ strategies, Hybrid ARQ schemes.

NOTE

        The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Suggested Books:

1.   Papoulis, A. Probability, Random Variables and Stochastic Processes, MGH.
2.   Gray, R.M. Davission,L.D,Introduction to Statistical Signal Processing-
         Web Edition-1999.
3.   F. M. Reza, Information Theory, McGraw Hill.
4.   Das, Mullick and Chatterjee, Digital Communication, Wiley Eastern Ltd.
5.   Shu Lin and J. Costello, Error Control Coding, Prentice Hall.
6.   B. R. Bhat, Modern Probability Theory, New Age International Ltd.

Linear IC Applications
(ECE-307E)

L   T   P
3   2   -

Theory   :   100
Sessional :   50
Time   :   3Hrs

UNIT-I

DIFFERENTIAL AND CASCADE AMPLIFIERS: Balanced, unbalanced output differential amplifiers, FET differential amplifier, current mirrors, level Translators, cascade configuration of amplifiers, operational amplifiers, Introduction to ideal OP-AMP, characteristic parameters, Practical OP-AMP, its equivalent circuit and op-amp circuit configurations.

UNIT-II

OP-AMP WITH NEGATIVE FEEDBACK AND FREQUENCY RESPONSE: Block diagram representation of feedback amplifier, voltage series feedback, voltage shunt feedback differential amplifiers, frequency response compensating network, frequency response of internally compensative op-amp and non compensating op-amp. High frequency op-amp equivalent circuit, open loop gain V/s frequency, closed loop frequency response, circuit stability, slew rate.

UNIT-III

OP-AMP APPLICATION: DC, AC amplifiers, peaking amplifier, summing, scaling, averaging and instrumentation amplifier, differential input output amplifier, voltage to current converter, current to voltage converter, very high input impedance circuit, integration and differential circuit, wave shaping circuit, active filters, oscillators

UNIT-IV

SPECIALIZED LINER IC APPLICATIONS: 555 timer IC (monostable & astable operation) & its applications , Universal active filter, PLL, power amplifier, 8038 IC.

NOTE

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Suggested Books:

1.   R.A. Gayakwaed , OP-amps and Linear Integrated circuits .
2.   K.R.Botkar , Integrated circuits.

B.TECH Vth SEMESTER
MICRO-ELECTRONICS
(ECE-309E)

L   T   P
4   1   -

Theory   :   100
Sessional :   50
Time   :   3Hrs

UNIT-I:
Crystal Growth: MGS, EGS, Czochralspi crystal Puller, Silicon shaping, Wafer Preparation.
Oxidation: Thermal Oxidation Kinetics, Oxidation Techniques, Oxide Properties, Oxidation induced defects. Thin film deposition techniques: Epitaxy, VDE, CVD, PECVD, MOCVD, PVD, Sputtering , MBE and epitaxial layer evaluations.

UNIT-II:
LithoGraphy, Photolithography, E-beam lithography, X-ray Lithography, reactive Plasma Etching, Plasma Properties, Feature Size control and anisotropic etching, Plasma etching techniques and equipment.

UNIT-III:
Diffusion : A Qualitative view of atomic diffusion in Solids, diffusion mechanisms, Fick's one dimensional diffusion equation, constant source and limited source diffusion, Diffusion of Grp3 and 5 impurities in Silicon Impurity Sources, diffusion apparatus, Characterization of diffused layers.
Ion Implantation: Introduction, Range Theory, Implantation Equipment, Annealing.

UNIT-IV:
Isolation Techniques, Bipolar IC fabrication Process Sequence,   N-MOS IC fabrication Process Sequence.
C-MOS IC fabrication Process Sequence .Assembly & Packaging: Package Types,   design considerations, Package fabrication technologies, Future trends reference to MEMS packaging.

NOTE:
   The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Suggested Books:

1.   S.M.Sze,   VLSI Technology, Mc Graw Hill.
2.   S.K.Ghandhi, VLSI Fabrication Principles.

B.TECH Vth SEMESTER
MICROPROCESSORS & INTERFACING
(ECE-311E)

L T P   Theory   :   100
4 1 -   Sessional :   50
                                                           Time   :   3Hrs

UNIT-I:

INTRODUCTION : Evolution of microprocessors, technological trends in microprocessor development. The Intel family tree. CISC Versus RISC. Applications of Microprocessors.

8086 CPU ARCHITECTURE : 8086 Block diagram; description of data registers, address registers; pointer and index registers, PSW, Queue, BIU and EU. 8086 Pin diagram descriptions. Generating 8086 CLK and reset signals using 8284. WAIT state generation. Microprocessor BUS types and buffering techniques, 8086 minimum mode and   maximum mode CPU module.

UNIT-II:

8086 INSTRUCTION SET : Instruction formats, addressing modes, Data transfer instructions, string instructions, logical instructions, arithmetic instructions, transfer of control instructions; process control instructions; Assembler directives.

8086   PROGRAMMING TECHNIQUES : Writing assembly Language programs for logical processing, arithmetic processing, timing delays; loops, data conversions. Writing procedures; Data tables, modular programming. Macros.

UNIT-III:

MAIN MEMORY SYSTEM DESIGN : Memory devices, 8086 CPU Read/Write timing diagrams in minimum mode and maximum mode. Address decoding techniques. Interfacing SRAMS; ROMS/PROMS.   Interfacing and refreshing DRAMS. DRAM Controller – TMS4500.

UNIT-IV:

BASIC I/O INTERFACE : Parallel and Serial I/O Port design and address decoding. Memory mapped I/O   Vs Isolated I/O Intel's   8255 and 8251 description and interfacing with 8086. ADCs and DACs, - types, operation and interfacing with 8086. Interfacing Keyboards, alphanumeric displays, multiplexed displays, and high power devices with 8086.

INTERRRUPTS AND DMA : Interrupt driven I/O. 8086 Interrupt mechanism; interrupt types and interrupt vector table. Intel's 8259. DMA operation. Intel's 8237. Microcomputer video displays.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Suggested Books:

1.   D.V.Hall , Microprocessors and Interfacing , McGraw Hill 2nd ed.
2.   J Uffenbeck , The 8086/8088 family , (PHI).
3.   Liu,Gibson , Microcomputer Systems – The 8086/8088 family, (2nd Ed-PHI).

B.TECH Vth SEMESTER
LINEAR INTEGRATED CIRCUITS (Pr.)
(ECE-313E)

L   T   P   Exam   :   25
-   -   3   Sessional :   50
                                               Time   :   3Hrs

1.   To study OP-AMP as adder and sub tractor circuits(IC-741).
2.   To study clipping circuits using OP-AMP(IC-741).
3.   To study clamping circuits using OP-AMP(IC-741).
4.   To study OP-AMP as Schmitt trigger(IC-741).
5.   To study an instrumentation amplifier using OP-AMP(IC-741).
6.   Study of current to voltage and voltage to current converter using OP-AMP(IC-741).
7.   To study Astable multivibrator circuit using timer IC-555.
8.   To study monostable multivibrator circuit using timer IC-555.
9.   To study Voltage Controlled Oscillator using timer IC-555.
10.   To study Frequency divider using IC-555.
11.   To design 2nd order low pass butterworth filter.
12.   To design order high pass butterworth filter.

NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope

B.TECH Vth SEMESTER
MICROPROCESSORS (Pr.)
(ECE-315E)

L   T   P
-   -   3

Exam   :   25
Sessional :   50
Time   :   3Hrs

Before starting with the experiments, teacher should make the students conversant with the following essential theoretical concepts.

A.   i) Programming Model of Intel's 8086.
      ii) Addressing Modes of Intel's 8086.
      iii) Instruction formats of Intel's 8086

B.   Instruction set of Intel's 8086.
C.   Assembler , and Debugger.

LIST OF EXPERIMENTS:
I   a) Familiarization with 8086 Trainer Kit.
      b) Familiarization with Digital I/O, ADC and DAC Cards.
      c) Familiarization with Turbo Assembler and Debugger S/Ws.

II   Write a program to arrange block of data in
      i) ascending and (ii) descending order.

III   Write a program to find out any power of a number such that $Z = X^N$.
      Where N is programmable and X is unsigned number.

IV   Write a program to generate.
      i) Sine Waveform   (ii) Ramp Waveform (iii) Triangular Waveform Using DAC Card.

V   Write a program to measure frequency/Time period of the following functions.
      (i) Sine Waveform (ii) Square Waveform   (iii) Triangular Waveform
      using ADC Card.

VI   Write a program to increase, decrease the speed of a stepper motor and reverse its direction of
      rotation using stepper motor controller card.

VII   write a programmable delay routine to cause a minimum delay = 2MS and a maximum delay
      = 20 minutes in the increments of 2 MS

VIII a) Use DOS interrupt to read keyboard string/character.
      b) Use BIOS interrupt to send a string/character to printer.

IX   Write a program to :
      i)   Create disk file.
      ii)   Open, write to and close- a disk file.
      iii)   Open, read from and close a disk file.
      iv)   Reading data stamp of a file using BIOS interrupt.

X   i)   Erasing UVPROMs and EEPROMs
      ii)   Reprogramming PROMs using computer compatible EPROM Programmer.
XI   Studying and Using 8086 In-Circuit Emulator.

**NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either
be performed from the above list or designed & set by concerned institution as per the scope of syllabus.**

Bachelor of Technology (Electronics and Communication Engg.)
Scheme of Courses/Examination
(6 Th SEMESTER)

Sl. No.	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam (Hours)
			L	T	P/D	Tot	Th	Sess	P/VV	Tot	
1	HUT-302E	Fundamentals of Management	3	1	-	4	100	50	-	150	3
2	ECE-302E	Control System Engineering	4	1	-	5	100	50	-	150	3
3	ECE-304E	VHDL & Digital Design	3	1	-	4	100	50	-	150	3
4	ECE-306E	Digital Signal Processing	3	2	-	5	100	50	-	150	3
5	ECE-308E	Digital Communication	3	1	-	4	100	50	-	150	3
6	ECE-310E	Computer Communication Networks	3	1	-	4	100	50	-	150	3
7	ECE-312E	Digital Communication (Pr)	-	-	3		-	50	25	75	3
8	ECE-314E	Electronic Design (Pr)	-	-		3	-	50	25	75	3
9	ECE-316E	VHDL (Pr)	-		3	3	-	50	50	100	3
		Total	19	7	9	35	600	450	100	1150	

FUNDAMENTALS OF MANAGEMENT
HUT-302E

L   T   Theory   : 100 Marks
3   1   Sessionals : 50 Marks
                                                                          Total   : 150 Marks
                                                                          Time   : 3 hours

UNIT-I   **Financial Management**
              Introduction of Financial Management, Objectives of Financial Decisions, Status and
              duties of Financial Executives. Financial Planning – Tools of financial planning.
              Management of working capital, Factors affecting requirements of working capital.
              Capital structure decisions. Features of appropriate capital structure. Sources of
              finance.

UNIT-II   **Personnel Management**
              Personnel Management – Meaning, Nature and Importance; Functions of Personnel
              Management – (a) Managerial Functions and (b) Operative functions. Job Analysis:
              Meaning and Importance; Process of Job Analysis; Job Description and Job
              specification. Human Resource Development-Meaning and concept.

UNIT-III   **Production Management**
              Production Management : Definition and Objectives.
              Plant location: Ideal plant location. Factors affecting plant location.
              Plant Layout : Ideal plant layout, factors affecting plant layout.
              Work Measurement : Meaning, Objectives and Essentials of work
              Measurement.
              Production Control : Meaning and importance of production control and steps
                                   involved in production control.

UNIT-IV   **Marketing Management**
              Nature, scope and importance of marketing management.   Modern Marketing
              concepts. Role of marketing in economic development. Marketing Mix. Marketing
              Information System. Meaning, nature and scope of International Marketing.

NOTE :

The question paper shall have eight questions in all organized into four sections, each section
having two questions from each of the four units. The candidate shall have to attempt five questions
in all , selecting at least one question from each unit.

Suggested Books:
1.   Business Environment – Francis Charurilam (Himalaya Publishing House).
2.   Management – Harold, Koontz and Cyrilo' Donell (Mc Graw Hill)
3.   Principles of Personnel Management – Edwin B. Flippo (Mc Graw Hill)
4.   Personnel Management and Industrial Relations – D.C. Sharma and R.C. Sharma)
                                                              (SJ Publications, Meerut)
5.   Basic Marketing – Cundiff and Still (PHI, India)
6.   Marketing Management – S.A. Sherlekar (Himalaya Publishing House Bombay)
7.   Principles and Practice of Management – L.M. Prasad
8.   Financial Management – I.M. Pandey (Vikas Publishing House, New Delhi)
9.   International Marketing – Vorn terpestre and Ravi Sasathy.
10.   Production Management – E.S. Buffa & W. H. Tausart, Richard D. Irwin,
                              Homewood, Illionis.
11.   Personnel Management – C.B. Mamoria, (Himalaya Publishing House)

CONTROL SYSTEM ENGINEERING
(ECE-302E)

L T P   Theory   :   100
4   1 -   Sessional :   50
                                                             Time   :   3Hrs

UNIT-I :

INTRODUCTION: The control system-open loop & closed loop, servomechanism, stepper motor.
MATHEMATICAL MODELS OF PHYSICAL SYSTEMS: Differential equation of physical systems, transfer function, block diagram algebra, signal flow-graphs , Mason's formula & its application.
FEEDBACK CHARACTERISTICS OF CONTROL SYSTEMS: Feedback and non-feedback systems, Effects of feedback on sensitivity (to parameter variations), stability, overall gain etc.

UNIT-II:

TIME RESPONSE ANALYSIS: Standard test signals, time response of first order and second order systems, steady-state errors and error constants, design specification of second-order-systems.
STABILITY:The concept of stability ,necessary conditions for stability, Hurwitz stability criterion, Routh stability criterion, Relative stability analysis.
THE ROOT LOCUS TECHNIQUE:The Root locus concept, construction /development of root loci for various systems, stability considerations.

UNIT-III:

FREQUENCY RESPONSE & STABILITY ANALYSIS: Correlation between time and frequency response, Polar Plots, Nyquist plots, Bode Plots, Nyquist stability criterion, Gain margin & Phase margin, relative stability using Nyquist Criterion, frequency response specifications.

UNIT-IV:

COMPENSATION OF CONTROL SYSTEMS: Necessity of compensation, Phase lag compensation, phase lead compensation , phase lag lead compensation, feedback compensation .
STATE VARIABLE ANALYSIS : Concept of state,state variable and state model, state models for linear continuous time systems, diagonalization solution of state equations, concept of controllability and observability.

NOTE :

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

TEXT BOOK:
1. Control System Engg : I.J.Nagrath & M.Gopal; New Age India.

Reference Books:

1. Automatic Control Systems : B.C.Kuo; PHI.
2. Modern Control Engg : K.Ogata; PHI.
3. Control Systems: Principles & Designing : Madan Gopal; TMH.

B.TECH V1th SEMESTER
VHDL AND DIGITAL DESIGN
(ECE-304E)

L   T   P   Theory   :   100
3   1   -   Sessional :   50
                                                      Time   :   3Hrs

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, macrocell 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, process statement, variable assignment, signal assignment. Wait, If, Case, Null, Loop, Exit, Next and Assertion statements. Inertial and transport delays, Simulation deltas, Signal drivers.
DATA FLOW AND STRUCTURAL MODELLING:Concurrent signal assignment, sequential signal assignment,   Multiple drivers, conditional signal assignment, selected signal assignment, block statements, concurrent assertion statement, component declaration, component instantiation.

UNIT III:

GENERICS AND CONFIGURATIONS :Generiecs,   Why configurations ?, default configurations, component configurations. Generiecs in configuration. Generic value specification in architecture, block configurations, architecture configurations.
SUBPROGRAMS AND PACKAGES :Subprograms – functions, procedures, declarations. Package declarations, package body, use clause, predefinal package standard. Design libraries, design file.

UNIT IV:

ADVANCED TOPICS :Generate Statements, Aliases, Qualified expressions, Type conversions, Guarded signals, User defined attributes, Predefined attributes., VHDL synthesis.

NOTE:

   The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Suggested Books:

    1.   D. Perry , VHDL, 3rd Ed.- TMH.
    2.   J.Bhasker, A.VHDL- Primer, PHI.
    3.   Skahil, VHDL for Programmable logic- 2nd Ed – Wiley.

B.TECH V1 SEMESTER
DIGITAL SIGNAL PROCESSING
(ECE- 306E)

L   T   P
3   2   -

Theory   :   100
Sessional :   50
Time   :   3Hrs

UNIT – I:
DISCRETE TRANSFORMS: Z- transform and its properties, Inversion of Z-transform, One sided Z-transform and solution of differential equations. Analysis of LTI systems in Z-domain, causality, stability, schur-cohn stability test; relationship between Z-transform and Fourier transform. Frequency selective filters; all pass filters, minimum-phase, maximum-phase and mixed-phase systems.
Frequency domain sampling and DFT; properties of DFT, Linear filtering using DFT, Frequency analysis of signals using DFT, radix 2, radix-4, goertzel algorithm, Chirp Z-transform, applications of FFT algorithm, computation of DFT of real sequences. Quantization effects in computation of DFT.

UNIT – II:
IMPLEMENTATION OF DISCRETE TIME SYSTEMS: Direct form, cascade form, frequency sampling and lattice structures for FIR systems. Direct forms, transposed form, cascade form parallel form. Lattice and lattice ladder structures for IIR systems. State space structures Quantization of filter co-efficient structures for all pass filters.

UNIT – III:
DESIGN OF FIR FILTERS: Characteristics of practical frequency selective filters. Filters design specifications peak pass band ripple, minimum stop band attenuation. Four types of FIR filters Design of FIR filters using windows. Kaiser window method comparison of design methods for FIR filters Gibbs phenomenon, design of FIR filters by frequency sampling method, design of optimum equiripple FIR filters, alternation theorem.

UNIT – IV:
DESIGN OF IIR FILTERS: Design of IIR filters from analog filters, Design by approximation of derivatives, Impulse invariance method bilinear transformation method characteristics of Butterworth, Chebyshev, and Elliptical analog filters and design of IIR filters, Frequency transformation, least square methods, design of IIR filters in frequency domain.

NOTE:
   The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Suggested Books:
   1.   John G. Proakis, Digital Signal Processing,   PHI
   2.   S. K. Mitra, Digital Signal Processing , TMH
   3.   Rabiner and Gold, Digital Signal Processing, PHI
   4.   Salivahan, Digital Signal Processing , TMH
   5.   Digital Signal Processing: Alon V. Oppenhelm;PHI

B. TECH. VI SEMESTER
DIGITAL COMMUNICATION
(ECE-308E)

L T P
3 1 -

Theory : 100
Sessional : 50
Time : 3Hrs

UNIT – I:
PULSE MODULATION: sampling process, PAM and TDM; aperture effect. PPM noise in PPM, channel Bandwidth, Recovery of PAM and PPM signals Quantization process, quantization noise, PCM, μ Law and A- law compressors. Encoding, Noise in PCM, DM, delta sigma modulator, DPCM, ADM.

UNIT – II:
BASE BAND PULSE TRANSMISSION: Matched filter and its properties average probability of symbol error in binary enclosed PCM receiver, Intersymbol interference, Nyquist criterion for distortionless base band binary transmission, ideal Nyquist channel raised cosine spectrum, correlative level coding Duo binary signalling, tapped delay line equalization, adaptive equalization, LMS algorithm, Eye pattern.

UNIT – III:
DIGITAL PASS BAND TRANSMISSION: Pass band transmission model; gram Schmidt orthogonalization procedure, geometric Interpretation of signals, Response of bank of correlaters to noise input, detection of known signal in noise, Hierarchy of digital modulation techniques, BPSK, DPSK, DEPSK, QPSK, systems; ASK, FSK, QASK, Many FSK, MSK, Many QAM, Signal space diagram and spectra of the above systems, effect of intersymbol interference, bit symbol error probabilities, synchronization.

UNIT – IV:
SPREAD SPECTRUM MODULATION: Pseudonoise sequence, A notion of spread spectrum, direct sequence spread spectrum with coherent BPSK, signal space dimensionality & processing gain, probability of error, frequency spread spectrum, CDM.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Suggested Books:

1. John G. Proakis, Digital Communication, PHI
2. Taub & Schilling, Principles of Communication, TMH
3. Simon Haykin, Communication systems, John Wiley & Sons

B.TECH V1 SEMESTER
COMPUTER COMMUNICATION NETWORKS
(ECE-310E)

L   T   P   Theory :   100
3   1   -   Sessional :   50
                                                     Time   :   3Hrs
                          .

UNIT – I:
INTRODUCTION: Uses of Computer Networks, Network Hardware, Network Software, Reference models, Examples of Networks & Data communication Services, Network Standardization.
THE PHYSICAL LAYER: The Theoretical basis for Data communication, Transmission media, Wireless Communication, The Telephone System, Narrowband ISDN, Broadband ISDN and ATM, Cellular Radio, Communication Satellites.

UNIT – II:
THE DATA LINK LAYER: Data Link Layer Design issues,   Error Detection & correction, Elementary Data Link protocols, Sliding Window Protocols, Protocol Specification & Verification, Example of Data Link Protocols.
THE MEDIUM ACCESS SUBLAYER: Aloha Protocols, LAN Protocols, IEEE Standards, Fiber optic Networks, Satellite Networks, Packet switching, radio Networks.

UNIT – III:
NETWORK   LAYER: Design issues, routing algorithms, congestion control Algorithms, internetworking.
TRANSPORT & SESSION LAYER: Protocol design issues, connection Management, remote procedure calls.

UNIT – IV:
PRESENTATION LAYER: Design issues, abstract Syntax notation, data compression technique, cryptograph.
APPLICATION LAYER: Design issues, file transfer, access and management, electronic mail, virtual terminals, applications and examples.

Suggested Books:

1.   Tanenbaum A.S, Computer Networks, PHI.
2.   Forouzan B.A, Data Communications and Networking, Tata-Mc-Graw Hill.
3.   Stallings W, Data and Computer Communications, PHI.
4.   Ahuja V, Design and Analysis of Computer Communication, McGraw Hill.
5.   Bee K.C.S, Local Area Networks, NCC Pub.
6.   Davies D. W. Barber, Computer Networks and their Protocols, John Wiley.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

B.TECH VI SEMESTER
DIGITAL COMMUNICATION PRACTICAL
(ECE-312E)

L   T   P
-   -   3

Sessional :   50
Viva   :   25
Time   :   3Hrs

LIST OF EXPERIMENTS:

1.   To Study PSK

2.   To Study FSK

3.   To Study IF Amplifier

4.   To Study Balanced Modulator & Demodulator

5.   To Study PCM

6.   Setting up a Fiber Optic Analog Link

7.   Setting up a Fiber Optic Digital Link

8.   Losses in Optical Fiber

9.   Measurement of Numerical Aperture

10. Time Division multiplexing of signals

NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope

B.TECH V1th SEMESTER
ELECTRONICS DESIGN PRACTICAL
(ECE-314E)

L   T   P
-   -   3

Exam   :   25
Sessional :   50
Time   :   3Hrs

LIST OF EXPERIMENTS:

1.   Design a single stage R C Coupled amplifier and plot its gain frequency response.

2.   Design a two stage R C Coupled amplifier and plot its gain frequency response.

3.   Design a R C Phase shift oscillator using IC 741.

4.   Design a wein bridge oscillator.

5.   Design a square wave generator using IC 555.

6.   Design a 4 : 1 multiplexer and 1 : 4 demultiplexer using logic gates.

7.   Design a parallel parity bit generator using ICs.

8.   Design a digital to analog converter using ICs.

9.   Design a digital frequency meter (0-999HZ) using IC 555 for monoshot, IC-7404,7408,7490,7447.

10.   Design a controller such that LEDs glow in pairs sequentially using IC 7490 and LEDs.

NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be performed from the above list or designed & set by concerned institution as per the scope

VHDL PRACTICAL
(ECE-316E)

L   T   P
-   -   3

Exam   :   50
Sessional :   50
Time   :   3Hrs

LIST OF EXPERIMENTS:

1.   Write a VHDL Program to implement a 3 :8 decoder.

2.   Write a VHDL Program to implement a 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. Write a program to design a 2 bit ALU containing 4 arithmetic & 4 logic operations.

NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may
either be performed from the above list or designed & set by concerned institution as per the scope

HARYANA COLLEGE OF TECHNOLOGY & MANAGEMENT,KAITHAL
DEPARTMENT OF ELECTRONICS & COMMUNICATION
ENGINEERING

Scheme of examination for B.Tech Degree Course
Seventh Semester Examination

S.No	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exam(Hours)
			L	T	P/D	TOT	TH	SESS	P/VV	TOT	3
1	-	Departmental Elective -I	3	1		4	100	50		150	3
2	-	Departmental Elective-II	3	2		5	100	50	-	150	3
3	ECE-40IE	VLSI Design	3	2	-	5	100	50		150	-
4	ECE-403E	Television Engineering.	4	I		5	100	50		150	3
5	ECE-405E	Optical Communication	4	1	-	5	100	50		I5O	3
6	ECE-407E	Microwave Engineering.	3	2	-		100	5O		I5O	3
7	ECE-409E	Digital Signal Processing (Pr)				3		50	25	75	3
8	ECE-411 E	Minor Project	-		3	3	-	75	50	125	3
9	ECE-413E	Practical Training. Report	-					75		75	-
		Total	20	9	6	35	600	500	75	1175	

<u>DEPARTMENTAL Electives</u>   <u>DEPARTMENTAL Electives-II</u>

1	ECE-415E	Micro-controller	ECE-423E	Advanced Microprocessor	
2	ECE-417E	Bio Medical Signal Processing	ECE-425E	Artificial Intelligence and Export Systems	
3	ECE-419E	Reliability	ECE-427E	Power Electronics	
4	ECE-421E	Nanotechnology			

B.Tech 7th Sem
VLSI DESIGN
(ECE-401E)

L	**T**	**P**		**Theory: 100**
3	**2**	**-**		**Sessional : 50**
				Time: 3 Hrs

UNIT-1 :

NMOS & CMOS Fabrication Process Sequence, Basic electrical properties of NMOs & CMOS inverters, MOS Design Process: Stick Diagram & Design rules.

UNIT- 2

Delay in MOS Circuits, Scaling of MOS Circuits, Some design examples, inverter, NAND gates, Multiplexer, Logic Function Block.Introduction to physical design of IC's Layout rules & circuit abstractor, Cell generation, Layout environments, Layout methodologies, Packaging, Computational Complexity, Algorithmic Paradigms.

UNIT 3:

Placement: Partitioning, Floor planning, Placement.
Routing: Fundamentals, Global Routing, Detailed Routing, Routing in FPGA's.

UNIT-4:

Perfoffi1ance issues in Circuit Layout Delay models, Timing Driven Placement, Timing Driven Routing, Via Minimization, Power Minimization, other issues.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Suggested Books:

1. Puchnell DA & Eshraghian K, Basic VLSI Design , PHI
2. Sanfarazdeh M. & Wong C N, An Introduction to VLSI Physical Design,. Mc Graw Hill.
3. John P. Uyemura , Introduction to VLSr circuits and systems, John Wiley.

B.Tech 7ᵗʰ Semester
TELEVISION ENGINEERING
(ECE-403E)

L   T   P   **Theory: 100**
4   1   -   **Sessional : 50**
                                                                            Time: 3 Hrs

UNIT -I:
ELEMENTS OF A TELEVISION SYSTEM: Picture transmission, sound transmission, picture reception. sound reception synchronization, receiver controls. Analysis and Synthesis of Television Pictures: Gross structure, image continuity, no. of scanning lines, flicker, fine structure, tonal gradation. Composite Video signal, channel B.W. Vestigial side band transmission and reception, TV standards.

UNIT-II
THE PICTURE TUBE: Monochrome picture tube, Beam deflection, screen phosphor, face plate, picture tube characteristics, picture tube circuit controls.Television Camera Tubes: Basic principal, Image orthicon, Vidicon, plumbicon.
MONOCHROME SIGNAL TRANSMISSION AND RECEPTION :Block diagram of Monochrome Signal Transmitter and Receiver, Explanation of different sections, Transmitting and receiving antennas.

UNIT-III .
ELEMENTS OF COLOUR TV :Introduction, compatibility considerations, interleaving process, Three color theory, Chrominance Signal, composite color signal, comparison of NTSC, PAL and SECAM Systems. color television display tubes (Delta gun, PIL, Trinitron)
Color signal transmission, bandwidth for color signal transmission.

UNIT - IV:
ADV ANCED TOPICS IN TV. ENGINEERING :Introduction, & working and block diagram of the Projector TV, 3D-TV, HDTV, Digital TV, Camcorders.
TELEVISION APPLICATIONS: Cable television,CCTV, picture phone & fascimile, television via satellite, Remote Control (Electronic control system), Introduction to Digital TV Technology and their merits.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all, selecting at least one question from each unit.

Suggested Books:

I. AM Dhake, Monochrome and Colour TV, TMH.
2. R.R.Gulati, Colour TV.Engg. Wiley Eastern Ltd.
3. SP Bali, Colour TV theory & practice, TMH
4. Merrill!. Skolnik, lntroducion to Radar, Systems, TMH

B.TECH 7ᵗʰ SEMESTER
OPTICAL COMMUNICATION
(ECE-405E)

L   T   P   **Theory: 100**
4   1   -   **Sessional : 50**
                                                                                                                    Time: 3 Hrs

UNIT-I:

INTRODUCTION: Propagation within the fiber, Numerical aperture of fiber, diffraction, step index and graded index fiber, Modes of propagation in the fiber, Single mode and multi mode fibers. Splices and connectors.

UNIT- 11:

LOSSES IN OPTICAL FIBER: Rayleigh Scanering Losses, Absorption Losses, Leaky modes, mode coupling losses, Bending Losses, Combined Losses in the fiber.
 DISPERSION EFFECT: Effect of dispersion 011 the pulse transmission Intermodal dispersion, Material dispersion, Wave guide dispersion, Total dispersion, Transmission rate.

UNIT - III:

LIGHT SOURCES: LEDS, Laser Action in semiconductor Lasers, Semiconductor Lasers for optical communication - Laser modes, Spectral Characteristics, Power Voltage Characteristics, Frequency response.
DETECTORS: P-I-N Photodiode, APD Noise Analysis in detectors, Coherent and non-coherent detection, The fiber-optic Communication System, Infrared sensors(eg: TSOP 1738).

UNIT - IV:

OPTICAL NETWORKS: Optical coupler, space switches, linear divider-combiners, wavelength division multiplexer and de-multiplexer, optical amplifier, optical link network-single hop ,multi-hop, hybrid and photonic networks.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to altempt five questions in all , selecting at least one question from each unit.

Suggested Books:
   I. John Power, An Introduction o Fiber Optic System, McGraw Hill International.
   2. John Gowar, Optical communication Systems.
   3. R. Ramaswamy, Optical Networks, Narosa Publication

B.TECH 7th SEMESTER
MICROWAVE ENGINEERING
(ECE-407E)

L	**T**	**P**	**Theory: 100**
3	**2**	**-**	**Sessional : 50**
			Time: 3 Hrs

UNIT - I:
MICROW A VE RESONATORS: Brief description of waveguides, coplanar waveguides, cavity resonators: rectangular, cylindrical, spherical and coaxial, excitation and coupling of cavities, Q factor.
MICROWAVE MEASUREMENTS: Measurement of frequency, impedance (using slotted section) attenuation, power, dielectric constant, measurement of V.S. W. R., insertion loss and permeability

UNIT -II:
MICROW A VE GENERA TORS: Construction, characteristics, operating principle and typical applications of Klystron(two cavity, multifamily), Reflex Klystron, magnetron(Cylindrical magnetron and description of n mode applications) and Traveling Wave Tube(TWT).

UNIT - 111:
MATRIX DESCRIPTION OF MICROW A VE CIRCUITS: Scattering matrix-its properties, measurement of scattering coefficients, of scattering coefficients, scattering matrices for common microwave systems.
MICROW A VE COMPONENTS: Waveguide tees. E-plane, H-plane, magic tee, rat race, directional coupler, tuning screws and stubs, isolators and circulators-their constructional features and applications. Microwave filters, Phase shifters, attenuators, Wavemeters.

UNIT-IV.
SOLID STATE MICROWAVE DEVICES:
Tranferred electron devices- GUNN EFFECT: negative diffrerential resistance phenomenon, field domam
 formation. GUNN diode structu"e.
 Avalanche transit time devices:, IMPATT, TRAPATT, BARITT diodes, Parametric amplifiers

NOTE:
  The question paper shall have eight questions in all organized into four sections, each section having
  two questions !Tom each of the four units. The candidate shall have to attempt five questions in all ,
  selecting at least one question !Tom each unit.

Suggested Books:

I. Samuel Y. Liao, Microwave Devices and Circuits, Prentice-Hall of India.
2. David M. Pozar, Microwave Engineering, John Wiley and sons Inc.
3. Das, Annapurna & Sisir K. Das, Microwave Engineering, Tata McGraw-Hili.
4. POZAR DM, Microwave Engg, John Wiley & Sons Inc.

L   T   P   **Theory: 25**
-   -   3   **Sessional : 50**
                                                                    Time: 3 Hrs

LIST OF EXPERIMENTS:

1. Define a function to compute DTFT of a finite length signal. Plot the magnitude and phase plots using subplots. Use this function to obtain DTFT of a 21 point triangular pulse over the domain 10<n<10: Plot the results over *-1t<w<1t.*

2. Write a program to plot the following functions: a)impulse function b)unit step c)unit ramp d) exponential e) sinusoidal

3. Verify the Symmetry, time shifting and modulating properties of DTFT with a rectangular pulse of length 21.

4 Study the aliasing effect by using a Sinusoidal Signal. Show the plots of' continuous time Signal. Sampled Signal and reconstructed signals by using subplot.

5. Study different window functions available in signal processing toolbox and their Controlling parameters.

6. Write a program to plot real, imaginary phase and magnitude of exponential function.

7 Verify the properties of Discrete Fourier Transform (DFT).

8 Write a program to find the convolution of two sequences using in built convolution function

9 Study of Digital Signal Processing Kit(TMSI ADSP)

10. Implementation of FlR/digital filter using DSP Kit.

NOTE: At least 10 experiments are to be performed with atleast 7 from above list,
remaining 3 may either be perfol111ed from the above list or designed & set by concerned institution as per the scope

DEPARTMENTAL ELECTIVES-I
B.TECH 7th SEMESTER
MICROCONTROLLERS
(ECE-415E)

L	**T**	**P**	**Theory: 100**
3	**1**	**-**	**Sessional : 50**
			Time: 3 Hrs

UNIT I:
INTRODUCTION :Comparing Microprocessors and Microcontrollers. Technological trends in Microcontrollers development. .survey of microcontrollers- 4 bit, 8 bit, 16 bit, 32 bit microcontrollers. Applications of microcontrollers.

UNIT 2:
8051 ARCHITECTURE :Block diagram, pin. Diagram of 8051. Functional descriptions of internal units, registers, PSW, internal RAM, ROM, Stack, Oscillator and Clock. *UO* Pins, Ports and Circuits Connecting external memory. Counters and timers. Serial data interrupt Serial data transmission Ireception and transmission modes. Timer flag interrupt. External interrupt, software generated interrupts. External memory and memory space decoding, expanding I/Os, memory mapped I/O Reset & ClK Circuits.

UNIT 3:
8051 INSTRUCTION SET AND PROGRAMMING :8051 Instruction syntax, addressing modes, Data transfer instructions, logical instructions, arithmetic instructions, Jump and Call instructions. Interrupts and interrupt handler subroutines. Writing assembly Language programs. Time delays. Pure SlW time delays. S/W polled timer. Pure HIW delay. Lookup tables. Serial data transmission using time delays and polling. Interrupt driven serial transmission and reception.

UNIT 4:
8051 APPLICATIONS: Interfacing Keyboards Programs for small keyboards and matrix keyboards. Interfacing multiplexed displays, numeric displays and LCD displays. Measuring frequency and pulse width. Interfacing ADCs & DACs. Hardware circuits for handling multiple interrupts. 8051 Serial data communication modes- Mode 0, Mode I, Mode 2 and Mode 3.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Suggested Books:
1. KJ.A:ala, The 8051 Microcontroller - 2'd cd. Penram International.
2. Intel's manual on " Embedded Microcontrollers"

L	**T**	**P**	**Theory: 100**
3	**1**	**-**	**Sessional : 50**
			Time: 3 Hrs

UNIT I:

INTRODUCTION: Definition of reliability, failure data analysis, mean failure ratio, MTTF, MTBF, graphical plot, MITF in terms of failure density, generalization, reliability in terms of failure density (integral form), reliability in other situation.

HAZARD MODELS: Introduction, constant hazard linearly increasing hazard, Weibull model, on density function and distribution function, and reliability analysis, important distribution and its choice, expected value, standard deviation and variance, theorem concerning expectation and variance.

UNIT 2:

SYSTEM RELIABILITY: Introduction, series system with identical component, reliability bounds classical approach Bayesian approach application of specification hazard models, an r-out-of-an structure methods for solving complex system, systems not reducible to mixed configuration, mean time to failure system, logic diagrams, Markov model and graph.

Reliability IMPROVEMENT AND FAULT TREE ANALYSIS: Introduction, improvement by component, redundancy, element redundancy, unit redundancy, optimization, stand by redundancy. Reliability cost trade off, fault tree construction, calculation of reliability from fault tree.

UNIT 3:

MAINTAINABILITY, A V AILABITY AND REPAIRABLE SYSTEM: Introduction, maintainability, availability, system down time, reliability and maintainability trade off, instantaneous repair rate MITR, reliability and availability function.

BA YESIAN APPROXIMATION AND RELIABITY ESTIMATION: Introduction, Lindley's expansion, reliability estimation, normal, Weibull, inverse gaussian and Rayleigh.

UNIT 4:

RELIABILITY ALLOCATION AND APPLICATION: Reliability allocation for a series system, approximation of reliability in a computer system and nuclear power plant, failure models and ?ffects analysis (FMEA)

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

S.K.Sinha, Reliability and life testing, (WEL New Delhi).
LASrinalh, Reliability engineering, (EWP New Delhi).
Bal Guru Swami, Quality control and Reliability, (Khanna publisher New Delhi).

B.TECH 7th SEMESTER
NANOTECHNOLOGY
(ECE- 421E)

L	T	P	Theory: 100
3	1	-	Sessional : 50
			Time: 3 Hrs

UNIT I
Introduction to Nanotechnology, review of various techniques and tools, future prospects of nanotechnology, applications.

UNIT2
Synthesis techniques of clusters, nanoparticles : classical nucleation theory for cluster formation, sputtering and thermal evaporation and laser methods for nanoparticles' synthesis, particle synthesis by chemical routes.

Synthesis of semiconductor nanoclusters.

UNIT 3
Properties of nanostructured materials:
Magnetic properties, electrical transport properties, non-linear optical properties.

Special nanomaterials

Porous silicon nanostructures - formation, optical properties; Fullerones - synthesis, properties and application.

UNIT 4.
Nano electronics - Nanodevices, nanotransistors, nanoelectro optics, Nano structures in electronics.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at

Suggested Books:
I. Camarata, R.C, Nanomaterials synthesis, properties and application. Institute of Physics Publication.
2. Madou. Fundamentals of microf2lbrication, Mcgraw Hill.
3. Sibelia, J.P , A Guide!O material characterization, Prentice Hall.

L	**T**	**P**	**Theory: 100**
3	**2**	**-**	**Sessional : 50**
			Time: 3 Hrs

UNIT-I

INTEL'S X86 FAMILY :Introduction, Register set, data formats, addressing modes, interrupts, memory hierarchy, pipelining, segmentation, paging, real and virtual mode execution, protection mechanism, task management.

UNIT-II

ARCHITECTURE OF INTEL X86 F AMIL Y :CPU block diagrams, Pin diagrams and internal descriptions of -80286.386,486 and Pentium. Instruction formats. Intel X86 Instruction set. Assembler directives.

UNIT-Ill

ARITHMETIC CO-PROCESSORS: Data formats; 80287 architecture - Pin diagram, internal architecture, status register, control register; tag register. Instruction set - data transfer, arithmetic, omparison, transcendental operations, constant operations and control instructions. Interfacing 80287 with 80286 Programming examples.

UNIT-IV

HIGHER- CO-PROCESSORS :Introduction to 80387,80487.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question tram each unit.

Suggested Books:

Daniel Tabak, Advanced Microprocessors (2nd ed) Mc Graw Hill Pub.
Barry B.Brey, The Intel Microprocessors (4 " ed) PHI Pub.   ,
DV-Hall, Microprocessors & Interfacing (2nd ed) Mc Graw Hill Pub.

DEPARTMENTAL ELECTIVES-II
B.TECH 7th SEMESTER
ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS (ECE- 425E)

L	**T**	**P**	**Theory: 100**
3	2	-	**Sessional : 50**
			Time: 3 Hrs

UNIT-I

Introduction: - Definition of AI, evolution of Computing, History of AI, Classical, Romantic and Modem period, subject area, Architecture of AI machines, logic family, conclusion.

Production System: - Production rules, the working memory, Recognize-act cycle, conflict resolution strategies, refractoriness, Regency, specificity, alternative approach for conflict resolution, Architecture of production system, conclusion.

UNIT-II

Prepositional Logic: - Proposition, tautologies, Theorem proving in prepositional logic, Semantic method of theorem proving, forward chaining, backward chaining, standard theorems in prepositional logic, method of Substitution, theorem proving using Wang's algorithm conclusion,

Predicate logic: - Alphabet of first order logic (FOL), predicate, well formed formula, clause torm, algorithm for writing sentence into clause form, inflict of predicates, unification algorithm, resolution Robinson's inference rule, conclusion.

UNIT-III

Logic Programming and Prolog: - Logic program, Horn clause, program for scene interpretation, unification of goals, definite perform clause, SLD resolution, SLD tree, controlling back tracking, common use of cut, implementation of backtracking using stack, risk of using cuts, fail predicate, application of cut-fail combination, replace cut-fail by not, conclusion.

Default & Non monotonic reasoning: - Axiomatic theory, non-atomic reasoning using N\1L-I, problems with NML-I, reasoning with NML-II, truth maintenance system with example. conclusion.

UNIT-IV

Imprecision & Uncertainty: - Definition, Probabilistic technicians, Fuzzy reasoning, certainty factor based reasoning conditional probability, Baye's Theorem and its limitations, Rayesian belief network, propagation of belief, Dempster-Shafer theory of uncertainty management, belief interval, Fuzzy ration, inverse Fuzzy relations, Fuzzy post inverse, Fuzzy Inversion scope of neural network, EX-OR classifier, clustering by neural network, function approximation by neural net, retrieval of content, Fuzzy association memory, cognitive reasoning using fuzzy neural net, Hebbian learning, stability analysis.

Intelligent Search Technique: - Heuristic function, AND-OR graph, Heuristic search, A'algorithm and examples.

NOTE:

The question paper shall have eight qlieSti1ms ;n all organized into four sections, each section having two questions trom each of the four units. The candidate have to attempt five questions in all , selecting at least one question from each unit

Suggested Book:

I. E.Chamiak & D. McDermott, Introduction to Artificial Intelligence, Addison Wesley Longman.

POWER ELECTRONICS (ECE-427E)

L	T	P		Theory: 100
3	2	-		Sessional : 50
				Time: 3 Hrs

UNIT-I.

INTRODUCTION :Role of power electronics, review of construction and characteristics of power diode, Schottky diode, power transistor, power MOSFET, SCR, DlAC, Triac, GTO, IGBT & SIT.
. SCR: Ratings and protections, series and parallel connections, R, RC and UJT firing circuit and other firing circuits based on ICs and microprocessors

UNIT-2.

CONVERTERS :One, two, three, six and twelve pulse converters, fully and half controlled converters, load voltage waveforms, output voltage equation, continuous and discontinuous modes of operation, input power factor of converter, reactive power demand, effect of source inductance, introduction to four quadrant *I* dual converter, power factor improvement techniques, forced commutated converter, MOSFET and transistor based converters.

UNIT-3

INVERTERS :Basic circuit. 120 degree mode and 1&0 degree mode conduction schemes, modified McMurray half bridge and full bridge inverters, McMurray -Bedford half bridge and bridge inverters, brief description of parallel and series inverters, current source inverter (CSI), transistor and MOSFET based inverters.

UNIT -4.

CHOPPERS: Basic scheme, output voltage control techniques, one, two, and four quadrant choppers. step up chopper, voltage commutated chopper. current commutated chopper, MOSFET and transistor based choppers.
CYCLOCONVERTERS : Basic principle of frequency conversion, types of cycloconverter, non-circulating and circulating types of cycloconverter.

TEXT BOOK:

I. Power Electronics: MH Rashid; PHI.

REFERENCE BOOKS:

1. Power Electronics: PC Sen;TMH
2. Power Electronics: HC Rai; Galgotia
3. Thyristorised Power Controllers: GK Dubey, PHI
4. Power Electronics and Introduction to Drives: A.K.Gupta and L.P.Singh;Dhanpat Rai 5. Power Electronics: P.S Bhimra.

Note:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

HARYANA COLLEGE OF TECHNOLOGY & MANAGEMENT, KAITHAL

Scheme of examination for B.Tech Degree Course

Eighth Semester Examination

S.No.	Course No.	Subject	Teaching Schedule				Examination Schedule (Marks)				Duration of Exams (Hours)
			L	T	P/D	TOT	TH	SESS	P/VV	TOT	
1	-	Departmental Elective.III	3	I	-	4	100	50	-	150	3
2	-	Departmental Elective-IV	3	2	-	5	100	50	-	150	3
3	ECE-402E	Wireless and Mobile Communication	3	2	-	5	100	50	-	150	3
4	ECE-404E	Radar Engineering	3	2	-	5	100	50	-	150	3
5	ECE-406E	Multimedia Communications	3	I	--	4	100	50	-	150	
6	ECE-408E	Microwave (Pr)	-	-	3	3	-	25	25	50	3
7	ECE410E	Audio Visual Electronics (Pr)	-	-	3	3	-	25	25	50	3
8	ECE-412E	Major Project	-	-	4	4	-	75	75	150	-
9	ECE-414E	Seminar	2	-	-	2	-	25	-	25	-
10	ECE-416E	Comprehensive Viva Voce	-	-	-	-	-	75	-	75	-
11	ECE-418E	General Fitness & Professional Aptitude	-	-	-	-	-	-	75	75	-
		TOTAL	17	08	10	35	500	475	200	1175	

DEPARTMENT ELECTIVE-III

1   ECE-420E   Image Processing
2   ECE-422E   Advanced Control System
3   ECE-424E   Embedded System Design

DEPARTMENT ELECTIVE-IV

ECE-426E   Neuro Fuzzy System

ECE-428E   Electronic Switching System

ECE-430E   Transducers and their Application

B.TECH 8th SEMESTER
WIRELESS AND MOBILE COMMUNICATION
(ECE-402E)

L	T	P	
3	2	-	

Theory: 100
Sessional : 50
Time: 3 Hrs

UNIT-I:
Radio Propagation Characteristics, Models for Path loss, Shadowing & Multipath fading-delay spread, Coherence bandwidth, Coherence Time, Doppler Spread Jake's Channel model.

UNIT - II:
Digital Modulation for Mobile radio, Analysis under fading channel, diversity techniques and Rake demodulator. Introduction to Spread Spectrum Communication Multiple Access Techniques used in Mobile Wireless Communications: FDMA/TDMA/CDMA.

UNIT - III:
The .Cellular concept, Frequency Reuse basic theory of hexagonal cell layout, spectrum efficiency, FDM/TDM, Cellular System, channel allocation schemes, handover Analysis, cellular CDMA, Soft capacity, Erlang capacity comparison.

UNIT - IV:
Wireless standards-GSM, IS-95, UMTS-IMT-2000, Signaling, Call Control, Mobility Management and location Tracing.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Suggested Books:
Theodore S.Reppeport, Wireless Communications Principles and Practice, IEEE Press,   Prentice Hall.

William C.Y.Lec, Mobile Cellular Telecommunication, Analog and Digital Systems, McGraw Hill Inc.

Kamilo Feher, Wireless Digital Communications, Modernization & Spread Spectrum Applications, Prentice Hall oflndia, New Delhi.

Kaveh Pahlavan and Allen H. Levesque" Wireless Information Networks", Wiley Series, John Wiley and Sons Inc.

L   T   P   **Theory: 100**
3   2   -   **Sessional : 50**
                                                                                                                            Time: 3 Hrs

UNIT- l.
RADAR BASICS: Radar Block Diagram & operation, Applications of Radar.
RADAR EQUATION: Simple form of Radar Equation, Minimum detectable signal. Receiver noise, Signal to Noise ratio, Transmitter Power. Pulse repetition frequenc)' & range ambiguities, System losses, Propagation effects.

UNIT-2
CW & FREQUENCY MODULATED RADAR: The Doppler effect, CW Radar, FM- CW Radar, Multiple Frequency CW Radar.
MTI & PULSE DOPPLER RADAR: Introduction, Delay Line Cancellors. Multiple or staggered, Pulse repetition frequencies. range-Gated Doppler Filters, Other MTI delay line, Limitation of MTI performance, Noncoherent MTI

UNIT-3
TRACKING RADAR:
Tracking with Radar, Sequential Lobbing, Conical Scan, Monopulse Tracking Radar, Tracking in range, Acquisition.

UNIT-4
 RECEIVERS, DISPLAYS & DUPLEXERS:
 Radar Receivers, Noise Figure, Mixer, Low-noise Frontends. Displays, Duplexer, Receiver protectors.

TEXT BOOK:
I. Introduction to Radar Systems: Merrill!. Skolnik,; MGH

REFERENCE BOOK:
Electronic Communication Systems; Kennedy; TMH

NOTE:
 The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

B.TECH. 8th SEMESTER
MULTIMEDIA COMMUNICATIONS (ECE-406E)

L   T   P   **Theory: 100**
3   1   -   **Sessional : 50**
                                                                                                        Time: 3 Hrs

UNIT-1
Multimedia communications: Introduction, multimedia networks, multimedia applications.
Multimedia information representation: Introduction, digitization principles, representation of text,
images, audio & video.

UNIT-2
Text & Image compression: Various compression principles.
Text compression: Static Huffmann coding, dynamic Huffman coding, arithmetic coding, Lempel-ziv
coding
Image compression: Graphics Interchange format, tagged image file format, digitized document,
digitized pictures, JPEG (Introduction)

UNIT-3
Audio & Video compression:
Audio compression: Differential PCM, Adaptive differential PCM, Code excited LPC, MPEG audio
coders, Dolby audio coders.
Video Compression: Basic principles, Video compression standard H.261, H.263, MPEG(Basic
introduction)

UNIT-4
Internet applications: Domain name system, name structure and administration, DNS resource records,
Electronic mail message structure, content transfer, Basic concept of internet telephony, World Wide
Web

NOTE:
   The question paper shall have eight question in all organized into four sections, each section having
   two questions from each of the four units. The candidate shall have to attempt five questions in all ,
   selecting at least one question from each unit.

SUGESSTED BOOKS:

I. Multimedia communications Fred Hulsall; Pearson Education Asia.
2. Multimedia Systems-Design: K. Thakkar; PHI
3, Multimedia: Computing, Communications & Applications: Ralf Stein Metz & Klara
Nahrstedt; Pearson ''
4 . Advanced Multimedia Programming: Steve Rimmer; MB!
5. Multimedia: Making it Work IlIrd edition: Tay Vaughan; TMH

B.TECH 8th SEMESTER
MICROW A VE (PRACTICAL) (ECE-408E)

L   T   P   **Viva: 25**
-   -   3   **Sessional : 25**
                                                                         Time: 3 Hrs

LIST OF EXPERIMENTS

1.   To study the microwave components.

2.   To study the characteristics of the reflex Klystron tube and to determine its

        electronic tuning range.

3.   To determine the frequency and wavelength in a rectangular waveguide

        working in TE 10 mode.

4.   To determine the standing wave ratio and reflection coefficient.

5.   To study the I-V characteristics ofGunn diode.

6.   To study the magic tee.

7.   To study the isolator and attenuator.

8.   To measure the coupling coefficient and directivity of a wave guide

        directional coupler

9.   To measure the polar pattern and the gain of a waveguide horri antenna.

10.   To measure the insertion loss and attenuation.

B.TECH 8th SEMESTER

AUDIO VISUAL ELECTRONICS(Pr.)
(ECT-416)

L	T	P
-	-	3

Sessional :25
Viva :25
Time :3 Hrs.

LIST OF EXPERIMENTS

1. **Familiarization of PCB's and Mechanical Components of Tape recorder/ CD Player/ VCD Player/ Colour T.V.**

2. Study of tuner section of a colour T.V.

3. Study of VIF section of a colour T.V.

4. Study of sound section of a colour T.V.

5. Study of Chroma section of a colour T.V.

6. Study of Mechanical portion of VCD player.

7. Study of Sound processing of VCD player.

8. Study of Camcorder's mechanical portion.

9. Study of Camcorder's Electronic portion.

IMAGE PROCESSING (ECE-420E)

L	**T**	**P**	**Theory: 100**
3	**1**	**-**	**Sessional : 50**
			Time: 3 Hrs

UNIT-I:

INTRODUCTION : Image Processing Fourier Transform and Z-transform Causality and stability Toeplit and Circulate Metrics orthogonal and unitary Matrices and Kronecker product, Markov Processes KI Transform Mean square Estimates and orthogonal Principles.

IMAGE SAMPLING QUANTIZATION: Band Limited Image , Sampling Versus Replication, Reconstruction of Image from samples, Sampling Theorem, Sampling Theorem for Random Fields, Optimal Sampling, Non-rectangular Grid Sampling, Sampling Aperture, Display Aperture/Interpolation Function, lagrange Interpolation Moire Effect. Image Quantization Uniform Optimal Quantizer, Properties of mean Square Quantizer, Commander Design Visual Quantization.

UNIT-II:

IMAGE TRANSFORMS: Two Dimensional Orthogonal and Unitary Transforms and their properties. One Dimensional and two Dimensional DFT. Cosine and Sine Transform. Hadarnard, Slant, Harr and KL, Transform and their properties, Approximation to KI Transform.

IMAGE REPERESENTATION BY STOCHASTIC MODELS: One Dimensional Casual Models, AR and ARMA models, Non Casual Representation Spectral factorization Image Decomposition.

UNIT-III:

IMAGE ENHANCEMENT AND RESTORATION : point operation, Histogram Modeling, Spatial Operations, Transform Operations, Multispectral Image Enhancement, Image Observation Models, Inverse and Wiener filtering, FIR Wiener Filters, Filtering using Image Transform Casual Models and recursive filtering Maximum entropy restoration . Extrapolation of band limited signal.

UNIT-IV:

IMAGE ANALYSIS AND IMAGE COMPRESSION: spatial feature extraction, Edge detection and boundary extraction Boundary, region and moment representation structure, Texture, Image Segmentation, Reconstruction from Projections, Pixel Coding, Productive Technique, Transform Coding theory, Coding of Image, Coding of Two-tone image.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each four units. The candidate shall have attempt five questions in all selecting latest one question from each unit

Suggested Books:

1   Jain A , digital Image Processing , PHI
2   Gonzalez and woods , Image Processing , Addison Wesley.

DEPARTMENTAL ELECTIVES-III
B.Tech 8th SEMESTER
ADVANCED CONTROL SYSTEMS (ECE- 422E)

L   T   P   **Theory: 100**
3   1   -   **Sessional : 50**
                                                                     Time: 3 Hrs

UNIT-I:
State variable representation of systems by various methods, solution of state equations-state transition matrix, Transfer function from state variable model, Controllability and observability of state variable model.

UNIT-II:
Phase portrait of linear second order systems, Method of isoclines, Phase portrait of second order system with non-linearities, limit cycle, singular points.

UNIT-III:
Definition, limitations, use of describing function for stability analysis, describing function of ideal relay, relay with hysteresis and dead zone saturation/coulomb friction and backlash. Linear approximation of nonlinear systems: Taylor series, Liapunov's 2nd method.

UNIT-IV:
Sampling process, impulse modulation, mathematical analysis of sampling process, application of Laplace transform, Shanon's theorem, reconstruction of sampled signal zero order and first order hold, Z-transform, definition, evaluation of Z-transform, inverse Z-transform pulse transfer function, limitation of z-transform, state variable formulation of discrete time systems. Solution of discrete time state equations, stability, definition, the Schur-Cohn stability criterion, Jury's test of stability of extension of Routh-hurwitz criterion to discrete time systems.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each four units. The candidate shall have attempt five questions in all selecting latest one question from each unit.

Suggested Books:

1. Gopal M , Digital Control and State Variable Methods , TMH PUBLN
2. Kuo , B C , Digital control systems , PUBLN
3. Slotine J E & Li W P , Applied Non-Linear Control , Prentice Hall , USA

DEPARTMENTAL ELECTIVES-III

B.TECH VIII SEMESTER
EMBEDDED SYSTEMS DESIGN
(ECE-424E)

L   T   P
3   1   -

Theory   :   100
Sessional :   50
Time   :   3Hrs

UNIT 1 : INTRODUCTION:
Different types of microcontrollers: Embedded microcontrollers, External memory microcontrollers; Processor Architectures: Harvard V/S Princeton , CISC V/S RISC; microcontrollers memory types; microcontrollers features : clocking, i/o pins, interrupts, timers, peripherals.

UNIT 2 : MICROCONTROLLER ARCHITECTURE:
Introduction to PIC microcontrollers, Architecture and pipelining, program memory considerations, Addressing modes, CPU registers, Instruction set, simple operations.

UNIT 3 : INTERRUPTS AND I/O PORTS:
Interrupt logic, Timer2 scalar initialization, IntService Interrupt service routine, loop time subroutine, External interrupts and timers, Synchronous serial port module, Serial pheriphal device, O/p port Expansion, I/p port expansion, UART.

UNIT 4 : PROGRAMMING WITH MICROCONTROLLERS:
Arithmetic operations, Bit addressing, Loop control, Stack operation, Subroutines, ROM direct addressing, state machines, Oscillators, Timer Interrupts, Memory mapped I/O.
DESIGNING USING MICROCONTROLLERS:
Music box, Mouse wheel turning, PWM motor control, Aircraft Demonstration, ultra sonic distance measuring, Temperature Sensor, Pressure Sensor.

NOTE:
The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

TEXT BOOK:
1. Design with PIC Microcontrollers by John B. Peatman , Pearson.

REFERENCE BOOKS :
1.   Programming and Customizing the 8051 Microcontroller : Predko ; TMH.
2.   Designing Embedded Hardware : John Catsoulis ;SHROFF PUB. & DISTR. ND.
3.   Programming Embedded Systems in C and C++ : Michael Barr; SHROFF PUB. & DISTR. ND.

L   T   P   **Theory: 100**
3   2   -   **Sessional : 50**
                                                                     Time: 3 Hrs

UNIT-I:
INTRODUCTION TO FUZZY AND NEURO-FUZZY SYSTEM: Merits of Fuzzy and Neuro Fuzzy systems. Introduction to Architecture of a Fuzzy system. Fuzzification Rule Base Inference engine, defuzzizication.
FUZZY MATHEMATICS: Fuzzy sets and operations of fuzzy sets, properties of fuzzy sets, fuzzy relations, fuzzy graphs & Fuzzy arithmetic.

UNIT-II:
ARCHITECTURE AND DESIGN ISSUES: Fuzzification , fuzzy Rule- Base and Fuzzy – Rule Based models – implication process, defuzzification Techmiques.
ANALOG DESIGN OF FUZZY PROCESSORS : Modular design , design of a fuzzifier , knowledge base and inference engine , defuzzifier design.

UNIT-III:
IMPLEMENTATION OF A COMPLETE ANALOG FUZZY SYSTEMS: Design and microprocessor based implementation of fuzzy systems.
FUZZY MODEL IDENTIFICATION : Structure Specifications, Parameter estimation, model validation.

UNIT-IV:
NEURO FUZZY SYSTEMS: Introduction to Neural Networks , Neuro Fuzzy architecture , Learning methodologies , genetic Algorithum , neural networks in communications.

NOTE:

The question paper shall have nine questions in all. Organized into four sections, each section having two questions from each four units. The candidate shall have attempt five questions in all selecting atest one question from each unit

REFERENCES:
1. Klir & Yuan , Fuzzy Sets and Fuzzy Logic.
2. Chin – Teng Lin & Lee C S G Neural Fuzzy Systems , Prentice Hall International.
3. Bose N K , Liang P , Neural Networks Fundamentals with graphs , Algorithm and Applications , Tata McGraw Hill.

ELECTRONIC SWITCHING SYSTEMS
(ECE-428E)

L   T   P   Theory   :   100
3   2   -   Sessional :   50
                                                  Time   :   3Hrs

UNIT – I:

INTRODUCTION: Statistical Bandwidth Sharing, Switching, network Configurations, Elements of switching systems, Electronic exchange, PBX.
TELEPHONE NETWORKS: Subscriber loop, Switching Hierarchy & Routing Transmission systems, Numbering Plan, Charging plan, Signaling techniques Common Channel Signaling.

UNIT – II:
ELECTRONIC SPACE DIVISION SWITCH: Stored Program Control (SPC): Centralized & Distributed SPC, Software Architecture, and n-stage networks.
TIME DIVISION SWITCHING: Space Switching, Time Switching, Time multiplexed space switching & Time Switching, n-stage combination switching.

UNIT – III:
TRAFFIC ENGINEERING: Traffic load, Grade of service, blocking Probability models of switching systems, Markov processes, Birth-Death processes, delay systems, Models for packetized sources (voice and video), models for traffic flow in packet networks.
CELLULAR MOBILE TELEPHONY: Analog Switch System for Cellular Mobile, Cellular digital switching, centralized & remote controlled small switching system.

UNIT – IV:
TELEPHONE NETWORK PROTOCOLS: Protocols stacks, Digital Transmission hierarchy, SONET/SDH Signaling system. Multi Media Communication over global telephone N/W Introduction to Datagram switches, ATM Switches.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Suggested Books:
1.   Thiagarajan Viswanathan, Telecommunication Switching Systems & Networks, PHI
2.   Hui, J.Y., Switching & Traffic Theory for integrated broadband networks.
3.   Keshav, S., Engineering. Approach to Computer Networking, Addison Wesley.

DEPARTMENTAL ELECTIVES-IV

B.TECH.8th SEMESTER
TRANSDUCERS AND THEIR APPLICATIONS
ECE-430E

L   T   P   Theory :   100
3   2   -   Sessional   :   50
                                                                   Time   :   3Hrs

UNIT-I

Definition of transducer. Advantages of an electrical signal as out-put. basic requirements of transducers, Primary and Secondary Transducer ,Analog or digital types of transducers.

Resistive, inductive, capacitive, piezoelectric, photoelectric and hall effect tranducers.

UNIT-II

Measurement of pressure – Manometers, Force summing devices and electrical transducers

Measurement of temperature – Metallic resistance thermometers, semi conductor resistance sensors (Thermistors), thermo-electric sensors, pyrometers.

UNIT-III

Measurement of displacement – Potentiometric resistance type transducers, inductive type transducers, differential transformer (L.V.D.T), capacitive transducers, Hall effect devices, strain gage transducers.

Measurement of velocity – variable reluctance pick up, electromagnetic tachometers, photoelectric tachometer, toothed rotor tachometer generator..

UNIT-IV

Measurement of Force – Strain-gage load cells, pneumatic load cell, LVDT type force transducer.

Measurement of Torque – Torque meter, torsion meter, absorption dynamometers, inductive torque transducer, digital methods.

NOTE:

The question paper shall have eight questions in all organized into four sections, each section having two questions from each of the four units. The candidate shall have to attempt five questions in all , selecting at least one question from each unit.

Suggested Books:

1.   B.C. Nakra, K.K. Chaudhry, "Instrumentation Measurement and Analysis," Tata McGraw-Hill Publishing Company Limited, New Delhi.
2.   Thomas G. Beckwith etc. all, "Mechanical Measurements (International Student Edition), Addison-Wesley Longman, Inc. England.
3.   A.K. Sawhney, " A Course in Electrical and Electronic Measurements and Instrumentation," Dhanpat Rai & Sons, Delhi-6.