

KURUKSHETRA UNIVERSITY KURUKSHETRA
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 1ST YEAR (SEMESTER-I) COMMON FOR ALL BRANCHES (2004-2005)

Course No.	Course title	Teaching Schedule				Allotment of marks				Duration of Exams.
		L	T	P	Total	Sessional	Theory	Practical	Total	
MATH-101E	Mathematics-I	4	1	-	5	50	100	--	150	3
PHY-101E	Physics-I	3	1	-	4	50	100	--	150	3
BT-101E	Introduction to Biotechnology	3	1	-	4	50	100	--	150	3
HUM-101E	OR Communication skills in English	3	1	-	4	50	100	--	150	3
ME-101E/ CE-101E / EL-101E	Elements of Mechanical Engineering / Elements of Civil Engg./ Elements of Electronics Engg. *	3	1	-	4	25	75	--	100	3
ME-105E	OR Engg. Graphics and Drawing	-	--	3	3	50	--	100	150	3
ME-103E	Manufacturing Processes	4	--	--	4	50	100	--	150	3
CH-101E	OR Chemistry	3	1	-	4	50	100	--	150	3
CSE-101E	Fundamentals of Computer & Programming in c	3	2	-	5	50	100	--	150	3
EE-101E	OR Electrical Technology	3	2	-	5	50	100	--	150	3
ES-101E	Environmental Studies**	4	-	-	4	25	75	--	100	3
PHY-103E	Physics Lab.-I	-	-	-	2	25	--	25	50	3
ME-107E	Workshop Practice	--	--	3	3	25	--	25	50	3
CH-103E	Or Chemistry Lab.	--	--	2	2	25	--	25	50	3
CSE-103E	Computer Programming Lab.	--	--	2	2	25	--	25	50	3
EE-103E	OR Electrical Technology Lab.	--	--	2	2	25	--	25	50	3
ME-109E CE-109E EL-109E	Elements of Mechanical Engineering / Elements of Civil Engg./ Elements of Electronics Engg. *	--	--	2	2	25	--	25	50	3
	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 (BT-101E, ME-101E/ CE-101E/ EL-101E, ME-103E, CSE-101E, ME107E, CSE-103E, ME-109E/ EL-109E/ CE-109E) OR Group B (HUM-101E, ME-105E, CH-101E, EE-101E, ES-101E, CH-103E, EE-103E) SEMESTER-I/SEMESTER-II branches to be decided by the concerned institution.

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

Practical Examination will consist of 10 marks for viva-voce and 15 marks for Experiment.

*Institutes will offer one of these electives

**Subject is qualifying. It shall carry 25 sessional marks for field work (to be conducted by the institute) report.

KURUKSHETRA UNIVERSITY KURUKSHETRA
SCHEME OF STUDIES & EXAMINATIONS
B.Tech. 1ST YEAR (SEMESTER –II) COMMON FOR ALL BRANCHES (2003-2004)

Course No.	Course title	Teaching Schedule				Allotment of marks				Duration of Exams.
		L	T	P	Total	Sessional	Theory	Practical	Total	
MATH-102E	Mathematics-II	4	1	-	5	50	100	--	150	3
PHY-102E	Physics-II	3	1	-	4	50	100	--	150	3
BT-101E	Introduction to Biotechnology	3	1	-	4	50	100	--	150	3
HUM-101E	OR Communication skills in English	3	1	-	4	50	100	--	150	3
ME-101E / CE-101E / EL- 101E	Elements of Mechanical Engineering / Elements of Civil Engg./ Elements of Electronics Engg. *	3	1	-	4	25	75	--	100	3
ME-105E	OR Engg. Graphics and Drawing	--	--	3	3	--	--	75	125	3
ME-103E	Manufacturing Processes	4	--	--	4	50	100	--	150	3
CH-101E	OR Chemistry	3	1	-	4	50	100	--	150	3
CSE-101E	Fundamentals of Computer & Programming in C	3	2	-	5	50	100	--	150	3
EE-101E	OR Electrical Technology	3	2	-	5	50	100	--	150	3
ES-101E	Environmental Studies**	4	-	-	4	25	75	--	100	3
PHY-104E	Physics Lab.-II	-	-	2	2	25	--	25	50	3
ME-107E	Workshop Practice	--	--	3	3	25	--	25	50	3
CH-103E	Or Chemistry Lab.	--	--	2	2	25	--	25	50	3
CSE-103E	Computer Programming Lab.	--	--	2	2	25	--	25	50	3
EE-103E	OR Electrical Technology Lab.	--	--	2	2	25	--	25	50	3
ME-109E CE- 109E EL-109E	Elements of Mechanical Engineering / Elements of Civil Engg./ Elements of Electronics Engg. *	--	--	2	2	25	--	25	50	3
	Total	20/16	6/6	9/9	35/35	375/375	575/500	100/150	1050/1025	

Note:- 1. Students will study either Group A (BT-101E, ME-101E/ CE-101E/ EL-101E, ME-103E, CSE-101E, ME107E, CSE-103E, ME-109E/ EL-109E/ CE-109E) OR Group B (HUM-101E, ME-105E, CH-101E, EE-101E, ES-101E, CH-103E, EE-103E) SEMESTER-I/SEMESTER-II branches to be decided by the concerned institution.

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

3. Practical Examination will consist of 10 marks for viva-voce and 15 marks for Experiment.

*Institutes will offer one of these electives

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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.

HY-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

EM Theory : E.M. wave theory-review of basic ideas, Gauss's Law, Ampere's Law and its applications to infinite line charge & Infinite plane, 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, permittivity & 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

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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 Eukaryotic 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.

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HUM-101-E
COMMUNICATION SKILLS IN ENGLISH
B.E. Semester-I

L T P
3 1

Theory: 100 marks
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:

Language in Use (Upper intermediate Level), Adrian Doff Christopher Jones, Cambridge University Press

Common Errors in English, Abul Hashem, Ramesh Publishing House, New Delhi.

Objective English, Tata Mc. Graw Hill Publishing Company Ltd., New Delhi.

Spoken English for India, R.K. Bansal & J.B. Harrison, Orient Longman, Delhi.

The sounds of English, Veena Kumar, Makaav Educational Software, New Delhi.

English Phonetics & Phonology, P. Roach, Cambridge University Press, London.

English for Engineers and Technologists: A Skill Approach, Vol. 2, Orient Longman, Delhi.

Business Communication, M.S. Ramesh and C.C. Pattanshetti, R.Chand and Company, Delhi

Group Discussion, Sudha Publications/Ramesh Publishing House, New Delhi.

English Grammar & Composition. By Rajinder Pal & Prem Lata Singh, 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

3 1

Theory: 75 marks

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, Poisson'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, Allahbad.
3. Thermal Science and Engineering – D.S. Kumar, Pub. – Kateria & Sons, New Delhi.

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.

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ELEMENTS OF CIVIL ENGINEERINGS

L T P

3 1 -

Sessional: 25 Marks

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- riveted 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, Diode 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 application

Reference :

1. Electronic Devices & Circuits - Boylestad & 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. Jeyapooan, First Edition 2002, Vikas Publishing House.

ME- 103E

MANUFACTURING PROCESSES

L T P

4

Theory : 100 marks

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 Uses 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 :

Workshop Technology Vol. I &II - Hazra & Chaudhary, Asian Book Comp., New Delhi.

Process and Materials of Manufacture-Lindberg, R.A. Prentice Hall of India, New Delhi.

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.

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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 methodes,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.

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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.

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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 characteristics, 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 & Nagarith, 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.

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PHY-103E

PHYSICS LAB.-I

(COMMON FOR ALL BRANCHES)

L T P
- - 2

Sessional Work:25 Marks

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 Newton's formula and hence to find the focal length 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 Carey Foster Bridge
11. To find the resistance of a galvanometer 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 galvanometer into 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).

ME-107E

WORKSHOP PRACTICE

L T P
- - 3

Sessional Work: 25 Marks

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.

List of Experiments / Jobs

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 for 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, to 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 side and face milling on a milling machine.

**B.E. I/II Semester
CH-103E
CHEMISTRY LAB
(COMMON FOR ALL BRANCHES)**

L T P
- - 2

**Sessional Work: 25 Marks
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 spectrophotometrically.
11. Determination of strength of HCl solution by titrating it against NaOH solution conductometrically.
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)

EE-103E

ELECTRICAL TECHNOLOGY LAB

L T P
- - 2

Sessional Work: 25 Marks
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.

CSE-103E

COMPUTER PROGRAMMING LAB.

L T P
- - 2

Sessional Work:25 Marks

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 male 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
- - 2

Sessional Work: 25 Marks
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 emitter & 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 A_v , A_i 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

ME-109E

ELEMENTS OF MECHANICAL ENGINEERING LAB.

L T P
- - 2

Sessional Work: 25 Marks
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 study 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
4 1

Theory : 100 marks
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 independence of vectors, 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 Legendre'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 derivatives, transforms of integrals, multiplication by t^n , 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.

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

L T P
3 1

Theory: 100 marks
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. Solid 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.

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

L T P
- - 2

Sessional Work: 25 Marks
Examination: 25 Marks
Total: 50 Marks
Duration of Exam: 3 Hrs.

Note: Students will be required to perform at least 10 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. To find the frequency of ultrasonic waves by piezo electric method.
3. To find the value of e/m for electrons by Helical method.
4. To find the ionisation potential of Argon/Mercury using a Gyatron 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 semi-conductor.
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 thermometer 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).
3. Advanced Practical Physics Vol.I & II – Chauhan & Singh (Pragati Prakashan).

**THIRD SEMESTER SCHEME OF EXMINATION FOR B.TECH DEGREE COURSE
ELECTRICAL AND ELECTRONICS ENGINEERING**

Course No.	Course Title	Teaching Schedule				Examination schedule			Total Marks	Duration of Exam
		L	T	P/D	Total	Theory	Sessional	Practical Viva		
MATH-201-E, HUM-201-E	E/ MATHEMATICS-III/ BASICS OF INDUSTRIAL SOCIOLOGY,	3	1	-	4	100	50	-	150	3
EECT-201-E	SEMICONDUCTOR DEVICE	3	1	-	4	100	50	-	150	3
EE-201-E	NETWORK ANALYSIS & SYNTHESIS	3	-	-	4	100	50	-	150	3
EECT-203-E	PRINCIPLES OF COMM. ENGG.	-	1	-	4	100	50	-	150	3
EECT-205-E	POWER APPARATUS & MACHINE-I	-	1	-	5	100	50	-	150	3
EECT-207-E	SIGNAL & SYSTEMS	3	1	-	4	100	50	-	150	3
EECT-209-E	POWER APPARATUS & MACHINE LAB-	-	-	3	3	-	50	50	100	3
EECT-211-E	SEMICONDUCTOR DEVICES LAB	-	-	2	2	-	25	25	50	3
EECT-213-E	SIGNAL & SYSTEM LAB	-	-	2	2	-	25	25	50	3
EECT-219-E	ELECTRICAL WORKSHOP	-	-	3	3	-	25	25	50	3
		-	-	-	-	-	-	-	-	-
	TOTAL	19	6	10	35	600	425	125	1150	-

Note: - Students shall devote 8 weeks to industrial training after sixth semester exam outside the college campus at approved works.

BASICS INDUSTRIAL SOCIOLOGY, ECONOMICS & MANAGEMENT

HUM – 201 E	Sessional	:	50
L T P	Theory	:	100
3 1 -	Total	:	150
	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. MacIver 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

MATH-201 E**MATHEMATICS - III**

L T P
3 1 -

Theory : 100
Sessional : 50
Total : 150
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, Parseval'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. Churchill; 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.

SEMICONDUCTOR DEVICES
IIIrd SEM. EECt-201-E

L	T	P/D	TOTAL
3	1	-	4

Theory: 100 Marks
Sessional: 50 Marks
Duration: 3 hrs

UNIT-I Semiconductors: Band structure of semiconductor, Electron & hole distribution, current transport in semiconductor & concept about mobility, Diffusion & recombination, the continuity equation & its solution and Hall effect.

Semiconductor technology : Introduction to technology of semiconductor devices , basic of ICs- Bipolar , MOS and CMOS type.

UNIT II P-N Junction Diodes : Structures technology , V-I characteristics , charge control equation and transient response . Types of P-N junction diode: Tunnel , Zener , Shockley , Schottky, varactor diode & circuit : rectifiers , clipping and clamping circuits.

Opto –Electronics : Basic of opto –Electronics , photo Diodes photo transistor , P-N Junction solar cells , LED , laser and photovoltaic device .

UNIT III Bipolar Transistor: Ebers-Moll model & charge control model, Transient behavior, small signal equivalent circuit h -parameter and hybrid – π model, switching and power transistor.

Field Effect Transistor: JFET operation and V-I characteristics, high frequency response , MOS capacitor theory , MOSFET types , MOSFET operation and V-I characteristics , equivalent circuit metal semiconductor junction and MOSFET.

UNIT IV Special semiconductor Device : Metal semiconductor contact , MIS structure surface charge transfer and charge coupled device and their applications.

Semiconductor power devices : Diodes, transistors, UJT, Thyristor, DIAC, TRIAC, GTO, IGBT static characteristics. and principle of operation .

NOTE:

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

RECOMMENDED BOOKS :

1. B.G. Streetman : Solid State Electronic Devices (PHI)
2. S.M. Sze: Physics of Semiconductor Devices (WILEY)
3. D. Nagchoudhari : Semiconductor Devices (TMH)
4. P.S. Bimbhra : Power Electronics (KP)
5. Dubey G.K. : Thyristorised Power Controllers (NAIL)

NETWORK ANALYSIS & SYNTHESIS

EE-203-E

L T P
3 1 0

Sessional	:	50	Marks
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.

PRINCIPLES OF COMMUNICATION ENGG.

EEcT- 203-E

L	T	P
3	1	-

Theory : 100 Marks
Sessional : 50 Marks
Duration : 3hrs

UNIT I- NOISE:- Classification Noise, Various sources of Noise, Methods of Noise Calculation in networks and interconnected 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 AM Wave , modulation index, DSBSC modulation, Collector modulation, Square law modulation 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 MODULATIN: 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-Secley discriminator. Pre-emphasis & De-emphasis, effect of noise on carrier; noise triangle.

UNIT IV- TRANSMITTER 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.

NOTE:

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

Books recommended:

1. Principle of communication of engineering : By Umesh Sinha.
2. Communication system By R.Singh & S. D. Sapre (TMH)
3. Electronics communication system By George Kenddy (TMH)
4. Communication system By Taub Schilling.(TMH)
5. Communication Engineering By W.I.Everitt.& G. E. Anner (MGH)
6. Principle of communication System By Taub & Schilling , (TMH)
7. Radio Engineering By Mithal G.K. (Khanna Pub.)
8. Communication System By John Wiley

POWER APPARATUS AND MACHINE-1

IIIrd Sem. EEcT-205-E

L	T	P/D	Total	Theory: 100 Marks
4	1	-	5	Sessional : 50 marks
				Duration : 3 hrs

UNIT-I Principles of Electro- Mechanical energy conversion: Basic Principle, energy, force and torque of singly, multiply excited system, reluctance torque, basic rotating machine, distribution and harmonics in mmf. and e.m.f. of dc and ac machines, revolving field, torque production, asynchronous and synchronous torque.

UNIT-II D.C.Machines: Principles of e.m.f. and torque production, function of commutator, methods of excitation.

Operation of generators: interactions of armature and excitation fields, effects of brush shift, compensating winding, Characteristics of various generators, simple ideas of parallel operation.

Operation of Motor: Method of excitation, Characteristics, Speed control and starting methods, testing, losses and efficiency. Armature reaction and commutation.

UNIT III Transformer: Principle, Construction, equivalent circuit and phasor diagram of single phase transformer, determination of equivalent circuit parameters, regulations, losses and efficiency. Various types of connections for three phase transformer, their comparative features, parallel operation of single phase and three phase transformers. Auto transformer: Principle, application and comparison with 2-winding transformer.

Nature of magnetizing current, harmonics, construction of 3-phase transformer.

Phase conversion: 3-2 phase and 3-6 phase conversion. Three winding transformer, phase shifting, tap changing in transformers and induction regulator.

UNIT IV Single Phase Motors: Single phase induction motor, double revolving field theory, equivalent circuit and determination of parameters, single phase synchronous motors.

NOTE:

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

RECOMMENDED BOOKS:

1. Nagrath & Kothari: Electric Machines (TMH)
2. Langsdorf: A.C.Machines (TMH)
3. Fitzgerald and Kingsley: Electrical Machinery (MGH)
4. P.S. Bimbhra: Electrical Machinery (KP)
5. Dennis O' Kelly Performance and Control of Electrical Machine
6. Nagrath & Kothari: Theory and problem of Electrical Machines(TMh)

SIGNAL & SYSTEM

IIIrd Sem. EEC T-207-E

L	T	P/D	Total	Theory : 100 Marks
3	1	-	4	Sessional: 50 Marks
				Duration: 3 hrs

UNIT –I Classification of Signals & Systems: Definition & concept of different types of , signal, impulse sequence, other singularity functions, system: classifications of system, superposition system, casual and non-casual system, memory & memory less system, representation of continuous time & discrete time, signal & system, time invariance & causality, concepts of linearity & stability, LTI system(Continuous-time & discrete time type), properties of LTI system, response of linear system to random signal inputs, system modeling in terms of differential & different equations, methods for solving such equations, state variable representation multi input & multi output discrete/continuous \ representation multi input & multi output discrete/continuous representation. Random process band limited process , Gaussian & related process, discrete System.

UNIT-II Properties of Signal & Systems: Correlation function, autocorrelation & their properties, convolution sum, convolution integral & their evolution time domain representation and analysis of LTI system in terms of convolution sum & convolution-integral, Parseval's theorem for energy & power signals, energy spectral density, power spectrum density, system function(transfer function).

UNIT-III Transform Domain Considerations: Laplace transform of various signals, properties of Laplace transform & their application to system analysis, inverse Laplace transform spectral analysis, Fourier series & Dirichlet condition existence, convergence & consequences, Fourier transform to various signals & their properties (Fourier series & Fourier transform) application to system analysis, convolution & multiplication in Fourier & Laplace transforms, convergence in lapalce transforms, convergence in lapalce & Fourier transform.

UNIT-IV (a) Z- Transform: Introduction to Z-transform & properties of z- transform & properties of Z- transform, poles & zero of the Z- plane notions of convergence, techniques of inversion & related concepts, applications of Z- transform to analysis & characterization of discrete time system, interaction with lapalce & fourier transform.

(b) Sampling: Discrete representation of continuous signal sampling sampling theorem & its proof sampling & recovery of the signal, the effect of under sampling, digital simulation of analog system.

NOTE:

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

RECOMMENDED BOOKS:

- 1.A.V.Oppenheim, A.S. Winsky: Signal & Systems(PHI).
2. R.P. Singh & Sapre: Communication Systems(TMH).
3. John Prokakis: Digital Signal Processing(PHI).

4.R.F.Ziener,W.H.Traiter & Signal & system-Continuous & Discrete.

D.R. Fanin (Macmillan) 5. Fred J. Taylor: Principles of signal & systems by(MGH).

6.Simon Haykins: Signal & Systems(Wiley Eastern).

POWER APPARATUS & MACHINE-I
III SEM. EECt-209-E

L	T	P
-	-	3

Sessional : 50Mks
Practical : 50 Mks
Total : 100 Mks
Duration : 3hrs

1. To perform load test on a single phase transformer and plot graph between load current & efficiency.
2. To perform O.C. & S.C. test on a single-phase transformer.
3. To carry out speed control on DC shunt motor (Armature & Field control)
4. To obtain magnetizing characteristics of a separately excited DC generator and hence calculate critical resistance and critical speed.
5. To draw the load characteristics of a DC shunt /Compound Generator (I) shunt, (II) Cumulative Compound (III) Differential Compound.
6. To determine the efficiency of a DC machine by Swinburn test.
7. To transform power from 3- phase system to 2- phase system using Scott connection transformer.
8. To draw the equivalent circuit of 1- phase transformer from the result of open circuit test & short circuit test and estimate the regulation and efficiency of a transformer from test data.
9. To perform parallel operation of single-phase transformer.
10. To control speed of D.C. machine using Ward Leonard method.

SEMICONDUCTOR DEVICES

IIIrd SEM. EECt-211-E

L **T** **P**
- - 2

Sessional : 25 Mks

Practical : 25 Mks

Duration : 3 hrs.

Total : 50 Mks

List of Experiments :

1. Draw V.I characteristics of P.N.junction diode in forward bias region & study of L.E.D characteristics.
2. To study the reverse breakdown characteristics of given zener diodes as a voltage regulator.
3. To study the input and output characteristics of a given transistor in common emitter configuration
4. To study the static characteristics of a given JFET & evaluate parameters r_d , I_{dss} , V_{po} , g_m , μ .
5. Verify the Truth Table of And, OR, XOR, NOT Logic gates.
6. To study half wave rectifier, Full wave rectifier & bridge rectifier and effect of different filter circuits on ac ripple at different loads.
7. To study the inverting and non-inverting amplifier using op-amp.
8. (a) To understand the function of each subsystem of the Oscilloscope and the proper use of each of its controls
(b) To measure the voltage and frequency
9. To study the UJT as relaxation oscillator and to observe the effect of RC time constant upon output pulse.
10. To measure h- parameters of given transistor at 1 KHz in common emitter configuration.

SIGNALS AND SYSTEMS LAB
III rd SEM. EEcT-213-E

L	T	P
-	-	2

Theory : 25 Mks
Practical: 25 Mks
Duration : 3 hrs.
Total : 50 Mks

1. To study Z- transform of ;
 - a) Sinusoidal signals.
 - b) Step functions.
2. To compare fourier and laplace transform of a signal.
3. To study convolution theorem in time and frequency domain.
4. To Study Signal Synthesis via sum of harmonics.
5. To study LPF & HPF, band pass & reject filters using RC circuits.
6. To demonstrate how analog signals are sampled & how different sampling rates affect the outputs.
7. To study sampling theorem for low pass signals & band pass signals .
8. To determine the components of :
 - a) Square wave.
 - b) Clipped sine wave.

ELECTRICAL WORKSHOP

III rd SEM. (EE-219-E)

L T P	Sessional	:	25	Marks
0 0 3	EXAM	:	25	Marks
	TOTAL	:	50	Marks
	DURATION OF EXAM	:	3 HRS	

LIST OF EXPERIMENTS:

1. Introduction of tools, electrical materials, symbols and abbreviations.
2. To study stair case wiring.
3. To study house wiring i.e., batten, cleat, casing-caping and conduit wirings.
4. To study fluorescent tube light.
5. To study high pressure mercury vapour lamp (H.P.M.V).
6. To study Sodium lamp.
7. To study repairing of home appliances such as heater, electric iron, fans etc.
8. To study construction of moving iron, moving coil, electro-dynamics & induction type meters.
9. To design & fabricate single phase transformer.
10. To study fuses, relays, contactors, MCBs and circuit breakers.
11. Insulation testing of electrical equipments.
12. To design, fabricate a PCB for a circuit, wire-up and test.

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.

**FOURTH SEMESTER SCHEME OF EXMINATION FOR B.TECH DEGREE COURSE
ELECTRICAL AND ELECTRONICS ENGINEERING**

Course No.	Course Title	Teaching Schedule				Examination schedule			Total Marks	Duration of Exam
		L	T	P/D	Total	Theory	Sessional	Practical Viva		
MATH-201-E/ HUM-201-E	MATHEMATICS- III/, BASICS OF INDUSTRIAL SOCIOLOGY, ECONOMICS & MANAGEMENT	3	1	-	4	100	50	-	150	3
EEcT-202-E	DIGITAL ELECTRONICS	3	1	-	4	100	50	-	150	3
EEcT-204-E	POWER APPARATUS & MACHINE-II	4	2	-	6	100	50	-	150	3
EEcT-206-E	ANALOG INSTRUMENT & MEASUREMENT	3	1	-	4	100	50	-	150	3
EEcT-208-E	LINEAR IC & APPLICATION	3	1	-	4	100	50	-	150	3
EEcT-210-E	ANALOG ELECTRONICS	3	-	-	4	100	50	-	150	3
EEcT-212-E	DIGITAL ELECTRONICS LAB	-	-	2	2	-	25	25	50	3
EEcT-214-E	POWER APPARATUS & MACHINE LAB-II	-	-	3	3	-	50	50	100	3
EEcT-216-E	LINEAR IC LAB	-	-	2	2	-	25	25	50	3
EEcT-218-E	ANALOG ELECTRONICS LAB	-	-	2	2	-	25	25	50	3
		-	-	-	-	-	-	-	50	3
	TOTAL	19	7	9	35	600	425	125	1150	-

Note : - Students shall devote 8 weeks to industrial training after sixth semester exam outside the college campus at approved works.

DIGITAL ELECTRONICS

IV Sem. EECt– 202-E

L T P/D
3 1

Theory : 100 Marks

Sessional : 50 Marks

Duration : 3 hrs.

UNIT-I Number System of Codes : Decimal , Binary , octave , Hexadecimal number system , BCD codes , Excee code , grey , ASCII , Alphanumeric code , Binary arithmetic , 1's and 2's complements, Hamming code integer and floating point systems , code conversion.

Boolean Algebra: Basic theorems , commutative , associative , distributive laws , duality concept , SOP & form of Boolean expressions , minimization techniques up to six variables using K maps , QM method, variable map entered method.

UNIT-II Logic gates & Logic Families : Logic gates , transistor as a switching elements , positive and negative logic. Bipolar logic families ; DTL , TTL ,RTL , ECL , I²L , TTL parameters , three state TTL devices , MOS logic families : NMOS , CMOS families , CMOS characteristic , TTL to CMOS to TTL interface . Various Logic Functions and their implementation , Universal Gates.

UNIT-III Combinational Logic Gates : Introduction to combinational circuits , arithmetic and logic operation, design of half adder and full adder circuit , half & full subtractor, parity generator & checker , codes converter, decoder, multiplexers, demultiplexers , comparators.

Sequential Circuits : Flip-Flops , bistable circuits: RS, JK, D, T, F/F, race around condition method, synchronous and asynchronous counters, up & down counters, shift registers , state transition diagram.

Semiconductor memory : Basic of memory, memory addressing , ROM , PROM , EPROM, RAM, state and dynamic RAM..

UNIT-IV A/D & D/A Converters : D/A Converter, accuracy and resolution , variable resistor network , binary ladder . A/D Converter , accuracy and resolution, simultaneous conversion, counter method, continuous A/D Converter dual slope, successive approximation method.

Waveform Generation : Timing circuits using 555, multivibrators , Schmitt trigger, sample and hold circuits .

NOTE:

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

RECOMMENDED BOOKS: (1) R.P. Jain, Modern Digital Electronics (TMH). (2) Malvino A.P. & Leach D.P., Principles & Application (MGH). (3) Floyd : Digital Fundamentals (UBS). (4) Charles H.Roth : Fundamentals of logic Digital . (5) H. Taub & D. Schilling : Digital Integrated Electronics (MGH). (6) Gothman : Digital Electronics (PHI) . (7) Tokhem .R. : Digital Electronic Principles and Application (TMH).(8) V.K.Puri :- Digital Electronics (TMH) (9) Virender Kumar :- Digital Electronics(New Age).

POWER APPARATUS AND MACHINES- 11

IV SEM. EEcT-204-E

L T PID
4 2

Theory: 100 Marks
Sessional: 50 Marks

Duration : 3hrs

UNIT-I Polyphase Induction Machines: Production of torque, constructional features, operation, equivalent circuit, determination of parameters, current locus diagram, effect of rotor resistance, high starting torque motors, Generator operation, starting & speed control technique, space harmonics and their effect, cogging, crawling and noise.

UNIT-II Polyphase AC Commutator Machines: Effect of voltage injection in rotor circuit of slip ring induction motor by auxiliary Commutator machines, Kramers & Scherbius arrangement, principle and operation of doubly fed Commutator motor and Schrage motor.

UNIT-III Synchronous Machines: Special constructional features.

Cylindrical rotor machine: flux & mmf waves, torque angle, impedance, voltage regulation & its estimation.

Salient pole machine: two-reaction theory, phasor diagram, direct & quadrature-axis reactances, phasor diagram, voltage regulation. Determination of X_d & X_q , effect of saturation

Synchronous motor: principle of working, phasor diagram, steady state operating

Characteristics-curve, methods of starting, power angle characteristics of

Cylindrical and salient pole machines, parallel operation, synchronization and load

Division, synchronous machine connected to infinite bus bar Elementary idea

about stability & hunting, Effect of damper winding.

UNIT-IV Circuit Theory of Electrical Machines: Idealized machine, equation of primitive machines, transformation to d-q variable, Park's inverse transformation, impedance of matrices of d.c., cross field, synchronous & induction machines, d-axis and q-axis equivalent circuit of synchronous machine reactances and time constants. Electro-mechanical equation of synchronous machine, Linearized analysis

NOTE:

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

RECOMMENDED BOOKS :

1. Nagrath & Kothari: Electrical machine (TMH)
2. E.O.Taylor: Theory, Performance & design of AC commutator machines (WP)
3. Langsdorf : AC machines (TMH).
4. P.S.Bhimra: Generalised theory of machines (KP).
5. P.S.Bhimra: Electrical machinery (KP).
6. Nagrath & Kothari: Theory & problem of electric machines (TMH)

ANALOG INSTRUMENTS & MEASUREMENTS

IV SEM. EECt-206-E

L T PID
3 1

Theory : 100 Marks

Sessional : 50 Marks

Duration : 3hrs

- UNIT-I** SI system of units & dimensional analysis. Errors in measurements, relative, systematic and random errors, error estimation in measurement technique.
Recorders: X-Y recorder, strip chart recorder and magnetic recorder. Digital display methods display systems- LED, LCD.
- UNIT-II** Principle, constructional features, analysis & performance of (i) Moving coil instruments (D'Arsonval galvanometer, ballistic galvanometer, vibration galvanometer, flux meter, ratio meter and meggar) (ii) Moving iron instruments. (iii) Electrodynamic instrument. (iv) Electrostatic instruments & (v) Induction instruments
Measurements of potential current, (under D.C. and power frequency condition), power and energy. Measurement of high direct and alternating voltages and current. Measurement of transmission line parameters.
- UNIT-III** Measurement of resistance low, medium and high resistances.
Substitution and null methods measurements of self inductance, mutual inductance, for low Q and high Q coils and capacitance using Maxwell's Hay's, Anderson's, Campbell's, Deauty's and Schering bridge. Shielding and grounding of bridges.
Magnetic measurement sample forms, Lloyds-fisher square, separation of hysteresis loss and eddy current losses, instrument transformers current transformer, potential transformer their performance characteristics.
- UNIT-IV** Principle of telemetry, wire link channels, radio channels, multiplexers .
Measurement of non-electrical quantities by electrical means :- Transducers for measuring position, speed, force, pressure, temperature, torque, humidity, strains, flow, velocity,(angular & linear) and vibration.

NOTE:

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

RECOMMENDED BOOKS :

- (1) AK Sawhney: A course in Electrical & Electronics measurement and instrumentation (Dhanpat Rai & Sons)
- (2) J.B .Gupta:- Electrical & Electronics measurement & instrumentation
- (3) W.D. Copper :- Electronic instrumentation & measurement Techniques(PHI).
- (4) P.W. Golding:- Electrical Measurements & Measuring Instruments (WP)

LINEAR AND IC APPLICATION
IV SEM. EECt-208-E

L T P/D
3 1

Theory : 100 Marks
Sessional : 50 Marks
Duration : 3 hrs

- UNIT-I Differential and Cascade Amplifier:** Balanced and unbalanced output differential amplifier, FET differential amplifier, current mirrors, level translators, cascade or CB-CE configuration of amplifier, operational amplifier, block diagram representation of op-amp, introduction to idea op-amp, characteristics, parameters, interpretation of data sheets, data specification of op-amp & main parameter like CMMR, thermal drift, offset voltage & current practical op-amp and its equivalent circuit, op-amp circuit configurations.
- UNIT-II Frequency response of an Op-amp:** Frequency response compensating network, frequency response of internally compensated and non-compensated op-amp. High frequency op-amp equivalent circuit, open loop and closed loop frequency response, circuit stability, slew rate.
- Operational Amplifier with feedback:** Block diagram representation of feedback amplifier, voltage series feedback, voltages shunt feedback, differential amplifier.
- Op-amp application:** DC and AC amplifier, peaking amplifier, summing, scaling, averaging and instrumentation amplifier, differential input and output amplifier, voltage to current converter, current to voltage converter, very high input impedance circuit, integrator, differentiator, voltage limiters, voltage regulator, voltage to frequency converter & frequency to voltage converter.
- UNIT-III Active filters & Oscillators :** Introduction to active filters, Butter worth and Chebyshev approximation to low pass filter and high pass, band pass filters. Oscillators, criterion for oscillation, phase shift, wein bridge, quadrature, square wave, saw tooth and voltage controlled oscillator.
- Comparators & Converters:-** Introduction to basic comparator, zero crossing detector, Schmitt trigger, comparator characteristics, analog to digital & digital to analog converters, sample & hold circuit, peak detector.
- UNIT-IV Specialized IC Applications:-** Universal active filters, switched capacitor filter, the 555 & 556 timers and their applications. Phase locked loop and voltage regulators.

NOTE:

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

RECOMMENDED BOOKS:- (1) R.A.Gayakwad: Op-amp & Linear Integrated Circuits(PHI) (2) D.Roy Chodury :- Linear Integrated Circuits(New age Internation) (3) Millman & Halkias : Integrated Electronics (TMH) (4) Integrated-Circuit Op-amp: George B. Rutkoswaki (PHI) (5) Conulin R.F.: OP-amp and Linear Integrated Circuit (PHI) (6) Connely J.a. : Analog Integrated Circuit, Device Circuits Systems and Application(John Wiley) (7) Hnatch : Application of Linear Integrated Circuits (John Wiley)

ANALOG ELECTRONICS
IV SEM. EEcT-210-E

L T PID
3 1

Theory : 100 Marks
Sessional : 50 Marks
Duration : 3hrs

- UNIT-I Transistor Biasing & Stability :** Transistor construction and its operation, Transistor biasing & Q- point Stability, CB, CE & CC configuration , h-n parameter of Transistor, expression for current gain , voltage gain I/P & O/P Impedance , Transistor as switch, Transistor amplifying action.
- UNIT-II FET:** General description of FET, difference b/w UJT & FET, construction & characteristic of JFET transfer characteristic & parameters MOSFET & FET biasing. FET as an amplifier equivalent circuit JEFT and MOSFET ,UJT and its characteristic.
- UNIT-III Amplifier:** Small signal amplifier and then analysis, RC coupled, transformer coupled direct coupled amplifier and their frequency response and analysis . Wide band amplifier, tuned amplifier low frequency amplifier and their frequency, Intermediate stage amplifier.
Power amplifier: Class A, class B and class C amplifier Calculation of efficiency and distortion push pull amplifier, and application of power amplifier.
Feed Back amplifier: Concept of +ve & -ve feedback overall gain advantage of -ve feedback , voltage & current feedback ,series and shunt feedback, effect of feedback on frequency response and bandwidth , noise reduction using -ve feedback, effect on I/P & O/P characteristics.
- UNIT-IV Oscillators :** Barkhausen criteria, Wein Bridge, RC phase shift, Colpitts & Hartley oscillator . Multivibrators using transistor, crystal oscillator.
Analog Signal Processing : Clipping, clamping and rectification, filtering, Wave Shaping , circuit modulation and Electronics Demodulation.

NOTE:

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

RECOMMENDED BOOKS:

1. millman & halkias: Integrated circuit .
2. R. Boylested & L.Nashelky : Electronics Divices & Circuit (PHI)
3. millman & halkias: Electronics Divices & Circuit (TMH)
4. Malcolm Goodage: Analog Electronics & Synthesis.
5. Malvino a paul : Electronic Principal (THM)

DIGITAL ELECTRONICS LAB
1V Sem. (EEcT-212-E)

L	T	P
-	-	2

Sessional : 25 Marks
Practical : 25 Marks
Total : 50 Marks
Duration: 3hrs.

LIST OF EXPERIMENTS :

1. Verify the truth table of AND, OR, NOT, EX-OR, gate.
2. Verification of NAND, OR, EX-OR, NOR using 7400 IC.
3. Design a hardware circuit to perform the operation of half & full adder.
4. Design a hardware circuit to perform the operation of full subtractor.
5. Verify the truth table of RS, D, T, JK Flip Flop.
6. Study asynchronous counter in up & down mode.
7. To study multiplexer and demultiplexer.
8. To study decade counter.
9. To design D/A, A/D converter.
10. To study the operation of Schmit Trigger using 7414 IC.

Power Apparatus & Machine Lab-II

IV Semester (EEcT- 214-E)

L T P/D
- - 3

Sessional : 50Marks
Practical :50 Marks
Total : 100 Marks
Duration: 3 hrs

LIST OF EXPERIMENTS:

1. To study of running of three phase induction motor & determine of mechanical losses .
2. study & stating of a 1- phase induction motor, light & running block rotor test & hence, determine the parameter of equivalent circuit .
3. To find out of losses of transformer by Sumpener's test (Back to Back test or load test)
4. A) To perform a load test on a 3 – phase induction motor
B) compute efficiency, torque, slip, speed, I/P p.f. and stator current . plot the graph b/w efficiency Vs Po, T Vs, Po, II, Vs, Po, $\cos \phi$ Vs Po, S Vs Po , T vS N .
5. To study the various connection of 3- phase transformer .
6. To determine regulation of synchronous impedance method
 - 1) conduct open & short ckt. Test on a 3- phase alternator
 - 2) Determine & plot variation of synchronous impedance with IF
 - 3) Determine S.E.R.
 - 4) determine regulation for 0.8 lagging p.f., unity p.f.
7. To perform open & short ckt. Test on a 3- phase alternator to find regulation by mmf method .
8. V – curve of synchronous motor .
 - A) to study the effect of variation of field current upon the stator current and p.f. with synchronous motor running at no load, hence draw V & inverted V curves of the motor
9. To perform direct load Test on a 3- phase alternator for :
 - 1) Resistive load .
 - 2) Inductive load .
 - 3) Capacitive load .
10. To measure negative sequence reactance of a synchronous machine.
11. To measure direct – axis synchronous reactance and quadrature – axis Synchronous reactance. X_d X_q by slip test .

LINEAR IC LAB
IV SEM. (EEcT – 216-E)

L	T	P
-	-	2

Sessional: 25 Marks
Practical : 25 Marks
Total : 50 Marks
Duration : 3 hrs

LIST OF EXPERIMENTS

1. To study the OPAMP as inverting and non-inverting
2. To study the OPAMP as differentiator
3. To study the OPAMP as integrator
4. To demonstrate the operation of low pass filter and design the second order low pass filter.
5. To demonstrate the operation of high pass active filter
6. To study the frequency response of band pass filter
7. To study the notch filter
8. To construct the astable multivibrator using IC 555
9. To study the operation of the Schmitt trigger using the IC 741.
10. To study the phase shift wein bridge oscillator

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ANALOG ELECTRONICS

IV SEM.(EECt- 218-E)

L	T	P
-	-	2

Sessional : 25Marks

Practical : 25 Marks

Total : 50 Marks

Duration : 3 hrs.

LIST OF EXPERIMENTS:

1. To study of characteristics of photodiode & LED .
2. To study of characteristics of phototransistor.
3. To study of characteristics of VDR & LDR.
4. To study of characteristics of optocoupler .
5. To study of characteristics of Varactor diode .
6. To study Transformer coupled amplifier & determine its voltage gain.
7. To study RC coupled amplifier & determine its voltage gain, power gain & freq. response.
8. To study Hartley Oscillator .
9. To study the different types of negative feedback in two stage amplifier and to observe its effects upon the amplifier parameters.
10. To study biasing of transistor by following method :
 - I) Fixed bias .
 - II) Voltage divider bias .

**FIFTH SEMESTER SCHEME OF EXMINATION FOR B.TECH DEGREE COURSE
ELECTRICAL AND ELECTRONICS ENGINEERING**

Course No.	Course Title	Teaching Schedule				Examination schedule			Total Marks	Duration of Exam
		L	T	P/D	Total	Theory	Sessional	Practical Viva		
EEcT-301-E	ELECTROMAGNETIC FIELD & WAVES	4	1	-	5	100	50	-	150	3
EEcT-303-E	ELECTRONIC INSTRUMENT & MEASUREMENTS	3	1	-	4	100	50	-	150	3
EEcT-305-E	TRANSMISSION & DISTRIBUTION OF POWER	3	1	-	4	100	50	-	150	3
EEcT-307-E	CONTROL SYSTEM ENGG.	4	1	-	5	100	50	-	150	3
EEcT-309-E	POWER ELECTRONICS.	4	1	-	5	100	50	-	150	3
EEcT-311-E	VLSI & IC TECHNOLOGY	3	-	-	4	100	50	-	150	3
EEcT-313-E	ELECTRONIC INSTRUMENT & MEASURMENT LAB	-	-	2	2	-	25	25	50	3
EEcT-315-E	POWER ELECTRONICS LAB.	-	-	2	2	-	25	25	50	3
EEcT-317-E	CONTROL SYSTEM LAB.	-	-	2	2	-	25	25	50	3
EEcT-319-E	VLSI & IC TECHNOLOGY LAB.	-	-	2	2	-	25	25	50	3
EEcT-321E	PRACTICAL TRAINING REPORT	-	-	-	-	-	-	50	50	3
	TOTAL	21	6	8	35	600	400	150	1150	-

Note : - Students shall devote 8 weeks to industrial training after sixth semester exam outside the college campus at approved works.

ELECTROMAGNETIC FIELD & WAVES

V Sem. EECt-301-E

L	T	P/D	Total
4	1	-	5

Theory	: 100 Marks
Sessional	: 50 Marks
Duration	: 3Hrs

UNIT I

Review of vector analysis in all the three coordinate system line, surface & volume integrals, gradient, divergence & curl of a vector & their physical significance, Gauss Divergence theorem, Stokes theorem.

Gauss law in electrostatics & its applications, uniform line, surface & volume charge distributions, concepts of electric field & electric potentials, electric field & potential due to a linear dipole, method of images.

UNIT II

Biot Savart's law, Amperes circuital law & its applications. Boundary conditions for both the electric & magnetic fields at the interface of various types of media. Laplace, Poisson's equation & continuity equation. Faraday's & Lenz's laws, Maxwell's equations in differential & integral forms & their physical significance, retarded potentials.

UNIT III

Plane & uniform plane waves and their properties, waves equations in various media. . Polarisation & its types. Intrinsic impedance, propagation constant. Reflection & refraction of uniform plane waves at the interface of conductor- dielectric & dielectric - dielectric (both normal and oblique incidence). Relaxation time, skin effect, skin depth & surface impedance, Poynting vector theorem & its physical significance.

UNIT IV

Distributed parameters, circuit parameters, concepts of voltage & current flow on a transmission line, characteristic impedance. Reflection of transmission line, maxima & minima, standing wave ratio of a transmission line. Impedance matching, , Smith's chart & its applications, strip lines & microstrip lines, co-axial type transmission line. Concept of Wave Guide and TE, TM and TEM modes in rectangular and circular wave guide. Cut off and guide wave length, characteristic impedance, dielectric wave guide.

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.

References:

1. Electromagnetics by D.K. Cheng. (Pearson Education)
2. Electromagnetic Fields & Waves by Sadiku (Oxford Univ. Press)
3. Basic Electromagnetics with Application by N.N. Rao.
4. Electromagnetic waves and Radiating Systems by E.C. Jordan and K.G. Balman.
5. Electromagnetics by J.D. Kraus.

ELECTRONIC INSTRUMENT & MEASUREMENTS
V Sem. EEcT-303-E

L	T	P	Total
3	1	-	4

Theory : 100 Marks
Sessional: 50 Marks
Duration : 3Hrs

UNIT I

C.R.O.: Introduction, Cathode Ray Tube (CRT), Electron Gun, Electrostatic Focusing, Electrostatic Deflection, Post Deflection Acceleration of Electron Beam, Effect of Beam Transit Time, Frequency limitation. Deflection plates, Screens of CRT's Graticule Aquadog, Applications, Storage C.R.O. Digital CRO. Design of delay lines for CRO.

Amplifier Measurement: Amplifier Measurements, Transient response of Amplifiers, Measurements of Noise figure of Amplifier, Harmonic Distortions analyzer, Distortion Meter, Measurement of op-amp parameters.

UNIT II

Digital Instruments: Digital Indicating instruments, comparison with analog type digital display methods, theory and applications of digital voltmeters., Transistor, FET and other type of voltmeters. Electronic Galvanometers, Q-meter.

Frequency Measurements: - Measurements of frequency using cavity wave-meter. Heterodyne frequency meter, comparison of frequency using interpolation method. Digital frequency meter. Frequency measurements using digital means.

UNIT III

Signal Conditioning & Acquisition System: - Signal conditioning, A/D converter, D/A Converter, Use of op-amp in signal conditioning, Components of analog data acquisition System. Components of digital data acquisition system, signal conditioning, Multiplex special Encoders, Principles of Telemetry, Wire link channels, Ratio channels, and Microwave Channels.

UNIT IV

Instruments For Signals Generation: - Pulse and square wave circuits, Laboratory square wave and pulse generators, Function generators, Random noise generators, Frequency Synthesizer.

Bio-Medical Instruments:- ECG, EEG, EMG & Measurement of BP.

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.

References:

1. A course in Electrical & Electronics Measurement & Instrumentation: By A.K. Sawhney.
2. Electronics Instruments & Measurements techniques: By Helffrick & Cooper (PHI)
3. Instrumentation devices & Systems: By C.S. Rangan, G.R. Sharma & V.S. Mani.
4. Bio- medical Instrumentation & measurements: By Leslie Cromwell, Fred. J. Weibell, Erich A. Pfeitter (PHI).

TRANSMISSION & DISTRIBUTION OF POWER
V Sem. EEcT – 305-E

L T P/D Total
3 1 - 4

Theory : 100 Marks
Sessional : 50 Marks
Duration : 3 Hours

UNIT I

Transmission of Power: Growth of Power System in India, Transmission of Power by A.C. & D.C. system. Effects of increase in Voltage on transmission line efficiency. Underground or overhead system, Typical power system, Modern trends in power system transmission.

Distribution of Power: General consideration, Radial and ring main system D.C. Three wire system. Different types of distributors A.C. distribution; Relative copper consumption in various systems. Conductor size and Kelvin's Law, Tariffs and power factor improvement.

UNIT II

Resistance of transmission lines, skin effects, Proximity effect, Inductance of a single phase & two phase line, Composite conductor lines, Three phase lines with symmetrical and unsymmetrical spacing, Transposition of a line, Three phase double circuit line with symmetrical and unsymmetrical spacing, Bundled conductors.

UNIT III

Capacitance of two-wire line, three phase line with symmetrical and unsymmetrical spacing, Effect of earth capacitance of three-phase double circuit line with symmetrical and unsymmetrical spacing.

Short, medium and long lines – their representation, Performance, determination, Ferranti effect, Surge impedance, Loading of transmission lines, power circle diagram, Calculation of synchronous phase modifier capacity.

UNIT IV

Types of underground cables, Cables for A.C & D.C systems, Insulation, resistance and capacitance. Use of inter sheaths, Capacitance grading, Power factor in cable, Thermal characteristics.

Types of Insulators, Methods of equalizing voltage distribution, Corona loss and radio interference, Line supports, various types of conductor material, Sag calculations, Effect of wind, Ice and temperature on sag, Condition at erection.

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.

References :

1. Elements of Power System Analysis by W.D. Stevenson
2. Electric Power System by B.M. Weddy
3. The transmission and Distribution of Electric energy by H. Cotton
4. Modern Power System Analysis by I.J. Nagrath and D.P. Kothari
5. A Course in Electrical Power by Soni, Gupta and Bhatnagar
6. Power System analysis and Stability by S.S. Vadhwa
7. Electric Power System by C.L. Wadhwa
8. Electrical Power System by Ashfaq Hussain
9. Electrical Power System Vol. I and II by A.E. Guile and Peterson
10. Electrical Power by S.L. Uppal
11. Power System Analysis and Design by B.R. Gupta

CONTROL SYSTEM ENGINEERING

V Sem. EECt-307-E

L	T	P/D	Total
4	1	-	5

Theory : 100 Marks
Sessional : 50 Marks
Duration : 3 Hrs

UNIT I

Concept of control, Control system terminology, Classification of control systems, system representation-Analogies, mathematical modeling of physical system, Block diagram, signal flow graphs and reduction techniques. Transfer function, State space characteristics of control systems. Error detectors, Signal conditioners, Modulators, Demodulators, Servo amplifiers voltage and power, Actuators including servometers, Techogenerators, Stepper motor.

UNIT II

Time domain and frequency domain analysis, steady state error, peak response and resonant frequency, system specification in time and frequency domain and their relationship. Concept of stability, analytic, graphic and numeric techniques of stability analysis, Routh Hurwitz, Nyquist, Bode, Root locii and Lapunov's criteria/methods. D-partition method, Nicols chart.

UNIT III

Introduction to Feed Forward, P, I, P/I, P/D, P/I/D and ON/OFF control actions. Static space approach applied to control system, concepts of state variable feedback, controllability and observability.

UNIT IV

Compensation (lead, lag, lag-lead compensation) and design of system. Introduction of non-linear and digital control systems.

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.

References :

1. Control system Engg. By Nagrath and Gopal.
2. Control system Engg. By Ogata.
3. Liner Control System by R.S. Chauhan, (Umesh Publications)
4. Feedback control system Analysis and Synthesis by D'Azzo and Houpias.
5. Control system by B.C. Kuo.
6. Liner control System Analysis and Design by D'Azzo and Houpias.

POWER ELECTRONICS
V Sem.EEcT-309-E

L	T	P/D	Total
4	1	-	5

Theory	:100 Marks
Sessional	: 50 Marks
Duration	: 3Hrs

UNIT I

Introduction: Characteristics of different solid state devices namely power diodes, SCR, Diac, Triac UJT, FET, Power transistor, SCS. Firing circuits using-operations amplifiers, UJT and logic gates protection of SCR against-over voltage, over current, dv/dt , di/dt , Temperature calculation, Heat sink design, Methods of commutation of SCR's, Series and Parallel operation of Thyristors.

UNIT II

AC to DC Converters: Classification of rectifiers, principle of working of each along with control circuits, Analysis of output voltage and current waveforms. Ripple factors, utility factor and efficiency. Effect of source inductance and type of load. Reactive power requirements of converter, some important factor in design of converters, dual converter.

UNIT III

AC to AC Converters: Classification of cyclo converters, principle of working along with control circuits, Analysis of output voltage and current waveforms, effect of type of load, presence of subharmonic in cyclo converter output.

UNIT IV

DC to AC Converters: Classification of inverters, operation of each type, design of commutating circuits, Analysis of voltage and current waveforms, voltage and frequency control, current source inverter and pulse width modulated inverter.

DC to DC Converters: Classification of choppers, operating principle and control circuits for each type. Analysis of voltage and current waveforms.

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.

References:

1. Thyristor Engineering by M.S. Brede.
2. Thyristor and their Application by M. Ramamurthy.
3. Thyristor Theory and Applications by Sugandhi and Sugandhi.
4. Principles of Inverter Circuits by B.D. Bedford and R.G. Hoft.
5. Line Commutated Thyristor Converter by Gotifriend, Moltgen.

VLSI & IC TECHNOLOGY

V Sem. EECt-311-E

L	T	P/D	Total
3	1	-	4

Theory : 100 Marks
Sessional: 50 Marks
Duration : 3Hrs

UNIT I

Introduction Inonolythic Silicon Fabrication Technology: Crystal Growth, Vapour phase (CVDT Technique) and molecular beam epitaxy. Dry and wet Etching.

UNIT II

Diffusion & Oxidation: Oxide properties, oxidation kinetics, Oxidation process, diffusion Fick's law, dopant sources, Diffusion mechanism, Constant source & limited source diffusion, Characterization of diffused layers, Introduction to Ion implantation.

UNIT III

Lithography & Metalization: Choice of Metals, Vaccum evaporation, Sputtering Metalization problems, Lithography: Introduction to Photo X-ray, electron beam lithography process, various printing techniques.

MOS Circuits Design Process: MOS layer, Stick diagram, Design rules & layout diagrams-a brief introduction .

UNIT IV

Planer Technology: Fabrication process, Sequence for a BJT, Capacitor, resistor, IC, Environment for IC fabrication,. Assembly & packaging techniques.

Introduction to MOS Technology: Basic MOS transistors, NMOS & CMOS fabrication.

MOS Inverters: Pass Transistor, NMOS Inverter, CMOS Inverter, Latch up in CMOS circuits.

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.

References:

- 1 K.R. BOTKAR: Integrated Circuits.
- 2 S.M. SZE: Micro Electronics.
- 3 Milliam Gabel : Mico Electronics
- 4 Pucknell : VLSI Design.

Electronic Instrument & Measurements Lab
V Sem. EECt-313-E

L T P Total
- - 2 2

Sessional : 25 Marks
Practical : 25 Marks
Total : 50 Marks
Duration : 3 hrs

1. To measure voltage using digital voltmeter.
2. To measure the frequency using Lissajous pattern on CRO.
3. To measure the distortion in amplifiers using distortion meter.
4. To study Op-Amp. as half wave & full wave precision rectifier.
5. To study the op-amp as :
 - Adder**
 - Subtractor
 - Integrator
 - Differentiator
6. To study the wave form on ECG recorder.
7. To study the sphygmomanometer for blood pressure measurement.

NOTE : At least 9 experiments are to be performed with 7 from above list, remaining 2 may either be performed or designed & set by concerned institution as per the scope.

Power Electronics Lab

V Sem. EEC-315-E

L	T	P	Total
-	-	2	2

Sessional : 25 Marks
Practical : 25 Marks
Total : 50 Marks
Duration : 3 Hrs.

- To Plot the firing characteristics of given silicon control rectifier.
 - By varying the gate current I_g keeping forward voltage V_{ak} fixed.
 - By varying forward voltage V_{ak} keeping gate current fixed.
- To study the V-I characteristics of given UJT. To plot graph between V_e and I_e . To find negative resistance from the graph.
- To plot V-I characteristics of given Triac in I and III quadrant.
- To plot the drain characteristics of given F.E.T & to evaluate the parameter r_d , I_{dss} .
- To study the UJT based relaxation oscillator & to evaluate the dynamic resistance.
- To study & draw the characteristics of DC-DC chopper power circuit
- To study the characteristics of single phase fully controlled converter circuit.
- To study the characteristics of 3-phase fully controlled converter power circuit.
- To study single phase Mc Murray Inverter power circuit.
- To study single phase cyclo-converter circuit.

Control System Lab.
V Sem. EEcT-317-E

L T P Total
- - 2 2

Sessional : 25 Marks
Practical : 25 Marks
Total : 50 Marks
Duration : 3Hr.

1. To study D.C. Position control system.
2. To study linear system simulator.
3. To study light intensity control using P & PI controller with provision for disturbance and transient speed control.
4. To study D.C motor speed control.
5. To study the stepper motor characteristics and its control through microprocessor kit.
6. To study Temperature control system.
7. To study Compensation design
8. To study Digital control system.

NOTE : At least 9 experiments are to be performed with 8 from above list, the remaining may either be performed or designed & set by concerned institution as per the scope.

VLSI & IC TECHNOLOGY LAB

V Sem. EEC-319-E

L T P Total
- - 2 2

Sessional : 25 Marks
Practical : 25 Marks
Total : 50 Marks
Duration : 3 Hrs.

1. Study of VHDL.
2. To design the two input NAND gate , NOR gate , EX-OR gate in VHDL .
3. To design a full adder & full subtractor using the same hardware & with the help of control signal .
4. To design a 4:1 multiplexer and 1:4 demultiplexer in VHDL.
5. To design a priority encoder in VHDL.
6. To design a carry look ahead adder in VHDL.
7. To design a BCD adder & BCD subtractor in VHDL.
8. Write a program in VHDL to compute 2's complement of a four bit binary numbers.
9. Write a program in VHDL to implement the Boolean expression .
 $F = (A + B)(C + D)$ using CMOS circuitry .
10. Implement a $F = (A + B)$ using only PMOS circuitry.
 - (i) Design a MOD-6 synchronous & asynchronous (ripple) counter in VHDL.
 - (ii) Design a MOD-8 ring & Johnson counter in VHDL.

**SIXTH SEMESTER SCHEME OF EXMINATION FOR B.TECH DEGREE COURSE
ELECTRICAL AND ELECTRONICS ENGINEERING**

Course No.	Course Title	Teaching Schedule				Examination schedule			Total Marks	Duration of Exam
		L	T	P/D	Total	Theory	Sessional	Practical Viva		
EEcT-302-E	MICROPROCESSOR & APPLICATIONS	4	1	-	5	100	50	-	150	3
EEcT-304-E	POWER SYSTEM ANALYSIS & PROTECTION	3	1	-	4	100	50	-	150	3
EEcT-306-E	DESIGN OF ELECTRICAL MACHINES	4	1	-	5	100	50	-	150	3
EEcT-308-E	DEGITAL SIGNAL PROCESSING	4	1	-	5	100	50	-	150	3
EEcT-310-E	ELECTRIC DRIVES & CONTROL	3	1	-	4	100	50	-	150	3
EEcT-312-E	ELECTRICAL MATERIALS & PROCESSES	3	1	-	4	100	50	-	150	3
EEcT-314-E	MICROPROCESSOR LAB.	-	-	2	2	-	50	25	75	3
EEcT-316-E	POWER SYSTEM LAB.	-	-	2	2	-	50	25	75	3
EEcT-318-E	COMMUNICATION ENGG. LAB.	-	-	2	2	-	25	25	50	3
EEcT-320-E	ELECTRIC DRIVES LAB.	-	-	2	2	-	25	25	50	3
	TOTAL	21	6	8	35	600	450	100	1150	-

Note : - Students shall devote 8 weeks to industrial training after sixth semester exam outside the college campus at approved works.

MICROPROCESSOR & APPLICATIONS

VI SEM. EEcT-302-E

L	T	P	Total
4	1	-	5

Theory –100 Marks
Sessional-50 Marks
Duration: 3Hrs

UNIT I

Introduction to microprocessor, its advantage & limitations: Various type of processors including the special purpose; the concept of stored programme architecture; machine & instruction cycle timing; single chip vs. chip set microprocessor.

UNIT II

Microprocessor architecture & programming - Detailed description of 8085 bus, flags, registers etc.; generation of system clocks power on reset; addressing mode; instruction set; stack operation; sub routine & macros; interrupts; assembler directive languages programming

Buses: Parallel Vs serial; bus buffering tri stating noise; loading & reflection problem – an introduction only; bus standards like RS422/432, IEEE438, RS232.

UNIT III

Interfacing: Memory mapped I/O & input/output mapped I/O space, various data transfer techniques programme data transfer techniques, interrupt data transfer techniques, DMA.

Memory: Interfacing of the memory, various kinds of Memory (RAM, ROM, EPROM, EEPROM), IC 8755.

UNIT IV

Special purpose support devices & Application: Brief description & interfacing of 8255 PPI & 8253, 8251 USART & A/D ,D/A Chips , applications- A temperature monitoring system & closed loop control. Introduction to micro controller & advanced 8086 microprocessor & its architecture, comparison of 8086 & 8085.

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.

References:

1. R.S. GAONKAR: Microprocessor architecture, programming & Application.(MGH)
2. Malvino, A.P. : Digital computer electronics-an Introduction to microprocessor.(MGH)
3. D.V.HALL: Microprocessor & Digital circuits.(MGH)
4. MATHUR A.P. : Introduction to microprocessor

POWER SYSTEM ANALYSIS & PROTECTION

VI SEM. EEcT-304-E

L	T	P/D	Total
3	1	-	4

Theory : 100 Marks

Sessional: 50 Marks

Duration : 3Hrs

UNIT I Introduction : Per unit quantities characteristics & representation of components of a power system, synchronous machines, transformers, lines cables & loads. Single line diagram, impedance diagram, line reactance diagrams.

Protective Relaying : Scheme of protection of generators, transformers, transmission lines & bus-bars, carrier current protection, functional characteristics of relays, operating principle of electromagnetic and static relays, over current, directional over current, differential relay, impedance relay.

Neutral grounding : Need for neutral grounding, various types of neutral grounding.

UNIT II Circuit Interruption : Circuit interruption, theory of arc formation and its excitation in d.c., a.c. circuits, restriking & recovery voltage, interruption of capacitive & inductive currents. Rupturing capacity & rating of circuit breakers.

Circuit-Breakers : Classification of circuit-breakers, circuit-breakers of low medium, high & extra high voltages. Multibreak & resistance switching. Autoreclosing of high capacity & H.V. circuit breakers.

UNIT III Fault Analysis:- Symmetrical faults: Calculation of fault currents, use of current limiting reactors. **Unsymmetrical faults: Types of transformation in power system analysis, symmetrical components transformation, sequence impedance of power system elements, Sequence network of power system analysis of unsymmetrical short faults sequence components filters, Network analysis & its application to interconnected system.**

UNIT IV Transients in Power Systems: Transient electric phenomenon, lightning & switching surges, travelling waves, reflection & refraction of waves with different line termination, Protection against dangerous pressure rises.

Stability of power System: Concepts of stability, power angle characteristics of Synchronous, steady state & transient stability swing 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.

References:

1. Elements of power system analysis by W.D. Stevenson.
2. Electric Power System by B.M. Weddy.
3. The transmission & Distribution of electric energy by H.Cotton.
4. Modern Power System Analysis by I.J. Nagrath & D.P. Kothari.
5. A course in Electrical Power by Soni, Gupta & Bhatnagar.
6. Power System Analysis & Stability by S.S. Vadhera
7. Electrical Power System by C.L. Wadhwa. 8. Electrical Power System by Ashfaq Hussain.
9. Electrical Power by S.L. Uppal.
10. Switching & Protection by Sunil S. Rao.

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DESIGN OF ELECTRICAL MACHINES

VI SEM. EEcT-306-E

L T P/D Total
3 1 - 4

Theory : 100 Marks
Sessional : 50 Marks
Duration:3 Hrs.

UNIT I

DC MACHINES :Output equation, choice of specific loadings, choice of poles and speed, Design of conductors, windings, slots field poles, field coils, commutator and machine design.

UNIT II

SYNCHRONOUS MACHINES: Specifications, ratings and dimensions, specific loadings, main dimensions, low speed machines, turbo generators, armature conductors, cooling.

UNIT III

INDUCTION MOTORS: Three Phase Induction Motor: Standard specifications, output equations, specific loadings, main dimensions, conductor size and turns, no. of slots, slot design, stator core, rotor design, performance calculations.

Single Phase Induction Motor: output equations, specific loadings, main dimensions, design of main and auxiliary winding, capacitor design, equivalent circuit parameters, torque, efficiency,

UNIT IV

TRANSFORMERS: Standard specifications, output equations, design of core, coil, tank and Cooling tubes, calculation of circuit parameters, magnetizing current, losses and efficiency, Temperature rise and regulations from design data.

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 BOOKS

1. M.G.Say, Performance and design of ac machines, CBS Publishers and distributors, New Delhi, 1983.
2. S.K. Sen., Principles of electrical machine design with computer programs, Oxford and IBH publishing co. 1987.

REFERENCES

1. J.H. Kuhlmann, Design of electrical operators, John Willey, 1957.
2. CG Veinott, Theory and design of small induction machines, MGH, 1959.
3. A Shanmugasundarem, Electrical machine design databook, John willey, 1979.

DIGITAL SIGNAL PROCESSING

VI SEM. EECt-308-E

L	T	P/D	Total
4	1	-	5

Theory : 100 Marks
Sessional: 50 Marks
Duration : 3Hrs

UNIT I

The Z – Transform Analysis of LTI System:- Transform its properties, System Function of a linear Time- Invariant system. Inversion of the Z- Transform, the one-sided Z-transform, Solution of difference equations. Analysis of LTI system in Z- domain, transient and steady- state response. Causality and stability. Pole- Zero Cancellations. Shur- Cohn Stability test. Jury Test Shur-Cohn-fuzzivera stability criterion.

UNIT II

DFT and FFT: DFT and its properties, Circular Convolution and fast linear convolution, Linear filtering using DFT. Direct Computation of DFT, FFT algorithms, Radix-2 and Radix-4 algorithms. Goetzel Algorithm, Chirp-Z Transform algorithm.

UNIT III

Implementation of Discrete-Time Systems: Structure for FIR Systems-direct form, Cascade form, Frequency-Sampling and Lattice structures, Structures for IIR-direct form, signal flow graphs and transpose structures. Cascades form and lattice structures, state space structure.

Design for Digital Filters:- Design for FIR filters-using window method (hamming window, rectangular window), using frequency of IIR filters from Analog filters by approximation of derivatives, by impulse invariance by Transformation, Matched Z-Transformation Characteristics of commonly used analog filters.

UNIT IV

Time Frequency Analysis: Introduction to wavelets and wavelet transforms.

Brief Introduction to DSP Architecture: Pipeline, Lattice and systolic architecture.

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.

References:

1. Digital Signal Processing by J.G. Proakis and D.G. Manalakis-PHI
2. Digital Signal Processing by: A.V. Oppenheim and R.W. Schaffer-PHI
3. Element of Digital Signal Processing by N. Sarkar Khanna Publishers.
4. Digital Signal Processing by S. K. Mitra –TMH.
5. Digital Signal Processing by Rabinar, Gold-PHI
6. Digital Signal Processing by S. Salivahanan- TMH
7. Digital Signal Processing by IFecher

ELECTRIC DRIVES AND CONTROL

VI SEM. EECt-310-E

L	T	P/D	Total
3	1	-	4

Theory : 100 Marks

Sessional : 50 Marks

Duration : 3Hrs

UNIT I

Introduction:- Definition & classification of different type of drives, Review of characteristics and components of electric drives, Speed control methods of various a.c. and d.c. drives, its advantages and applications, acceleration and retardation time, energy consideration.

Braking of drives:- Various methods of braking of a.c. and d.c drives, Automatic control arrangement, characteristics and application, acceleration and Retardation time ,Energy consideration.

Induction motor (A.C) drives:- Basic principle of induction motor drives, $3\ \phi$ a.c voltage controller fed I.M drive, variable frequency control, voltage source inverter (VSI) and current source inverter (CSI), cycloconverter fed IM drive, Slip Power control, static rotor resistance control, chopper control of $3\ \phi$ slip ring induction motor.

UNIT II

D.C. drives:- Rectifier controlled circuits, Single phase fully controlled and half controlled rectifier fed separately excited d.c motor, $3\ \phi$ fully and half controlled fed separately excited d.c. Motor, performance and characteristics of single phase and $3\ \phi$ rectifier controlled d.c drives. Control techniques of d.c. Drives using chopper, multi quadrant control of chopper fed motors.

UNIT III

Dynamics of Electric drives:- Fundamental load torque equation, permissible frequency of starting and stopping, definite time, speed and current limit control, Automatic starting and pulling operation of synchronous motors.

Digitally Controlled (Microprocessor control of Electric drives) :- Application areas and functions of HP in drive technology, Block diagram of arrangement and comparison with other method, components for digital control, vector control of IM drive using HP.

UNIT IV

Traction Drives:- Nature of traction load, motors, conventional d.c & a.c traction drives, characteristics, d.c traction using chopper controlled d.c motors, polyphase a.c motors for traction drives, speed time relationship.

Rating of motors:- Determination of motor rating, Nature of loads and classes of motor duty, frequency of operation of motor subjected to intermittent loads, pulse loads etc.

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.

References:

1. Electric drives by S.K.Pillai, Wiley.
2. Thyristor D.C Drives by S.K.Sen.
3. Control System in Industry by Siskind, McGraw Hill. 4. Electric Machines & Drives by Fransver. Relevant I.S.I. Cader.

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ELECTRICAL MATERIALS AND PROCESSES
EEcT-312-E

L T P/D TOTAL
3 1 - 4

Theory : 100 Marks

Sessional : 50 Marks

Duration : 3 Hrs

UNIT 1 Conductors, Properties of conductors, ACSR, High resistivity materials and their properties, Alloys, Soldering and brazing materials, superconductivity, super conductor materials and their applications.

UNIT 2 Insulators, classification of insulators, dielectric materials, glass and ceramics, refractory materials and their uses, optical fibers, lasers and opto-electronics materials, semiconductor materials, properties of semiconductor materials thermosetting and thermoplast materials.

UNIT 3 Classification of material, dia, para, and ferro magnetic materials-curie law and curie weiss law (qualitative study). Ferromagnetism- Qualitative study of domain theory-Hysteresis phenomena. Hard and soft magnetic material and their applications. Ferrites, Structure and property.

UNIT 4 Processes used in Plano technology e.g. lapping, polishing, cleaning, masking, photolithography, diffusion, oxidation and Metallization, welding wire bonding, packaging and encapsulation, Heating- induction and dielectric, Electron beam welding and cutting, annealing, cold & Hot rolling

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.

REFERENCE :

1. Kasap S.O. Principles of Electrical Engg. Material and Devices(MGH)
2. Mahajan Principles of growth and processing of semiconductors(MGH)
- 3 Dhir. Electronics components and materials and principles Manufacturing & Maintenance (TMH)
4. Addison: Electronics Engg. Material Devices (TMH)
5. Ruska N scot: Microelectronics processing an introduction to the manufacturer of integrated Circuits(MGH)
6. Seth & Gupta: A course in electrical Egg. Materials(Dhanpat Rai & Sons)
7. Dekker: Electrical Engg. Materials(PHI)

MICROPROCESSOR LAB

VI SEM. EEcT- 314-E

L	T	P	Total
-	-	2	2

Sessional: 50 Marks
Practical : 25Marks
Total : 75 Marks
Duration : 3 Hrs

- 1 To study the 8085-microprocessor kit.
- 2 Add two Binary numbers using 8085-Microprocessor kit.
- 3 Find 2's complement of a binary number using 8085-Microprocessor kit.
- 4 To arrange a series of numbers in descending order using 8085-Microprocessor kit.
- 5 Multiplication of two binary numbers using 8085-Microprocessor kit.
- 6 Divide a 16-bit number by 8-bit number and restore result in memory location 2700 using 8085-Microprocessor kit.
- 7 To find Square root of a 8- bit number using 8085-Microprocessor kit .
- 8 To find the largest number in a data array using 8085-Microprocessor kit.
- 9 To interface a D/A converter with the 8085-microprocessor kit.
- 10 To interface the stepper motor with the 8085-microprocessor kit.

POWER SYSTEM LAB

VI SEM. EEcT- 316-E

L	T	P	Total
-	-	3	3

Sessional: 50 Marks
Practical : 25Marks
Total : 75Marks
Duration : 3 Hrs

1. To find out the dielectric strength of transformer oil.
2. To find zero sequence component of three phase line.
3. To draw the characteristics of thermal overload relay.
4. To study an IDMT over current relay to obtain and plot its characteristic curves i.e. the graph between current and time.
5. To measure the ABCD parameters of a given transmission line.
6. To plot the power angle characteristics of given transmission lines.
7. To find the string efficiency of a string insulator with/without guard rings.
8. To study the characteristics of transmission line for t-network & pie- network.
9. To study and testing of a current transformer
10. To study various types of distance relay

COMMUNICATION ENGG. LAB

VI SEM. EEcT- 318-E

L	T	P	Total
-	-	2	2

Sessional: 25 Marks
Practical : 25 Marks
Total : 50 Marks
Duration : 3 Hrs

1. Study of AM Modulation / Demodulation.
2. Study of FM Modulation / Demodulation.
3. Study of PAM Modulation / Demodulation.
4. Study of DA Modulation / Demodulation. ..
5. Study of PCM Modulation / Demodulation.
6. Study of Carrier Modulation technique using ASK.
7. Study of Carrier Modulation technique using FSK
8. Study of Carrier Modulation technique using PSK
9. Comparative study of Delta Modulation & Adaptive Delta Modulation Technique.
10. To study the Time Divison Multiplexing & Demultiplexing

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ELECTRIC DRIVES LAB

VI SEM. EECt- 320-E

L	T	P	Total
-	-	2	2

Sessional: 25Marks
Practical : 25 Marks
Total : 50 Marks
Duration : 3 Hrs

1. Study of Industrial Applications of various mills.
2. Variable Torque Control of Induction Motor.
3. Breaking of DC Motor by using Mechanical & Electrical Methods.
4. Rotor resistance control of 3 ϕ Slip Ring Induction Motor.
5. Chopper Control of DC Motor.
6. Chopper Control of separately excited DC motor.
7. Study of different types of a loading on a particular load.
 - (a) Intermediate Loading
 - (b) Continuous Loading
8. Methods of starting Induction Motor.
9. Variable Voltage Control of Induction Motor.
10. Microprocessor Based Control of any Motor.

**SEVENTH SEMESTER SCHEME OF EXMINATION FOR B.TECH DEGREE COURSE
ELECTRICAL AND ELECTRONICS ENGINEERING**

Course No.	Course Title	Teaching Schedule				Examination schedule			Total Marks	Duration of Exam	
		L	T	P/D	Total	Theory	Sessional	Practical Viva			
EEcT-401-E	COMPUTER ORGANIZATION & ARCHITECTURE	4	1	-	5	100	50	-	150	3	
EEcT-403-E	GENERATION AND CONTROL OF POWER	3	1	-	4	100	50	-	150	3	
EEcT-405-E	MICROWAVE AND RADAR ENGG.	3	1	-	4	100	50	-	150	3	
EEcT-407-E	ADVANCE PROGRAMMING	4	1	-	5	100	50	-	150	3	
*	DEPARTMENTAL ELECTIVE-I	3	1	-	4	100	50	-	150	3	
**	DEPARTMENTAL ELECTIVE-II	3	1	-	4	100	50	-	150	3	
EEcT-423-E	ADVANCE PROGRAMMING LAB.	-	-	3	-	-	25	25	50	3	
EEcT-425-E	DIGITAL SIGNAL PROCESING LAB.	-	-	2	2	-	25	25	50	3	
EEcT-427-E	MINOR PROJECT	-	-	-	3	-	50	50	100	3	
EEcT-429-E	MAJOR PROJECT	-	-	1	1	-	-	-	-	-	
EEcT-431E	SUMMER TRAINING REPORT	-	-	-	-	-	75	-	75	-	
	TOTAL			6	9	35	600	475	100	1175	-

LIST OF DEPARTMENTAL ELECTIVES FOR B.TECH. ELECTRICAL AND ELECTRONICS ENGG. FOR 7TH SEMESTER

* DEPARTMENTAL ELECTIVE –I, 7th Semester

Sr.No.	Subject Name	Subject Code
1	COMPUTER AIDED ANALYSIS & DESIGN	EEcT-441-E
2	HVDC TRANSMISSION	EEcT-443-E
3	POWER SYSTEM DYNAMIC & CONTROL	EEcT-445-E
4	POWER SYSTEM PLANNING	EEcT-447-E

** DEPARTMENTAL ELECTIVE-II, 7th Semester

Sr.No.	Subject Name	Subject Code
1	ANTENNA & WAVE PROPAGATION	EEcT-449-E
2	ADVANCED MICROPROCESSOR & INTERFACING	EEcT-451-E
3	DATA COMMUNICATION & NETWORKING	EEcT-453-E
4	OPERATING SYSTEM	EEcT-455-E

COMPUTER ORGANIZATION AND ARCHITECTURE

VII SEM.(EECt-401-E)

L	T	Total
4	1	5

Theory : 100 mks

Sessional: 50 mks

Duration: 3 Hrs

UNIT I

Evolution of computers: Generation of computer system, different types of computers, characteristics of Von Neumann architecture, Limitation of computer systems, Parallel computer structures.

Instruction formats, addressing modes and instruction types: Principles of linear pipelining, Classifications of pipeline processor, Interleaved memory organizations, Instructions and arithmetic pipelines, Design examples, vector processing requirements, characteristics of vector processing.

UNIT II

Multiprocessor: Architecture, Functional structure, Loosely coupled multiprocessors, Tightly coupled multi processor, Processor characteristics for multiprocessing, Interconnection networks, Time shared, crossbar switch and multiport memories and multistage networks for multiprocessors, classification of multiprocessor operating system.

UNIT III

AL Unit: Construction, Integer representation, Binary half adder, full adder, Parallel Binary adder, Addition and subtraction in a parallel arithmetic element, Full adder design, BCD adder, Positive and negative BCD number, Shift operations, Basic operations, Logic operations, Multiplexer, High Speed arithmetic.

Control Unit: Construction of an instruction work, Instruction cycle and execution cycle, organization of control registers, Instruction formats, Controlling arithmetic operations, Typical Sequence of operations, Instruction set, Register transfer language, Microprogramming- Micro instruction format, Simple microprogram, Microprogramming applications.

UNIT IV

Memory: Basic concepts, memory device characteristics, semiconductor memories, static and dynamic memories. Random access and serial access memories. Memory hierarchies-cache, virtual, interleaved and associative memories.

I/O Devices: Input media, Keyboards, Mouse, Pointing Devices, character recognition (MICR & OCR), Output devices, CRT, Flat panel display, Printers, Tele printer (TTY).

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.

References:

1. Hay, “ Computer Architecture And Organizations” TMH
2. Stalling , “Computer Organization” PHI
3. Tannanbaum, “Structured Computer Organization” TMH

GENERATION & CONTROL OF POWER

VII Sem (EEcT-403-E)

L T P/ D Total
3 1 - 4

Theory : 100 mks
Sessional: 50 mks
Duration: 3 Hrs

UNIT I

Load Fore-casting: Load curves, load factor, maximum demand factor, diversity factor, different types of loads, fore-casting of loads.

Power plant Economics and Selection: Choice in type of generation, choice of size of generator units and number of units, cost of electrical energy, depreciation of plant, effect of load factor on cost of electrical energy.

UNIT II

Thermal Power Plants: Choice of site, main parts and working of plants & their layout, characteristics of turbo-generators.

Hydro-Electric Plants : Choice of site, types of hydro-electric plants, capacity calculations for hydro power main parts and working of plants and their layout, characteristics of hydro-electric generators.

UNIT III

Nuclear Power Plants: Choice of site, classifications of plants main parts and working of plants and their layout.

Diesel Power Plants: Choice of site, diesel plant equipment, working and layout of the plant.

UNIT IV

Combined working of Power Plants: Advantages of combined working of different power plants, Basic load stations and Peak load stations, Economic load of thermal power plants.

Power Station Equipment and Control: Exciters, purpose & requirements of good exciters, self-excited exciter, Rotating main & pilot exciters, Brushless exciters. Voltage Regulators- purpose & requirements of good voltage Regulator, Direct acting Rheostatic type voltage regulator, static voltage regulator.

1. Speed Governing Systems: Purpose of speed governing system, Hydraulic type speed governing system for steam turbines & hydro turbines.
2. Voltage Control- Voltage control by Reactive Power Control, Voltage control by tap-changing transformers combined use of tap-changing transformer and reactive power injection, use of induction regulators.

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.

References:

1. Deshpande, M V : Elements of Electrical Power Station Design, wheeler publishing Co.(P) Ltd. Allhabad,1979.
2. Gupta, B. R. : Generation of Electrical Energy, Eurrasia Publishing House, (Pvt) Ltd. New Delhi, 1983
3. Gupta, P.V. : A Course in Electrical Power, Dhanpat Rai and Sons, Delhi-6
4. Vadhera, S.S : Power Sytem Analysis and Stability, Khanna Publishers, Delhi-6, 1981.

**MICROWAVE & RADAR ENGG.
VII SEM. (EEcT-405-E)**

L T P/D Total
3 1 - 4

Theory : 100 Marks

Sessional: 50 Marks

Duration : 3 Hrs

UNIT I

Introduction to microwaves and tubes, Microwave Devices: Advantage of Microwaves, limitation of conventional tubes, Light house tube, Multicavity & Reflex klystron, Magnetron

UNIT II

Tunnel diode, Gunn diode, Parametric amplifier, masers, TWT, IMPATT, TRAPTT,

Microwave solid state devices.

UNIT III

Microwave Circuits: Scattering matrix, impedance transformation & Matching, passive Microwave devices (E-plane & H-plane Tee, Magic Tee, Circulator, Attenuator, isolators, directional coupler, TE, TM & T_{mn} modes in Rectangular wave guides, resonators, phase shifter).

UNIT IV

Radar Engg. : Introduction, Radar range equation, parameters affecting the range, Doppler effect, CW and pulse Doppler Radar, MTI delay lines and canceller, range gate pulse, MTI & Doppler radar, non coherent MTI. Noise and clutter, Radar displays, Radar signal processing, applications of radar, radio aids to navigation.

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.

REFERENCES:

1. Liao S.Y. : Microwave Circuit & Devices, PHI.
2. Skolonik M. K. : Introduction to Radar system, McGraw Hill.
3. Siegman A.E. : An introduction to lasers & Masers, McGraw Hill.
4. M. Kulkarni : Microwave & Radar Engineering, Umesh Publication.
5. Gautam A. K. : Microwave Engineering, S.K. Kataria & Sons.

ADVANCE PROGRAMMING

VII Sem. (EEcT-407-E)

L T P/D Total
4 1 - 5

Theory : 100Marks
Sessional:50 Marks
Duration : 3 Hrs.

UNIT I

Review of elementary data structures- arrays, stacks, queues, link list with respect to storage representation and access methods.

UNIT II

Searching methods: Sequential, binary, Indexes searches.

UNIT III

Sorting: internal and external sorting, Methods: bubble, insertion, selection, merge, heap, radix and quick sort. Comparison with respect to their efficiency.

UNIT IV

C++ Programming Language:- Concept of object oriented programming, Abstract Data type C classes , Data encapsulation , inheritance, polymorphism , virtual function templates implementation using C++.

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.

Reference:

1. Trembley and Sorenson, “ An Introduction of data structures with application” McGraw Hill.
2. Goodman, S.E., and Hetedniemi, S.T, “ Introduction to the design and Analysis” , McGraw Hill.
3. Herbert Schildt, “ C++ Computer reference”, TMH.
4. Herowitz E and Sahni S. “ Fundamentals of Data Structures”.

ADVANCE PROGRAMMING LAB
(VII Semester) EEcT-423-E

L T P/D Total
- - 3 3

Sessional : 25Marks
Practical : 25 Marks
Total : 50 Marks
Duration : 3 Hrs.

- 1) Write a program to perform following operations on linked list.
 - a. Insertion of a node
 - b. Deletion of node.
- 2) WAP to implement stack.
- 3) WAP to implement queues.
- 4) WAP to sort a list using following.
 - a. Insertion sort
 - b. Bubble sort
 - c. Selection Sort
 - d. Quick sort
 - e. Merge sort
 - f. Radix sort
- 5) WAP to find roots of quadratic equation using polymorphism.
- 6) WAP to find addition & multiplication of two matrices using classes.
- 7) WAP which shows the use of inheritance.
- 8) WAP to implement the concept of copy constructor & destructor.

NOTE : At least 9 experiments are to be performed with 8 from above list, remaining may either be performed or designed & set by concerned institution as per the scope.

DIGITAL SIGNAL PROCESSING LAB
(VII Sem) EEcT-425-E

L T P Total
0 0 2 2

Sessional - 25 Marks
Practical - 25 Marks
Total - 50Marks
Duration - 3 Hrs

Perform the Experiments using MATLAB:-

1. To develop a program for computing Z- transform in factored form, Plot its poles and zeros , and then determine its ROCs.
2. To develop a program for computing Inverse Z-transform of a rational transfer function.
3. To develop a program for linear convolution and circular convolution .
4. To develop a Program for computing discrete fourier transform .
5. To develop a Program for computing the convolution by overlap-add method and overlap save-method.
6. To develop Program for realization of IIR Digital filters (Direct, Cascade, Parallel).
7. To develop a program for sampling theorem .
8. To design FIR filters using windows technique.
9. To design analog filter (Low pass, High pass).
10. To design analog filter (Band pass, Band stop)
11. To design IIR filters using (Impulse Invariant method).
12. To design IIR filters using (bilinear transformation).

COMPUTER AIDED ANALYSIS AND DESIGN
DE-I (EEcT-441-E)

L T P/D TOTAL
3 1 - 4

Theory : 100Marks
Sessional: 50 Marks
Duration: 3 Hrs.

UNIT I:

Basic principles of analysis and design of structured and modular system, advantages and disadvantages of computer aided design over conventional design, specification, problem definition, object formulations

Methods of network modeling by graph theoretic and algorithm approach,

UNIT II :

Impedance Matrices, Primitive Network, Formulation of network matrices by singular and non-singular transformations, Indefinite admittance matrix and formation, definite admittance matrix by digital computer.

UNIT III :

Algorithm for formulation or Bus Impedance matrix, Modification of Bus impedance and admittance matrices, Analysis of various faults (3- Phase, L-L, L-L-L, L-L-G) using Z-bus algorithms.

UNIT IV :

Load Flow equations, Formation and Solutions Using Gauss, Gauss-Seidel iterative methods, Newton-Raphson and Fast decoupled methods, Comparison of load flow 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.

References:

1. The Practical Guide to Structured System Design: Prentice Hall, by Hones, M.P.
2. Structured Analysis: Prentice Hall, by Weinberg Victor.
3. Computer Methods in Power System Analysis: by EI- Abiad and Stagg McGraw Hill.
4. Computer Techniques in Power System Analysis: by TATA McGraw Hill.
5. Electric Energy System Theory: TATA McGraw Hill, by Pai, M.A.
6. Advanced Power System Analysis and Dynamics by Singh, L.P Willey Eastern.
7. Modern Power System, International Text Book by Neuenswandor, J.R.
8. Elements of Power System Analysis McGraw Hill, by Stevenson.
9. Modern Power System Analysis: TATA McGraw Hill, by Nagrath and Kothari.

HVDC Transmission

DE-I (EEC T-443-E)

L T P/D TOTAL

3 1 - 4

Theory : 100 mks

Sessional : 50 mks

Duration : 3 Hrs.

UNIT I : Merits and Demerits of HVDC over EHVAC, type of HVDC links, Analysis Of 3-phase bridge converter with grid control for $U \leq 60^\circ$ and $U \geq 60^\circ$, derivation of equivalent circuit of HVDC link.

UNIT II : Basic means of control of HVDC link, C.C.A., C.C. and C.E.A, Control Characteristics characteristics of a converter, Harmonics in HVDC Operation, types of filters used for harmonic elimination, characteristics harmonics, characteristic AC current harmonics, Non characteristics AC harmonics, harmful effects.

UNIT III: Protection aspects of a HVDC link, types of faults, overcurrent protection, over voltage protection, ground and short circuit fault & their protection.

UNIT IV : Parallel operation of A.C. and D.C systems. Corona & R.I characteristics of HVDC link.

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.

Reference:

1. K.P. Padyar, "HVDC Power Transmission Systems", Wiley Eastorn Ltd. 1990.
2. E.W. Kimbark, "Direct Current Transmission", Vol.I, Wiley Intersct
3. J. Arrillage, "High Voltage Direct Current Transmission", Peter Peregrines,1983.
4. S. Rao," EHV-AC and HVDC transmission Engineering Practice", Khanna publishers,1990.

POWER SYSTEM PLANNING

DE-I (EECt-447-E)

L T P/D TOTAL

3 1 - 4

Theory : 100 mks

Sessional: 50 mks

Duration : 3 Hrs

UNIT I

Load Forecasting : Introduction, Classification of loads, methods of load forecasting.

Scope of power system planning and design significance:-Computer programming for planning, generation, transmission, Investment growth, generation cost.

UNIT II

Reliability of Transmission and Distribution System : Definition of reliability, bath tub Curve, Two state model, failure and repair rate, Probability density function, probabilities of survival and failure, mean time to failure, Mean down time, continuous Markov's process, reliability of series and parallel system, Approximate method, reliability planning, and perception of reliability models.

UNIT III

Reliability Schemes in Power System:- Introduction, Marine power plant, Nuclear Power plant, General Complex systems, Failure modes and effect analysis, Fault free Analysis of power systems.

UNIT IV

Operation and Control of Interconnected Power systems(AGC and SCADA):- Main tasks planning , operation , accounting , Tasks of national control center, Regional control center, Generating station control room, Tasks of major substations, AGC-SCADA, Normal state - Restoration, system security, factors affecting security, load flow, state estimation.

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.

Reference :

1. Switch gear protection and power system by SUNIL S. RAO.
2. Power System Analysis and stability by S.S. Vadhera.
3. Power System Design and Analysis by B.R. Gupta
4. System Engg. & Reliability by L. S. Srinath.

ANTENNA & WAVE PROPAGATION

DE-II (EEcT-449-E)

L T P/D TOTAL
3 1 - 4

Theory : 100 Marks
Sessional: 50 Marks
Duration: 3 Hrs.

UNIT I :

Basic Principle: Scalar & vector potential for electric & magnetic components, Retardation, retarded vector potential relation between scalar & vector potential current element.

Basic Antennas: Half wave dipole, quarter wave mono pole, short dipole, calculation of radiation resistance, effective length & pointing vector. Current distribution: Linear current & sinusoidal distribution.

UNIT II :

Antenna Parameter: Solid angle, radiation intensity, directive gain directivity, power gain, beam width: HPBW, FNBW, band width, Q factor resonance in antenna, antenna as a transmission line, antenna as active component, antenna temp. Radiation pattern, Eplane H plane, efficiency. Effective aperture, scattering aperture, loss aperture, directivity, polarization. Transmission between two Antenna, Reciprocity theorem application of Reciprocity theorem.

Low Freq Antennas: Monopole, folded, loop antenna, biconical antenna, yagiuda antenna: different antenna used for A.M, FM transmission. VHF & LHF antennas, Resonant Antennas & non-resonant antenna, design parameter of different Antenna.

UNIT III :

Microwave Antenna: Parabolic Antenna, Lens Antenna, horn Antenna, Antenna used for tracking & antenna used for satellite communication. E-plane horn, H-Plane horn circulars Horn, pyramidal Horn.

Radio Wave Propagation: Different technique for radio wave propagation: Ground wave propagation, space wave, sky wave, duct propagation, troposcatter.

UNIT IV :

Ionosphere propagation: Skip distance, LUF, MUF, Critical freq, Variation of refractive index with height, effect of earth magnetize field on ionospheres propagation, calculation of refractive index dielectric constant & Conductivity for ionospheres. Ionospheres abnormalities.

Antenna Array: Multiplication of Pattern, Significance of Antenna Array, Broadside, End fired, Uniform, Parasitic feed in Antenna Array, Calculation of Directivity & B.W for Antenna array. Increased directed directive end fired array. Tapering of Array: Binomial Array, Techepyshe.

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.

References:

1. Jordan Balmian:- Electromagnetic Field Theory (PHI)
2. Kraus Antenna & Wave propagation (Mc Graw Hill)
3. Antenna & Wave propagation by K.D.Prasad (Satya Prakashan)
4. Collin R.E :- Antenna & Wave Propagation (TMH)

ADVANCED MICROPROCESSOR & INTERFACING
DE-II (EEcT-451-E)

L T P/D TOTAL
3 1 - 4

Theory : 100 Marks
Sessional : 50 Marks
Duration : 3 Hrs.

UNIT I :

8086 Microprocessor: 8086 Internal Architecture timing diagram, interfacing 8086 to memory.

UNIT II :

8086 Assembly Language Programs: 8086 instruction set, Assembler directive, program development method, Writing simple 8086 programs for use with an assembler.

UNIT III :

8086 Interrupts: 8086 Interrupts and Interrupt responses, hardware interrupt application.

Interfacing: Digital interfacing, Programming parallel port and handshake I/O, Interfacing a Microprocessor to keyboards & displays, Analog interfacing, introducing to A/D and D/A Converter & applications.

UNIT IV:

Introduction to 80286, 80386, 80486 microprocessor, Single chip microcontrollers.

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.

References:

1. Douglas V. Hall “ Microprocessor & Interfacing Programming & Hardware-IIrd Edition”, TATA Mc Graw Hill.
2. A.P. Mathur “, Introduction Microprocessor–IIIrd Edition”, (TMH)
3. Tabak. D,” Advanced Microprocessor-2nd edition,” (TMH)

DATA COMMUNICATION & NETWORKING

DE-II (EEcT-453-E)

L T P/D TOTAL

3 1 - 4

Theory : 100 mks

Sessional : 50 mks

Duration : 3Hrs.

UNIT I: Basic & Computer Networks, Need & Evolution of Computer Networks, Description of LAN, MAN, WAN and wireless Networks, OSI and TCP/IP models with description of Data Encapsulation & peer to peer communication, Comparison of OSI and TCP/IP, Basic terminology of computer networks- bandwidth, Physical and logical topologies, Media-10 base Z, 0 base S, 10 base T, 100base TX, 100base FX, 1000 base LX and wireless, LAN & WAN devices- Router, bridge Ethernet switch HUB, Modem CSU/DSU etc.

UNIT II: Physical Layer- Representation, one bit on physical modem i.e. in wired network, Optical Network and wireless N/W, Encoding/Modulation- TTL Encoding, Manchester Encoding, AM, FM and PM, Dispersion, Jitter, Latency and collision. Different types of Media- Shielded twisted pair, Unshielded twisted pair, Coaxial cable, Optical Fiber cable and wireless. Layer- LLC and MAC sub layer, MAC addressing Layer 2 devices, Framing Error control and flow control. Error detection and correction CRC Codes, block parity and checksum, elementary data link protocol, sliding window protocol, Channel allocation problem- static and dynamic.

UNIT III: Multiple Access protocols, ALOHA, CSMA/CU Token bus Tokening, FDDI. Network Layer, Segmentation and autonomous system path determination, Network Layer addressing, Network layer data gram, IP addressed classes, Subnetting, Sub network, Subnet mark, Routing algorithm- optimality Principle, Shortest path routing, Hierarchical routing, Broadcast routing, Multicast routing, Routing for mobile host- Concatenated Visual circuits, tunneling, Fragmentation and DHCP. Routing Protocol- RIP, IGRP, USPF and EIGRP Network layer in ATM Networks.

UNIT IV: Transport Layer- Layer 4 Protocol TCP & UDP, Three way hand shakes open connection ATM AAL Layer protocol, Session Layer design issue, Presentation Layer design issue and Application layer design issue. Application layer Protocol, TELNET, FTP, HTTP, SNMP

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.

References:

1. Tannenbum, " Computer Networks," PHI
2. Darlx, " Computer Networks and Their Protocols", DLA Labs
3. Freer, " Comp. Communication & Networks" , East-West-Pre
4. Frozen, "Data Communication & Networking (TMH)
5. Stalling , "Data & Computer Communication.(PHI)

OPERATING SYSTEM

DE-II (EEcT-455-E)

L T P/D TOTAL

3 1 - 4

Theory: 100 mks

Sessional: 50 mks

Duration: 3 Hrs.

UNIT I:

Introduction: Operating System Services-types.

File Systems: File concept, File support, Access methods, Allocation methods, Directory Systems, File protection.

CPU Scheduling: Review of multiprogramming concepts, scheduling concepts, Scheduling algorithms, Algorithm evaluation, multiple processor scheduling.

UNIT II:

Memory Management: Bare machine concept, Resident monitor, Swapping-Multiple partitions, Paging, Segmentation, Combined systems, Virtual memory, Demand paging, Page replacement algorithms, Thrashing, Cache memory.

UNIT III:

I/O Management And Disk Scheduling: Organisation of I/O function, Logical structure and I/O buffering, Memory physical characteristics, First come first served scheduling,

Protection: Goals of protection, Mechanisms and policies, Domain of protection, Access matrix, Dynamic protection structure, Language based protection, Protection problems, Security. Round robin, Shortest seek time first scheduling, SCAN, CSCAN, LOOK, CLOOK, Selecting a disk scheduling algorithm, Sector queueing.

UNIT IV:

Concurrency: Principle of concurrency, Mutual exclusion, Software support, Dekker's algorithm, Hardware support, Operating system support, Semaphore Implementation, Messages, Deadlock presentation, Deadlock detection, Deadlock avoidance, recovery.

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. James L. Peterson and Abraham Silberschatz, Operating System Concepts, Addison Wesley, World Students Series Edition, Second edition, 1985.

References:

1. Harvey M. Deitel, An Introduction to Operating Systems, Addison Wesley Publishing Company, Revised First edition, 1984.
2. John J. Donovan, Systems Programming, McGraw Hill Book Co., International Student Edition, 1985.

EIGHTH SEMESTER SCHEME OF EXMINATION FOR B.TECH DEGREE COURSE

ELECTRICAL AND ELECTRONICS ENGINEERING

Course No.	Course Title	Teaching Schedule				Examination schedule			Total Marks	Duration of Exam
		L	T	P/D	Total	Theory	Sessional	Practical Viva		
EEcT-402-E	MODELLING AND SIMULATION	4	1	-	5	100	50	-	150	3
EEcT-404-E	MODERN TRENDS IN COMMUNICATION	4	1	-	5	100	50	-	150	3
EEcT-406-E	SPECIAL ELECTRIC MACHINES	4	1	-	5	100	50	-	150	3
*	DEPARTMENT ELECTIVE-III	3	1	-	4	100	50	-	150	3
**	DEPARTMENT ELECTIVE-IV	4	1	-	4	100	50	-	150	3
EEcT-422-E	SIMULATION LAB.	-	-	3	3	-	25	50	75	3
EEcT-424-E	MAJOR PROJECT	-	-	6	6	-	75	75	150	3
EEcT-426-E	SEMINAR	-	2	-	-	-	25	25	50	-
EEcT-428-E	COMPREHENSIVE VIVA	-	-	-	-	-	75	-	75	-
EEcT-430-E	GENERAL FITNESS & PROFESSIONAL APTITUDE	-	-	-	-	-	-	75	75	3
	TOTAL	19	9	-	35	500	450	225	1175	-

LIST OF DEPARTMENTAL ELECTIVES FOR B.TECH. ELECTRICAL AND ELECTRONICS ENGG. FOR 8TH SEMESTER

* DEPARTMENTAL ELECTIVE –III , 8 th Semester		
Sr.No.	Subject Name	Subject Code
1	UTILIZATION OF ELECTRICAL ENERGY	EEcT-442-E
2	NON-CONVENTIONAL SOURCES OF ENERGY MANAGEMENT	EEcT-444-E
3	HIGH VOLTAGE TRANSMISSION SYSTEMS	EEcT-446-E
4	FUZZY LOGIC & NEURAL NETWORKS	EEcT-448-E
** DEPARTMENTAL ELECTIVE-IV , 8 th Semester		
Sr.No.	Subject Name	Subject Code
1	RADIO & TV ENGINEERING	EEcT-450-E
2	DIGITAL HARDWARE DESIGN	EEcT-452-E
3	DIGITAL IMAGE PROCESSING	EEcT-454-E
4	SOFTWARE ENGINEERING	EEcT-456-E

MODELLING AND SIMULATION
EEcT-402-E
VIII SEMESTER

L T P Total
4 1 - 5

Theory : 100 mks
Sessionals: 50 mks
Duration : 3 hrs

UNIT 1:

Introduction: Systems, Models and simulation, concept of model, model classification and mathematical representation, Identification, continuous and discrete, static and dynamic, deterministic and stochastic systems.

UNIT 2:

Discrete event systems: Introduction, statistical model in simulation, random number generation, method of generating random variables, discrete random variates, generating correlated random numbers.

Queuing models: Characteristics, queuing notation, single server and multiple server systems.

UNIT 3:

Simulation: State space simulation techniques, Digital simulation languages, Analog simulation of linear systems, magnitude scaling, time scaling, simulation equations, transfer function simulator, hybrid simulation. Load flow, short circuit and steady state stability studies. Transmission parameters.

UNIT 4:

Matlab: Matlab environment, programming, modeling, with matrices, simulation in Matlab, introduction to dynamic system simulation using SIMULINK, applications of simulink.

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.

REFERENCES:

1. Banks J. Carson J.S and Nelson B: Discrete Event system simulation, PHI.
2. Celler F.E. Continuous system simulation, Springer veriang.
3. Athanasios Papoulis: Probability Random variables and Statistics Processes, Mc-Graw Hill.
4. Reference manual & user's guide on Matlab.
5. Analog computation & simulation (V Raja Raman)
6. System simulation with digital computer (D E O)
7. System simulation (Jordan)
8. System modeling & Computer Simulation by Nain A. Kheir. Marcel Dekker Inc.
9. Discrete Event System Simulation, PHI Banks J. Carson J. S. and Nelson B.
10. Advanced Computer methods for power system Analysis- Stagg and Elabiad.
11. Advanced power System L. P. Singh (New Age Publication)

MODERN TRENDS IN COMMUNICATION
VIII Sem. (EEcT-404-E)

L T P/D TOTAL
Mks
4 1 - 5
Mks

Theory : 100

Sessional: 50

Duration : 3

hrs.

UNIT I

Digital Communication: - Introduction to sampling theorem for band limited & band pass signals, bit rate, detection levels, Digital filtering, Pulse code modulation, Adaptive data modulation, coding, Coding efficiency, introduction to used codes. Error detection & corrections codes, ASK,FSK,PSK,DPSK,QPSK.

UNIT II :

Satellite Communication: - Introduction, Satellite orbits, frequency used, station keeping, orientation of satellite, transmission paths & its losses & noise consideration. Satellite systems flux density, effective isotropic radiated power, link budget calculations, multiple accessing techniques.

UNIT III :

Fiber Optic Communication: - Introduction, advantages & disadvantages, principle of light transmission in a fiber, types of optical fibers, effect of index profile on propagation, modes of propagation. Number of modes via fiber, single mode propagation, rayleigh scattering losses, absorption losses, mode coupling losses, bending losses, combined losses, effect of dispersion on pulse transmission, inter modal dispersion, material dispersion, wave guide dispersion, total dispersion.

UNIT IV:

Optical Communication:- LEDs, semiconductor laser diode, the PN photodiode, PIN diode. The avalanche photo diode, fiber optic communication system block diagram & loss budget, connectors & Splices.

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.

References:

1. Dennis Roddy & John Collen: Electronics Communication.(PHI)
2. John Gowar: Optical communication system (PHI)
3. D. C. Aggarwal : Satellite Communication

SPECIAL ELECTRIC MACHINES

VIII Sem. (EEcT-406-E)

L T P/D Total
mks

4 1 - 5
mks

Theory : 100

Sessional: 50

Duration : 3 hrs.

UNIT I Different types of FHP motors and uses in domestic & industrial applications, Single phase Induction motor, Qualitative examination starting and running performance of I-Phase Induction Motors.

UNIT II Linear Induction Motors and Actuators and its principle of operation, Linear Levitated machine & applications, Permanent magnet motors, High performance energy efficient machines, Effect of E.M.F injected into secondary circuits , quantitative study, scharge motor.

UNIT III Special Induction generations, special motors and generators associated with Wind, Solar, Tidal, Biogas and other unconventional energy forms and their applications.

UNIT IV Synchronous motors, Series universal motors, Stepper motor, Permanent magnet D.C. motor, Permanent magnet AC motors, Switch reluctance motors. Servo motor, shaded pole motor, brush less D.C motor, Typical applications in Computers, Electronics, Communications and Information Technologies.

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.

References:

1. Generalized Electrical Machines by P. S. Bhimbra
2. Generations of Electrical Energy by A. E. Fitzgerald/Charles , Kingsley J. R.
3. The Performance & design of A.C Commutator Motor by O.E .Taylor
4. Performance & Design of A.C machines by M.G. Say

SIMULATION LAB
VIII- Sem. (EEcT-422-E)

L	T	P	Total
-	-	3	3

Practical : 50 mks

Sessional: 25 mks

Duration: 3 hrs.

List of Experiments :

Perform the experiments using C/C++ Language

1. To develop a Program for Matrix $n*n$.
2. Add two Matrix.
3. Multiplication of two Matrix.
4. Find Inverse of Matrix.
5. Check stability by Routh Hurwitz Criteria.
6. Check stability by Jury Test.
7. Draw a circle for given radius use graphics.
8. Draw a straight-line use graphics.
9. Find Eigen value for given Matrix.
10. To develop a program for Cramer's Rule
11. To develop a program for Tower of Hanoi.

NON-CONVENTIONAL SOURCES OF ENERGY MANAGEMENT DE-III (EEcT-444-E)

L T P/D TOTAL

3 1 - 4

Theory : 100 mks

Sessional : 50 mks

Duration : 3Hrs

UNIT I: Introduction : Limitation of Conventional Energy sources, used & growth of alternate energy sources, Basic schemes & application of direct energy conversion.

Energy Management : Principles of energy conservation , Energy Audit, energy conservation approach/technologies, co-generation, waste heat utilization, power factor improvement, regeneration methods, energy storage, efficient energy management techniques, energy management system in India.

UNIT II : MHD Generators: Basic principle, gaseous conduction & Hall effect, generator & motor effect, different types of MHD generators, practical MHD generators, applications & economic aspects.

Thermo-Electric Generators: Thermoelectric effects, Thermoelectric converters, figure of merit, properties of Thermoelectric materials, brief description of construction of thermoelectric generators, applications & economic aspects.

UNIT III: Photo Voltaic Effect & Solar Energy: Photo Voltaic effect, different types of photoelectric cells, cell fabrication, characteristics of photo voltaic cells, conversion efficiency, solar batteries, Solar radiation analysis, solar energy in India, solar collector, solar furnaces & applications.

UNIT IV: Miscellaneous Sources : Fuel cells, principle of action, general description of fuel cells, conversion efficiency, operational characteristics & applications. Low level hydro plants, definition of low head hydropower, Choice of site, choice of turbines. Wind power, history of wind power, wind machines, theory of wind power, characteristics of suitable wind power sites, Bio mass energy, conversion processes. Different bio mass energy resources, electric equipment, precautions, and applications.

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.

References:

1. Energy Resources; Demand & Conservation with special reference to India by Kashbari, C, TMH
2. An Introduction to Direct Energy Conservation by R.A. Coormbe.
3. Direct Energy Conversion by Kettani, M.
4. Energy Hand book by Robert L. Loftness.
5. Energy Technology Hand Book by Considine.

HIGH VOLTAGE TRANSMISSION SYSTEMS

DE-III (EEcT-446-E)

L T P/D TOTAL

3 1 - 4

Theory : 100 mks

Sessional : 50 mks

Duration: 3

Hrs.

UNIT I: Introduction to EHV AC and HVDC transmission-Comparison between HVAC and HVDC, overhead and underground transmission scheme-Standard transmission voltages- Factors concerning choice of HVAC and HVDC transmission-Block diagram of HVAC and HVDC transmission schemes. Modern developments in HVDC transmission. Protection of HVAC and HVDC systems.

UNIT II: Properties of bundled conductors –Inductance and capacitance of EHV line – Surface voltage gradient on single, double and more than three conductor bundles – Corona effects-Power loss increase in radius of conductors-Charge voltage diagram- Qualitative study of corona pulses, their generation and properties.

UNIT III: Properties of EHV AC transmission at power frequency – Generalised constants-Power circle diagram and its use-Voltage control using compensators-High phase order transmission. Review of rectification and inversion process-Constant current and constant extinction angle modes of operations-Analysis of DC transmission systems-Harmonics on AC and DC sides and filters for their suppression – Multi terminal DC transmission systems – Parallel operation of AC and DC transmission.

UNIT IV: Over voltage in EHV systems, origin and types – Ferro resonance over voltage – Switching surges, reduction of switching surges on EHV systems-Introduction to EHV cable transmission – Electrical characteristics of EHV cables – properties of cable insulation materials-EHV insulators – Characteristics and pollution performance

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 BOOKS:

- 1.Rakesh Das Begamudre ,EHV AC Transmission Engineering, Wiley Eastern Limited, 1990.
2. E.W.Kimbark, Direct Current Transmission, Volume 1,Wiley Interscience,1971.

REFERENCES:

1. Sunil S.RAO ,Swichgear and Protection,Khanna Publishers,1986.
2. T.J.E Miller,Reactive Power Control in Electric Systems,John Wiley and Sons, Newyork,1980.
3. G.K.Dubey, S.R.Doralda. A.Joshi,R.M.Sinha,Thyristorised Power Conrollers,Wiley Eastern Limited,1992.

**UTILAZTION OF ELECTRICAL ENERGY
DE-III (EEcT-442-E)**

L T P Total
3 1 -- 4

Theory: 100 mks
Sessional: 50 mks
Duration: 3 Hrs

UNIT 1: Illumination: Term used in illumination, Law's of illumination, sources of light, arc lamp incandescent lamp, discharge lamp, sodium vapour, mercury vapour lamp, florescent tubes, lightening schemes, method of lightning calculation.

UNIT II: Electrical Heating: Advantages of Electrical Heating, various types of Electrical heating, Power frequency and High frequency heating, Degree of heating element, Equivalent circuit of arc furnace, Resistance heating, Arc heating, Induction heating, dielectric heating etc.

Electric Welding: All types of electrical welding, resistance welding, arc welding, electrical winding equipment, Comparison between AC & DC welding, types of electrodes, advantages of coated electrodes.

UNIT III:Electroplating: Basic principle, faraday's law of electrostatics, terms used, Application of electrolysis, factors governing electro deposition, power supply.

Refrigeration & Air Conditioning: Basic principle, various compression cycle & system its application, electric circuit of refrigerator, air conditioner.

UNIT IV: Traction Motors : Different system of electric traction, comparison between AC & DC system, block diagram of traction system ,Starting, Speed control and braking –Speed time curves,-Mechanics of Train movement-Tractive effort for acceleration – Power and energy output from driving axles-Specific energy output and consumption-Train resistance.

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.

References:

1. Dr.S.L.Uppal, Electrical Power ,Khanna Publishers, New Delhi,1980.
2. M.L.Soni,P.V.Gupta,U.S.Bhatnagar,A.Chakrabarti,A Text Book On Power System Engineering, Dhanpat Rai & Co,New Delhi1997-98
3. H.Pratap, Art and Science of Utilization of Electric Energy, Dhanpat Rai & Sons, New Delhi,1980.
4. G.C.Garg, Utilization of Electric Power and Electric Traction, Khanna publishers, New Delhi,1995.

FUZZY LOGIC & NEURAL NETWORKS

DE-III (EEcT-448-E)

L T P/D TOTAL
3 1 - 4

Theory : 100 mks

Sessional : 50 mks

Duration : 3 Hrs.

UNIT I :

Introduction to Fuzzy sets, Crisp sets, Basic concepts of Fuzzy sets, L-fuzzy sets, level 2-fuzzy sets, type 2-fuzzy sets. Fuzzy sets Vs. Crisp sets. Fuzzy Arithmetic, Algebraic operations, set-theoretic operations, fuzzy relation on sets & fuzzy set compositions of Fuzzy relations, properties of the minimum-maximum composition.

UNIT II :

Introduction to Fuzzy control, Fuzzy logic controller components, Construction of Fuzzy sets

(Direct methods, Indirect method), Introduction to Expert system, Case study on fuzzy logic controller, Application of Fuzzy control.

UNIT III:

Introduction to Neural Networks, Artificial Neuron model, Neural Network controller, Multilayer Network, Back propagation Algorithm (Forward, Backward), learning control Architecture (Indirect learning, General, Forward Inverse), Simplex matrix operation.

UNIT IV:

Application of Neural Network: The traveling salesman problem, Time series prediction.

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.

References:

1. James A. Anderson “ Introduction to Neural Networks”, Prentice Hall India.
2. H.J. Zimmermann “ Fuzzy set theory & its Applications “, Allied Publishers Ltd.
3. Nil Junbong “ Fuzzy Neural Control Principles & Algorithm”, PHI.
4. N.K. Bose “ Neural Network Fundamental with Graphics “, TATA McGraw Hill.
5. Klir George J. “ Fuzzy sets and Fuzzy Logic Theory and Applications”, PHI.
6. J.M Zurada , “ Introduction to Artificial Neural Network” , Jaico Publishers

RADIO & TV ENGINEERING

DE-IV (EEcT-450-E)

L T P /D TOTAL
4 1 - 5

Theory : 100 mks
Sessional: 50 mks
Duration : 3Hrs.

UNIT I: Radio Transmitter: Modulation, AM Transmitter, FM Transmitter; AFC, Sensitivity selectivity, VODAS, Radio Transmitter, Telephone transmitter Privacy device, Radio telegraph transmitter.

UNIT II: Radio receiver: TRF, super-heterodyne, communication receiver, double conversion receiver, SSB Rx, freq synthesis, image freq, selectivity. IF freq tracking AFC & AGC n Rx, FM demodulator, neutralization, freq drift & scintillation, Diversity reception, fading, armstrong FM Rx.

UNIT III: Monochrome TV: Introduction, composite video signal picture tube, camera tube image orthicon, vidicon, plumbicon TV Tx & Rx, modulation technique, TV Application CATV, CCTV, Video games Theater T.V., VTR, AGC, Various AGC system

UNIT IV: Color T.V.: Compatibility, Three color theory different color picture tube, color signal transmission, NTSC, Color TV, PAL, SECAM

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.

References:

1. Monochrome & color T.V. by R.R.Gulati (Wiley Eastern Ltd.)
2. Radio Engineering by G.K. Mithal (Khanna Publications)
3. A.M Dhaka, " Monochrome & color T.V" (TMH)
4. Skolnik.M.I," Introduction to Radar System" (TMH)

DIGITAL HARDWARE DESIGN
DE- IV (EEcT-452-E)

L T P/D TOTAL
mks
4 1 - 5
mks
Hrs

Theory :100

Sessional: 50

Duration : 3

UNIT I: Combination Circuit Design: Adders Subtractor, BCD Adder code converters, 7-segment display, designing using multiplexer, demultiplexer, decoder, encoder.

UNIT II: Synchronous Sequential ckt Design: Flip-flop, FSM. Sequence detector, parity checker & Detector and different applicator of sequential ckts, state table state diagram. Moore & mealy sequential ckt with state diagram reduction of state table using merger graph method & moose method, computing M/C, limitation & capabilities of seq. Ckt.

UNIT III: Asynchronous Sequential ckt : FSM, Racer, state table & flow table diagram, compatibility chart state assignment in Asynchronous ckt.

UNIT IV: Introduction to: ROM, PROM, EPROM, EEPROM, masked ROM, FAMOS, PAL, PLA, FPGA.

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.

References:

1. Z.Kohavi by Switching & System (McGraw Hill)
2. R.P.Jain By Digital Electronics & Microprocessor (McGraw Hill)
3. W.Fletcher :- An Engineering Approach to Electronic Design (PHI)
4. Floyd: - Digital Fundamentals (UBS)
5. Morris Mano:- Digital Logic & Computer Design (PHI)

Digital Image Processing

DE-IV (EEcT-454-E)

L T P/D TOTAL
4 1 - 5

Theory : 100 mks
Sessional: 50 mks
Duration: 3 Hrs.

UNIT I:

DIGITAL IMAGE FUNDAMENTALS: Introduction, image model, sampling and Quantization, relationship between pixels, imaging geometry, photographic film, discrete, Fourier transform, properties of two dimensional Fourier transform, fast Fourier transform.

UNIT II:

IMAGE ENHANCEMENT AND COMPRESSION: Enhancement by point processing, spatial filtering and enhancement in the frequency domain, pseudo color image processing, image compression models, error free compression, image compression standards.

UNIT III:

IMAGE RESTORATIONS: Degradation, models, diagonalizations of matrices, inverse filtering, interactive restorations, geometric transformations.

IMAGE SEGMENTATION: Detection of discontinuities, edge linking and boundary detection, thresholding, region orienting segmentation.

UNIT IV:

REPRESENTATIONS AND RECOGNITION: Representations schemes, boundary descriptors, regional descriptors, morphology, recognition and interpretation, basics.

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 BOOKS

1. Rafael c. Gonzalez and Richard E. Woods, digital image processing, Addison Wesley publishing company, 1987

REFERENCES

1. William K. Pratt, digital image processing, John Wiley and sons, 1978
2. Jain, Fundamentals of digital image processing, PHI, 1996
3. Barrie W. Jervis , "digital signal processing (Pearson education India)
4. Prokis, " digital signal processing" (PHI)

SOFTWARE ENGINEERING

DE-IV (EECt-456-E)

L T P/D TOTAL
4 1 - 5

Theory : 100 mks

Sessional : 50 mks

Duration : 3Hrs

UNIT- I: Introduction: Programs vs. Software products, Emergence of Software Engineering, Notable Changes in Software Development Practices, Software Life Cycle Models.

Software Project Management: Project Planning, Project Size Estimation Matrices, Project Estimation Techniques, Empirical Estimation Techniques, COCOMO- A heuristic Estimation Technique, Halstead's software Science- An Analytical Technique, Staffing Level Estimation, Scheduling, Organization and Team structures, Staffing, Risk Management, Software Configuration Management.

UNIT- II: Requirements Analysis and Specification: Requirements Analysis, Software Requirements Specification (SRS), Formal System Development Techniques, Algebraic Specifications, Software Design: Good Software Design/Practices, Cohesion and Coupling, Neat Hierarchy, Software Design Approaches.

Function-Oriented Software Design: Overview of the SA/DK Methodology, Structured Analysis, Data Flow Diagrams (DFDs), Extending the DFD Technique to Real Time Systems, Structured Design.

UNIT- III: Object Oriented Software Design: Overview of Object-Oriented Concepts, Object- Oriented vs. Function –Oriented Design, Graphical Representation of Object-Oriented Design, Object-Oriented Design Methodology.

User Interface Design: Characteristics of a Good User Interface Design, Basic Concepts, Command Language –Based Interface, Menu-Based Interface, Director Manipulation Interfaces, Windowing Systems, Types of Widgets, An overview of X Window/MOTIF, Visual C++.

Coding And Testing: Coding, Unit testing, Black Box Testing, White-Box testing, Debugging, Program Analysis Tools, Integration Testing, System, General Issues Associated with Testing.

UNIT-IV Software Reliability and Quality Assurance: Software Reliability, Software Quality, Software, Software Quality Management, ISO 9000, SEI Capability Maturity Model. Computer Aided Software Engineering: CASE and its Scope, CASE Support in Software Architecture of a CASE Environment.

Software Maintenance: Software Reverse Engineering, Software Maintenance Process Models, and Estimation of Maintenance Costs.

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.

References:

1. Rajib Mall, “ Fundamentals of Software Engineering”, PHI
2. Roger S. Pressman, “Software Engineering A Practitioner’s Approach, McGraw-Hill.
3. Ali Behforooz and Frederick J. Hudson, “ Software Engineering Fundamentals”, Oxford University Press.

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