WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

SCHEME OF INSTRUCTION AND EXAMINATION

B.E. IInd YEAR

ELECTRICAL & ELECTRONICS ENGINEERING

SEMESTER - I

Sl. No.	Syllabus Ref. No.	Subject	Scheme of Instruction		Scheme of Examination		
			Periods per Week		Duration in Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	MT 201	Mathematics – III	4	-	3	75	25
2.	EE 201	Electrical Circuits - I	4	-	3	75	25
3	CE 222	Environmental Studies	4	-	3	75	25
4.	EE 204	Electrical Measurements & Instruments	4	-	3	75	25
5.	EC 221	Electronic Engg. - I	4	-	3	75	25
6.	ME 221	Elements of Mechanical Engineering	4	-	3	75	25
		PRACTICALS					
1.	EC 241	Electronic Engg. Lab. - I	-	3	3	50	25
2.	EE 242	Circuits & Measurements Lab.	-	3	3	50	25
		Total	24	6	-	550	200

SCHEME OF INSTRUCTION AND EXAMINATION

B.E. IInd YEAR

SERVICE COURSES OFFERED TO OTHER DEPARTMENTS

SEMESTER - I

Sl. No.	Syllabus Ref. No.	Subject	Scheme of Instruction		Scheme of Examination		
			Periods per Week		Duration in Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	EE 221	Electrical Circuits & Machines. (For CSE, ME & PE)	4	-	3	75	25
2.	EE 222	Electrical Technology (For ECE)	4	-	3	75	25

MT 201

MATHEMATICS-III

(Common to all Branches)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

UNIT –I

Partial differential Equations : Formation of partial differential equations of first order, Lagrange's solution. Standard types. Charpit's & Jacobi's method of solution, Partial differential equations of higher order, Monge's method.

UNIT-II

Fourier Series : Expansion of a function in Fourier series for a given range, half range sine and cosine expansion, odd and even functions of Fourier series, change of interval, complex form of Fourier Series.

UNIT – III

Partial differential Equations : Solution of wave equation, heat equation and Laplace's equation by the method of separation of variables, and their use in problems of vibrating string, one and two dimensional wave and heat flow and examples thereon.

UNIT-IV

Z - Transforms : Introduction. Basic theory of Z-Transforms. Z-transform of some standard sequences. Existence of Z-Transform, Linearity property, Translational Theorem, Scaling property, Initial and Final Value Theorems, Differentiation of Z-Transform, Convolution Theorem, Solution of Difference equations using Z-transforms.

UNIT-V

Numerical Methods : Solution of linear system of equations. Gauss elimination method Gauss-Seidel iterative method, ill-conditioned equations

and refinement of solutions, Interpolation, Lagrange Interpolation, Newton's divided difference interpolation, Newton's Forward and Backward difference Interpolation Formulas. Numerical differentiation and integration (Trapezoidal and Simpson's formulas) Solution of Differential equations by Runge Kutta Method.

Suggested Reading

1. E. Kreyszig. *Advanced Engineering Mathematics*, Wiley Eastern Ltd., 8th Edition, New Delhi, 2006.
2. R. K. Jain and S.R.K. Iyengar, *Advanced Engineering Mathematics*, Narosa Publications, 2005.
3. B.V. Ramana, *Higher Engineering Mathematics*, Core Engineering Series, Tata McGraw Hill Publishing Company Ltd, New Delhi, 2007.
4. B.S. Grewal, *Higher Engineering Mathematics*, Khanna Publications, 34th Edition, 1998.

EE 201

ELECTRICAL CIRCUITS - I

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

Unit I

DC Circuit Analysis, Techniques, Definitions of Electric Circuit Parameters, Voltage Current, and Power, Passive sign convention, Passive circuit elements R, L and C and their V-I relationships & symbols, Description of independent and dependent sources, Simple series and parallel circuit analysis and reduction techniques, Current and voltage division principles, Star – Delta transformation

Unit II

Nodal, loop and mesh circuit analysis. Network theorems: Thevenin, Norton, Maximum Power Transfer and Reciprocity theorems and their applications. Transient Response: Initial conditions in Zero-Input response of RC, RL and RLC networks. Definitions of unit impulse, Unit step and Ramp functions.

Unit III

Zero State Response with impulse and step inputs, Complete Response of circuits with initial conditions and forcing functions such as Step, Exponential and Sinusoidal functions

Unit IV

Definition and computation of average value, RMS value of time varying periodic signals, Steady State response of RLC networks subjected to sinusoidal excitation, Complex exponentials, Definition of phasor domain, Phasor domain conversions, Network analysis techniques in phasor domain. Definition of complex power, Reactive power, Power factor and Calculations of power in single phase ac circuits.

Unit V

Resonance-Definitions and computations of series and parallel resonance. Definitions of bandwidth and Q-factor. Introduction of simple concepts regarding filters, Low pass, High pass, and Band pass filters. Polyphase and in particular 3-phase circuit analysis: 3-phase power, Y and Δ connected systems, Calculations of voltages, current and power in 3-phase circuits with Y and Δ connected loads and generators. Balanced and unbalanced loads, Measurement of 3-phase power by two wattmeter method.

Suggested Reading:

1. Van Valkenburg, *Network Analysis*, Prentice Hall of India, 3rd Edition, 1992
2. W.H.Hayt, J.E.Kimmerly, *Engineering Circuit Analysis*, McGraw Hill, 5th Edition, 2000
3. Charles K.Alexander & Matthew N.O.Sadiku, *Fundamentals of Electric Circuits*, Tata McGraw-Hill, 2003.

CE 222

ENVIRONMENTAL STUDIES

(Common to all Branches)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessionals	25	Marks

UNIT –I

Environmental studies : Definition, scope and importance, need for public awareness. Natural resources: Water resources; use and over utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Effects of modern agriculture, fertilizer-pesticide problems, water logging salinity. Energy resources, growing energy needs, renewable and non-renewable energy sources. Land Resources, land as a resource, land degradation, soil erosion and desertification.

UNIT – II

Ecosystems : Concepts of an ecosystem, structure and functions of an ecosystem, producers, consumers and decomposers, energy flow in ecosystem, food chains, ecological pyramids, aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).

UNIT – III

Biodiversity : Genetic species and ecosystem diversity, bio-geographical classification of India. Value of biodiversity, threats to biodiversity, endangered and endemic species of India, conservation of biodiversity.

UNIT - IV

Environmental Pollution : Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution, thermal pollution and solid waste management.

Environment Protection Act: Air, water, forest and wild life acts, issues involved in enforcement of environmental legislation.

UNIT – V

Social Aspects and the Environment : Water conservation, watershed management, and environmental ethics. Climate change, global warming, acid, rain, ozone layer depletion. Environmental protection act, population explosion.

Disaster management : Types of disasters, impact of disasters on environment, infrastructure, and development. Basic principles of disaster mitigation, disaster management, and methodology, disaster management cycle, and disaster management in India.

Suggested Reading

1. A. K. De, *Environmental Chemistry*, New Age Publications, 2002.
2. E. P. Odum, *Fundamentals of Ecology*, W.B. Sunders Co., USA.
3. G.L. Karia and R.A. Christian, *Waste Water Treatment, Concepts and Design Approach*, Prentice Hall of India, 2005.
4. Benny Joseph, *Environmental Studies*, Tata McGraw-Hill, 2005
5. V. K. Sharma, *Disaster Management*, National Centre for Disaster Management, IIPE, Delhi, 1999.

EE 204

ELECTRICAL MEASUREMENTS AND INSTRUMENTS

(Common to EEE and IE)

Instruction	4	Periods per week
Duration of University Examination	3	Hours,
University Examination	75	Marks
Sessional	25	Marks

Unit I

Principle of Measurement and Instrumentation: Objectives of measurements, Analog versus digital measurements, Accuracy, Precision and Uncertainty, Sources of measurement error. Standard cell and Standard resistance. Basic Characteristics of measuring instruments with moving element. Ammeter, Voltmeter, Expression for torque of moving coil, Moving iron, Dynamometer, Induction and electrostatic instruments, Extension of range of instruments, Wattmeters, Torque expression for dynamometer instruments, Reactive power measurement.

Unit II

Energy meters, Single phase and polyphase, Driving torque and braking torque equations, Errors and testing compensation, Maximum demand indicator, Power factor meters, Frequency meters, and Weston type of synchroscope.

Unit III

Bridge Methods: Measurement of Inductance, Capacitance and Resistance using Bridges, Maxwell's, Anderson, Desauty's, Schering's bridges, Kelvin's double bridge, Megger.

Unit IV

Magnetic Measurements: Ballistic galvanometer, Calibration by Hibbert's magnetic standard flux meter, Lloyd-Fischer square for measuring iron loss. Testing of ring and bar specimens, Determination of B-H curve and Hysteresis loop using CRO, Determination of leakage factor.

Unit V

Potentiometers and Instrument Transformers: Crompton's DC and AC-polar and coordinate type potentiometers, Applications, Measurements of impedance, Calibration of ammeter, voltmeter and wattmeters. Use of oscilloscope in frequency, phase and amplitude measurements, Instrument transformers, Ratio and phase angle errors and their reduction

Suggested Reading:

1. A.K. Sawhney, *Electrical and Electronics Measurements and Instruments*, Dhanpat Rai & Sons, Delhi, 2000.
2. Umesh Sinha, *Electrical and Electronics Measurements & Instrumentation*, Satya Prakashan, New Delhi, 2000.

EC 221

ELECTRONIC ENGINEERING - I

(Common for EEE & IE)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Semiconductor diodes and Rectifiers : Review of semiconductor physics, p-n junction as a rectifier, V-I characteristics, temperature dependence of V-I characteristics; Breakdown of junctions-Zener and Avalanche. Half wave, full wave, bridge rectifiers, L, C, pi-section filters; Regulation and Ripple characteristics.

UNIT-II

Transistors and their biasing : BJT, current components; CE, CB, CC configurations; characteristics. Transistor as an amplifier; h-parameters; Analysis of CE, CB, CC amplifiers. Operating point, bias stability, bias stabilization circuits, fixed bias, collector to base bias and Emitter bias.

UNIT-III

Field Effect Transistors and their biasing : Principles of V-I characteristics of JFET and MOSFETs; Depletion and Enhancement modes, small signal equivalent circuit, FET as a CS amplifier.

Biasing of JFET's and MOSFET's, source self bias, biasing for zero current drift, biasing against device variations, Biasing the enhancement MOSFET, Characteristics of UJT, SCR, DIAC & TRIAC.

UNIT-IV

Low frequency BJT amplifier Circuits : Cascading amplifier stages, simplified analysis for three amplifier configurations, Miller's theorem-High input impedance transistor circuits, cascade configuration, Difference amplifier.

UNIT-V

Multistage amplifiers : Classification of amplifiers, Distortion in amplifiers, Frequency response of RC coupled amplifiers, Transformer coupled amplifiers, step response, Bandwidth of cascaded stages. Effect of emitter (source) bypass capacitor on LF response.

Suggested Reading :

1 Jacob Millman & Christos C. Halkias, *Electonic Devices and Circuits,* McGraw Hill, 1991.

2. Jacob Millman & Christos C. Halkias, *Integrated Electronics,* McGraw Hill, 1991.

3. Donald L Schilling & Charles Belove, *Electronics Circuits : Discrete & Integrated,* 3rd Edition, McGraw Hill International Student Editio ı, 3rd Edition, 1989.

ME 221

ELEMENTS OF MECHANICAL ENGINEERING

(Common for ECE and EEE)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessionals	25	Marks

UNIT-1

Thermodynamics: Concept of system, process and properties, laws of thermodynamics, concept of entropy and Clausius inequality, steady flow energy equation for an open system, conditions of reversible and irreversible process, simple calculations of change in internal energy, enthalpy, entropy and workdone

IC Engines: Working of four stroke and two stroke petrol and diesel engine with p-V diagrams, valve timing diagram, calculation of indicated power, brake power, specific fuel consumption, mechanical and thermal efficiencies.

Reciprocating Air compressors:Single and multistage compressors, workdone, efficiency of multistage compressors, effect of clearance volume.

UNIT-II

Heat transfer: Basic modes of heat transfer, Fourier's law of conduction, Newton's law of cooling, Stefan –Boltzamn law of radiation and concept of black body one dimensional steady state conduction heat transfer through plane walls without heat generation. Critical radius of insulation for cylinders.

Heat exchangers: Classification and application of heat exchangers in industry, derivation of LMTD in parallel and counter-flow heat exchangers and problems

UNIT-III

Refrigeration: Types of refrigeration systems- Air refrigeration system, vapor compression system, ammonia-water absorption refrigeration system, thermoelectric refrigeration system, COP and representation cycle on T-S and H-S diagrams, Types and properties of refrigerants, eco-friendly refrigerants., Introduction to psychrometry and psychrometry processes.

UNIT-IV

Basic Manufacturing Processes: Welding, brazing, soldering, brief description of process and parameters, associated principles of gas welding, arc welding.

Casting: Sand casting, die casting, and principles and application.

Forming: Basic concepts of forming process-Rolling and wire drawing.

Principles and Applications of basic Machining Processes: Turning, drilling and shaping

UNIT - V

Applications of four bar planar mechanisms-single slider crank mechanisms. **Gears**: Classifications of gears, nomenclature **Gear Trains**: Simple, compound, inverted and epi-cyclc gear trains

Belt and Rope drives: Open and cross belt drives, length of belt, ratio of tensions of flat belt, condition for maximu n power transmission for flat belt.

Suggested Reading:

1. P. N. Rao, *Manufacturing Technology*, Vol.1(Foundry, welding and Forming) & 2 (Metal cutting and machine tools), Tata McGraw Hill publishing Co, 2005.
2. Thomas Beva, *Theory of Machines*, CBS Publishers, 1995.
3. R. K. Rajput, *Thermal Engineering*, Laxmi Publications, 2005
4. C. Sachdeva, *Fundamentals of Engineering Heat and Mass Transfer*, Wiley Eastern Ltd., 2004.

EC 241

ELECTRONIC ENGINEERING LAB -I

(Common to EEE and IE)

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

List of Experiments:

1. Comparison of semiconductor diodes (Ge, Si and Zener)
2. Static Characteristics of BJT (CE)
3. Static Characteristics of BJT (CB)
4. Static Characteristics of FET (CS)
5. Design of Half wave and Full wave Rectifier with and without filters
6. Design of rectifiers with C, L, LC & Pi-filters
7. Static characteristics of SCR
8. Static characteristics of UJT
9. Measurement of phase, frequency and sensitivity with CRO
10. Biasing of BJT and FET
11. Frequency Response of RC coupled amplifier using BJT
12. Frequency Response of RC coupled amplifier using FET
13. Emitter Follower
14. Source Follower
15. Cascaded Amplifiers

Suggested Reading :

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, *Basic Electronics*, A Text – Lab Manual, 7th Edition, TMH, 1994.
2. S. Poorna Chandra, B. Sasikala, *Electronics Laboratory Primer*, A design approach, Wheeler Publishing, 1998.

WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

EE 242

CIRCUITS & MEASUREMENTS LAB

(Common for EEE and IE)

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

List of Experiments:

Part A: Circuits:

1. Charging and Discharging Characteristics of RC Series Circuits.
2. Locus Diagram of a RC / RL Circuit.
3. Frequency Response of a RLC Series Circuit.
4. Parameters of Two Port network.
5. Verification of Theorems (a) Thevenin's Theorem (b) Norton's Theorem (c) Superposition Theorem (d) Maximum Power Transfer Theorem.
6. Characteristics of Linear, Non-linear and Bilateral Elements.
7. Transients in RLC Circuits.

Part B: Measurements:

1. Measurement of Low Resistance by Kelvin's Double Bridge.
2. Calibration of Single Phase Energy Meter by Phantom Loading.
3. Measurement of Inductance by Maxwell's and Anderson's Bridges.
4. Measurement of Capacitance by DeSauty's Bridge.
5. Measurement of Iron losses by Lloyd Fischer Square.
6. Use of D.C. Potentiometer for Measurement of Unknown Voltage and Impedance.
7. Calibration of 3-phase Energy Meter (Electromagnetic/static) by Direct Loading.
8. Use of Oscilloscope and Plotting of B-H Curve and Calculation of Iron Loss.

Note: At least 5 experiments should be completed from each part.

WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

EE 221

ELECTRICAL CIRCUITS AND MACHINES

(Common to CSE, ME and PE)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessionals	25	Marks

Unit I

DC & AC Circuits: Analysis of circuits using loop current method, Thevenin's and Norton's theorems, Sinusoidal sources, Phasor representation of sinusoidal quantities, Average and rms values, Active power, Reactive power, Energy stored in inductance and capacitance, Mutual inductance, Dot convention, analysis of simple coupled circuits.

Unit II

Production of 3-Phase Voltages: Analysis of 3-phase balanced circuits, 3-phase power measurement by two-wattmeter method. Transformers: Principle of transformation of voltages and currents, Equivalent circuit of transformer on no load and load, Efficiency and regulation of transformer, OC and SC tests, Auto-transformer.

Unit III

DC Machines: Construction and working principle of a DC machine, Production of emf in a generator, Types of excitation, Characteristics of series, shunt and compound motors, Speed control and application of DC motors, Losses and efficiency.

Unit IV

Induction Motors: Production of rotating magnetic field, Construction and principle of operation of induction motors, Methods of starting and Speed control of 3-phase induction motors, Speed-torque characteristics.

Unit IV

Single-Phase & Special Motors: Various types of single phase motors, Split phase, Capacitor start and Capacitor run, Basic features of Stepper motor and Brushless DC motor.

Suggested Reading:

1. V.K.Mehta, *Principles of Electrical Engineering*, S.Chand & Co., 1995
2. Kothari and Nagrath, *Basic Electrical Engineering*, Tata McGraw Hill, 2nd Edition, 2002.

EE 222

ELECTRICAL TECHNOLOGY

(For ECE)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

Unit I

DC Generators: Constructional details, Simple lap and wave windings, Methods of excitation, Induced emf, Basic ideas of armature reaction and commutation, Characteristics of shunt, series and compound generators and applications

DC Motors: Torque developed in motors, Motor starter, Characteristics of shunt, series and compound motors, Speed control of DC motors.

Unit II

Balanced three-phase system: Star-delta connection, Relationship between line and phase quantities, Measurement of power by Two-Wattmeter method

AC Generators: Construction, emf equation, Armature reaction, Synchronous impedance, Regulation.

Unit III

Transformers: Single-phase transformer: Construction, Theory of action, Phasor diagram under no-load and loaded conditions, OC and SC tests on transformer, Efficiency and regulation, Auto transformer, Theory of operation

Unit IV

Induction Motors: Construction, Production of rotating magnetic field, Slip-torque characteristics, Starters for cage and wound rotor induction motors, Single-phase induction motors, Construction, Theory of operation, Characteristics of shaded pole, Split phase and Capacitor motors, Applications.

Unit V

Power Systems : Basic ideas of thermal, hydro, nuclear and non-conventional generating systems and layout, Block schematic of power systems, Transmission using high voltages, Advantages, Basic ideas of line parameters, Short line calculations.

Suggested Reading :

1. H.Cotton, *Electrical Technology*, BI Publications, 1985.
2. M.L. Soni, P.V. Gupta and V.S. Bhatnagar, *A Course in Electrical Power*, Dhanpat Rai and Sons, Delhi, 1995.

WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

SCHEME OF INSTRUCTION AND EXAMINATION

B.E. IInd YEAR

ELECTRICAL & ELECTRONICS ENGINEERING

SEMESTER - II

Sl. No.	Syllabus Ref. No.	Subject	Scheme of Instruction		Scheme of Examination		
			Periods per Week		Duration in Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	EE 251	Electrical Circuits-II	4	-	3	75	25
2.	CE 223	Solid Mechanics	4	-	3	75	25
3.	EE 252	Electro-Magnetic Theory	4	-	3	75	25
4.	EE 254	Electrical Machinery-I	4	-	3	75	25
5.	EC 271	Electronic Engineering-II	4	-	3	75	25
6.	ME 273	Prime Movers & Pumps	4	-	3	75	25
		PRACTICALS					
1.	EC 291	Electronic Engg. Lab. - II	-	3	3	50	25
2.	ME 291	Prime Movers & Pumps Lab.	-	3	3	50	25
		Total	24	6	-	550	200

WITH EFFECT FROM THE ACADEMIC YEAR 2007-2008

SCHEME OF INSTRUCTION AND EXAMINATION

B.E. IInd YEAR

SERVICE COURSES OFFERED TO OTHER DEPARTMENTS

SEMESTER - II

Sl. No.	Syllabus Ref. No.	Subject	Scheme of Instruction		Scheme of Examination		
			Periods per Week		Duration in Hrs	Maximum Marks	
			L	D/P		Univ. Exam	Sessionals
		THEORY					
1.	EE 271	Part A : Electrical Technology (For CE)	3	-	1.5	38	12
		PRACTICALS					
1.	EE 292	Electrical Technology Lab	-	3	3	50	25
2.	EE 291	Electrical Circuits & Machines Lab. (For ME & PE)	-	3	3	50	25

EE 251

ELECTRICAL CIRCUITS -II

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

Unit I

Two Port Parameters: Z,Y,A,B,C,D and h- parameters, Their inter-relationships, Series, Parallel and Cascade connection of two ports, Terminated two ports. Coupled circuits: Analysis of circuits with mutual inductance, Linear Transformers and ideal Transformers

Unit II

Fourier series representation of periodic functions using both trigonometric and exponential functions. Symmetry conditions, Fourier transform representation of aperiodic signals, Symmetry properties, Power and bandwidth concepts. System function and its application in determining steady- state response.

Unit III

Development of Laplace Transform Method: Laplace Transform pair, Evaluation of Laplace Transforms of common time functions in particular delta, Unit step, Ramp, sinusoids and Exponential functions and building of Laplace Transform tables, Laplace transform theorems relating time shifting, Differentiation, Integration and Convolution of time functions, Initial and final value theorems, Waveform synthesis, Partial fraction expansion method of obtaining inverse transforms.

Unit IV

Application of Laplace Transform for circuit analysis, Concept of transfer function, Pole, Zero plots.

Unit V

Network Synthesis: Hurwitz polynomials and their properties-Positive Real functions and their properties-Synthesis of reactive network (one port) by Foster method-pole-zero interpretations of elements of Foster form- Cauer form of reactive networks-RL network synthesis by Foster and Cauer form of representation-RC network systems by Foster method.

Suggested Reading:

1. M.R.Van Valkenburg, *Network Analysis*, Prentice Hall of India, 3rd Edition, 1995
2. W.H.Hayt, J.E.Kimmerly, *Engineering Circuit Analysis*, McGraw Hill, 6th Edition, 2002
3. N.C. Jagan & C.Lakshminarayana, *Network Analysis and Synthesis*, B.S.Publications, 2004
4. M.R.Van Valkenburg, *Introduction to Modern Network Synthesis*, Wiley, New York, 1960.

CE 223

SOLID MECHANICS

(Common to Instrumentation / EEE)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessionals	25	Marks

UNIT – I

Simple Stresses and Strains: Definitions, types of stresses and strains. Hooke's law, stress-strain diagrams for engineering materials. Modulus of elasticity, Poisson's ratio, volumetric strain, and relationship between elastic constants. Compound bars, and temperature stresses.

UNIT – II

Shear Force and Bending Moment: Shear force and bending moment diagrams for cantilever, simply supported beams and beams with overhangs under point loads and uniformly distributed loads. Relationship between intensity of load, shear force and bending moment.

UNIT – III

Theory of Simple Bending: Assumptions and derivation. Modulus of section, moment of resistance, and determination of flexural stresses. Direct and bending stresses on rectangular, circular and standard structural sections. Distribution of shear stresses on rectangular, circular, I-, T-, standard steel and hollow sections.

UNIT – IV

Deflections: Slope and deflections by the method of double integration in cantilever, simply supported beams, and simple beams with overhangs under point loads and uniformly distributed loads.

Strain Energy: Concepts and applications. Stresses and deformations in bars due to gradually applied loads, sudden and impact loads.

UNIT – V

Torsion: Theory of torsion, and derivation of basic equation. Solid and hollow circular shafts, strain energy, transmission of power; combined bending and torsion.

Springs: Close coiled helical springs subjected to axial loads and couples, strain energy in springs.

Suggested Reading :

1. D. S. Prakash Rao, *Strength of Materials ___ A Practical Approach,* Universities Press, Hyderabad, 1999.
2. G H. Ryder, *Strength of Materials,* Third Edition in SI units, Macmillan India Limited, Delhi, 2002.
3. A. Pytel and F. L. Singer, *Strength of Materials,* Harper & Row, Fourth Edition, New York, 1987.
4. S. S. Bhavakatti, *Strength of Materials,* Vikas Publications, 2003.

EE 252

ELECTROMAGNETIC THEORY

(Common to EEE & IE)

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessionals	25	Marks

Unit I

Coulomb's Law, Electric field intensity, Electric field due to different charg distributions. Electric field due to line charge, Sheet charge, Volume charg distribution. Electric flux density, Gauss's law, Divergence theorem, Energ and potential.

Unit II

Potential gradient, Energy in electrostatic field, Potential field of a point charge, System of charges, Conductors, Dielectric capacitance, Conductor properties and Boundary conditions, Capacitance of two wire line, boundary conditions for perfect dielectric materials. Poisson's and Laplace equations, Uniqueness theorem, Solution of Laplace's equation.

Unit III

Steady magnetic field, Biot-Savart's law, Ampere's law, Stoke's theorem, Magnetic vector potential, Faraday's law, Magnetic boundary conditions, Self and Mutual inductances.

Unit IV

Maxwell's equations, Differential & Integral forms and Interpretation of Maxwell's equations, Uniform plane wave, Wave motion in free space, Poynting vector power, Wave motion in perfect dielectric, Lossy dielectric.

Unit V

Visual and Numerical electromagnetics, Visual display of flux lines, Equipotential line, Examples of conformal mapping, Introduction to finite distance and finite element method, Method of moments, Numerical solution of Laplace's equation

Suggested Reading:

1. W.H.Hayt, *Engineering Electromagnetics*, Tata McGraw Hill, 5th Edition, 1994.
2. Sadiku, *Elements of Electromagnetics*, 3rd Edition, Oxford University Press, 2000
3. H.Narayan Rao, *Elements of Engineering Electromagnetics*, Prentic Hall of India, 3rd Edition, 1992.

EE 254

ELECTRICAL MACHINERY - I

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessionals	25	Marks

Unit I

Principles of Electro-mechanical Energy Conversion: Energy in magnetic system, Field energy and mechanical force, Direction of mechanical force developed, Flow of energy in electro-mechanical devices, Singly excited and multiply excited systems, Basic concepts of magnetically induced emf and force.

Unit II

DC Generators: Brief constructional features, Armature windings, Simple lap and wave windings, Brush position, Classification of DC machines, Generated emf, Methods of excitation, Armature reaction, Theory of commutation, Types of generators and their characteristics.

Unit III

DC Motors: Generation of electromagnetic torque, Types of motors and their characteristics, Application of motors, Starting and speed control methods of DC motors.

Unit IV

Testing of DC Motors: Losses and efficiency, Swinburne's test, Hopkinson's test, Field test for series motors, Retardation test, Separation of losses.

Unit V

Single Phase Transformers: Constructional features, Principle of operation, Ideal transformer, Transformer on 'No load' and 'On load', Vector diagram, Equivalent circuit, Polarity test, O.C & S.C tests, Sumpner's test, Regulation & efficiency, All day efficiency, Separation of losses.

Suggested Reading:

1. Nagrath I.J & Kothari D.P, *Electrical Machines*, Tata McGraw Hill, 1985.
2. H.Cotton, *Advanced Electrical Technology*, Wheeler & Co., 2000.
3. Kingley Jr., *Electrical Machinery*, Tata McGraw Hill, 2000.

EC 271

ELECTRONIC ENGINEERING -II

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessional	25	Marks

UNIT-I

Feedback amplifiers: Concept of Feedback, Feedback amplifier configuration, Circuits, Advantages of negative feedback, Analysis of simple feedback amplifiers using BJTs and FETs.

UNIT-II

Oscillators: Barkhausen criterion; RC oscillators; Weinbridge, phase shift, LC, Hartley and colpitts oscillators; Crystal controlled oscillators (Analysis of oscillators using BJTs only), stability of oscillators.

UNIT-III

D.C. Amplifiers: Problems of dc amplifiers, drift compensation techniques, differential amplifiers, importance of CMRR, high CMRR differential amplifier.

UNIT-IV

Power Amplifiers: Classification of power amplifiers, analysis of class A and B power amplifiers; Distortion in amplifiers, pushpull amplifiers, complementary symmetry.

UNIT-V

Wave shaping circuits: RC low pass and high pass circuits; response to step, pulse, Ramp and Square wave inputs; differentiating and integrating circuits using diode; clipping circuits for single level and two levels; clamping circuits.

Suggested Reading:

1. Jacob Millman & Christos C. Halkias, *Integrated Electronics*, McGraw Hill, 1991.
2. Jacob Millman & Christos C. Halkias, *Electronics Devices and Circuits*, McGraw Hill, 1991.
3. Jacob Millman & Taub : *Pulse, Digital and Switching wave forms*, McGraw Hill, 1985.

ME 273

PRIME MOVERS AND PUMPS

Instruction	4	Periods per week
Duration of University Examination	3	Hours
University Examination	75	Marks
Sessionals	25	Marks

Unit-I

Fluid Mechanics: Newtonian and Non-Newtonian Fluids, viscosity, types of fluid flows, continuity, momentum and energy equations, Bernoulli's equation and its applications, laminar and turbulent flows, flow through pipes, friction losses in pipes, Darcy equation, Reynolds number and its significance.

Unit-II

Hydraulic Turbines: Classification and working principles of turbines-Pelton, Francis, and Kaplan turbine, velocity diagrams for impulse and reaction turbine, calculation of blade angles, work-done , power output and efficiencies, specific speed of turbines, function of draft tube and type of draft tubes, unit quantities, performance and characteristic curves

Unit-III

Generation of steam: Dryness fraction and properties of steam, function of boilers, working principle of Lancashire boiler, Cornish boiler, Cochran boiler, Locomotive boiler, Babcock and Wilcox boiler, boiler mounting and accessories

Steam engines: Rankine and Modified Rankine cycle for steam engines, evaluation of mean effective pressure, power and cylinder dimension for single acting and double acting steam engines

Unit-IV

Steam turbines: Classification of steam turbines, velocity diagrams for simple impulse and reaction turbines, compounding of steam turbines, pressure compounding, velocity compounding, and pressure-velocity compounding, problems on workdone, blade angles, power and thermal efficiency of the turbine.

Gas turbine: Classification of gas turbine-constant pressure combustion cycle, closed cycle and constant volume combustion gas turbine plants, calculation of various efficiencies and parameters

Unit-V

Pumps: Reciprocating pumps, working of single and double acting types, effect of acceleration head and friction, use of air vessels, work done and power required without and with air vessels

Centrifugal pumps: Classification and working of centrifugal pumps, need for priming, workdone and efficiencies, specific speed of pumps, cavitation and its effect on performance

Suggested Reading

1. R.K.Rajput,*Thermal Engineering*, Laxmi Publications, 2004
2. R.Yadav, *Steam and Gas turbines*, Central Publishing House Ltd, 2004
3. S.Ramamrutham, *Hydraulic Machines*, Dhanpat Rai and Sons, 2004.

EC 291

ELECTRONIC ENGINEERING LAB - II

(For EEE and IE)

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	5	Marks

List of Experiments:

1. Voltage series feedback amplifier
2. Voltage shunt feedback amplifier
3. Current series feedback amplifier.
4. Current shunt feedback amplifier
5. Hartley Oscillator
6. Colpitt's oscillator
7. RC Phase shift oscillator
8. Wien Bridge Oscillator
9. Linear wave shaping - Integrator & Differentiator
10. Nonlinear wave shaping - Clipping
11. Class-B Power Amplifiers
12. Clamping Circuits (Diode)
13. Difference Amplifier (Op. Amp)

Suggested Reading:

1. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, *Basic Electronics*, A Text – Lab Manual, 7th Edition, TMH, 1994.
2. Paul B. Zbar, *Industrial Electronics*, A Text – Lab Manual, 3rd Edition, TMH, 1983.

ME 291

PRIME MOVERS AND PUMPS LAB
(For EEE)

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessionals	25	Marks

1. Performance of reciprocating pump
2. Performance and characteristic curves of centrifugal pumps
3. Performance and characteristic curves of Pelton wheel
4. Performance and characteristic curves of Francis turbine
5. Performance and characteristic curves of Kaplan turbine
6. Performance test on multi- cylinder petrol engine
7. Performance test on Diesel engine
8. Determination of volumetric efficiency of reciprocating air compressor
9. Study of constructional details of and operation of steam turbine
10. Thermal conductivity of composite wall.
11. Determination of Stefan-Boltzman Constant.
12. Determination of heat transfer coefficient under natural convection phenomenon.

EE 271

ELECTRICAL TECHNOLOGY & MECHANICAL TECHNOLOGY
PART - A ELECTRICAL TECHNOLOGY
(For CE)

Instruction	3	Periods per week
Duration of University Examination	1-1/2	Hours
University Examination	38	Marks
Sessionals	12	Marks

Unit I

DC Circuits : Ohm's law, Kirchoff's laws, Resistance network, Series, parallel and series - parallel circuits with dc sources, Power loss in resistive elements, Alternating Currents : Principles of production of ac waveform, Frequency, Effective value and form factor, Effective values of current and voltage, Vector representation, Behaviour of pure inductance, capacitance and resistance with sinusoidal sources, Impedance and power factor, simple ac network with R, L & C elements under steady-state, Three-Phase circuits under-balanced conditions, Star-delta connections, Power in balanced three-phase circuit.

Unit II

Transformers : Ideal transformers, Principle of transformation, Working of actual transformer under no-load and load conditions, Approximate equivalent circuit, Open circuit & Short circuit tests, Regulation and efficiency.

Unit III

Induction Motors : Types of Induction motors, Production of rotating magnetic field, Synchronous speed, Torque production, Slip and speed of motor, Slip-torque characteristics, Starting of induction motors, Applications of induction motors, Illumination : Units of light measurement, Coefficient of utilization and depreciation, Polar curves, Calculations of street lighting.

Suggested Reading :

1. J.B. Gupta, *Fundamentals of Electrical Engineering,* S.K. Kataria & Sons, 2002.

EE 292

ELECTRICAL TECHNOLOGY LAB

(For ECE)

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessional	25	Marks

List of Experiments:

1. To determine the magnetization curve of a separately excited d.c. generator.
2. To determine the load characteristics of a shunt generator.
3. To determine the load characteristics of a series generator.
4. To determine the performance characteristics of a d.c. shunt motor
5. To determine the load characteristics of a d.c. series motor
6. To determine the performance characteristics of a compound motor.
7. Speed control of d.c. motor
8. O.C. and S.C. tests on single phase transformer
9. Load test on single phase transformer
10. To determine the performance characteristics of a three phase induction motor
11. Speed control methods of induction motors
12. Regulation of alternator by O.C. and S.C. tests.
13. Measurement of three-phase power by Two Wattmeter method.

EE 291

ELECTRICAL CIRCUITS & MACHINES LAB

(Common for ME, PE)

Instruction	3	Periods per week
Duration of University Examination	3	Hours
University Examination	50	Marks
Sessionals	25	Marks

List of Experiments:

In the normal course, not less than 10 of the following experiments should be done during the semester.

1. Verification of Thevenin's and Norton's Theorems
2. Measurement of Power by Two-Wattmeter Method
3. Study of Single-Phase R, L & C Series & Parallel Circuits
4. Study of Self and Mutual Inductance of Coils and their Interconnections
5. To Determine the Magnetization Curve of a Separately Excited DC Generator
6. To Determine the Load Characteristics of a Shunt Generator
7. To Determine the Performance Characteristics of a Shunt Motor
8. To Determine the Performance Characteristics of a Compound Motor
9. To Determine the Performance Characteristics of a Series Motor
10. Speed Control of DC Shunt Motor.
11. O.C. and S.C. Tests on Single-Phase Transformer.
12. Performance Characteristics of 3-Phase Induction Motor.
13. Speed Control Methods of Induction Motors.