10. Public Speaking : Advantages of public speaking, essentials of an effective speech, rehearsal techniques, planning and delivering a speech.
11. Role play : Use of dialogues in a variety of situations and settings.
12. Effective use of a dictionary and thesaurus : Advantages of using a dictionary and thesaurus.

***Suggested Reading :***


1. E. Suresh Kumar et al, *English for Success (with CD),* Cambridge University Press India Pvt. Ltd. 2010.
2. T. Balasubramanian, *A Textbook of English Phonetics for Indian Students,* Macmillian, 2008.
3. Edgar Thorpe, *Winnings at Interviews,* Pearson Education, 2006.
4. Hari Mohan Prasad, *How to prepare for Group Discussions and Interviews,* Tata McGraw Hill, 2006.
5. J. Sethi et al, *A Practical Course in English Pronunciation (with CD),* Prentice Hall India, 2005.






## SCHEME OF INSTRUCTION & EXAMINATION
## B.E. II YEAR
## ELECTRICAL & ELECTRONICS ENGINEERING

### SEMESTER - I

| Sl. No. | Syllabus Ref. No. | SUBJECT | Scheme of Instruction | | Scheme of Examination | | |
|---|---|---|---|---|---|---|---|
| | | | Periods per week | | Duration In Hours | 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 | Enviornmental Studies | 4 | - | 3 | 75 | 25 |
| 4. | EE 204 | Electrical Measurements and Instruments | 4 | - | 3 | 75 | 25 |
| 5. | EC 221 | Electronic Engg. - I | 4 | - | 3 | 75 | 25 |
| 6. | ME 223 | Principles 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 & EXAMINATION
## B.E. II 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 Hours | Maximum Marks | |
| | | | L | D/P | | Univ. Exam | Sessionals |
| 1. | EE 222 | **THEORY**<br>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 equation of first order-Lagrange's solution, Standard types-Charpit'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-odd and even functions of Fourier series-change of interval-Applications of Fourier series-square wave forms-saw tooth wave form and modified square saw tooth wave form-half range sine and cosine expansions-complex Fourier series.

**UNIT-III**

**Applications of Partial differential equations :** Solution of wave equation, hear equation and Laplace's equation by the method of separation of variables and their use in problems of vibrating string, one dimensional unsteady heat flow and two dimensional steady state hear flow.

**UNIT-IV**

**Numerical methods :** Solutions of Algebraic and Transcendental equations - Bisection method, Regula-Falsi method and Newton-Raphson's method-Solution of Linear system of equations, Gauss elimination method, Gauss Seidel iterative method, ill conditioned equations and refinement of solutions, Interpolation, Newton's divided difference interpolation-Numerical differentiation, Solution of differential equations by Euler's method, modified Euler's method and Runge-Kutta Method of 4th order.

UNIT-V

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

***Suggested Reading :***


1. R.K. Jain & S.R.K. Iyengar, *Advance Engineering Mathematics,* Narosa Publications - 2008.
2. B.S. Grewal, *Higher Engineering Mathematics,* Khanna Publications, 40th Edition, 2008.
3. N. Bali, M.Goyal, C.Watkins, *Advanced Engineering Mathematics,* 7th Edition, 2009 Laxmi Publications.
4. M.K. Venkatraman, *Engineering Mathematics-III,* Technical Publications, Chennai.
5. H.K. Dass, *Advanced Engineering Mathematics,* S.Chand & Co. Pvt. Ltd., 2010.






**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**

D.C Circuit Analysis, Techniques, Definitions of Electric Circuit Parameters, Voltage, Current, and Power, Passive sign conventions, Passive circuit elements R, L and C, 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.

**Unit-II**

Nodal, loop and mesh circuit analysis. Network theorems: Superposition Theorem, Thevenin, Norton, Maximum Power Transfer and Reciprocity theorems and their applications.

**Network Topology:** Network Graph concept, oriented graph, node, branch, complete incidence matrix, basic incidence matrix, loop, tie-set, tree and its properties, co-tree, Fundamental tie-set matrix, cut-set, Fundamental cut-set matrix, Duality.

**Unit-III**

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, 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-IV**

Resonance - Definitions and computations of series and parallel resonance, definitions of bandwidth and Q-factor. Locus diagrams Coupled circuits: Analysis of circuits with mutual inductance, Linear Transformers and ideal Transformers.

Two-port parameters: Z, Y, ABCD and h-parameters, their inter-relationships. series, parallel and cascade connection of two ports, terminated two ports.

**Unit-V**

Poly phase circuits and in particular 3-phase circuit analysis: 3-phase power, Y and " connected systems, Calculations of voltages, current and power in 3-phase circuits with Y and " connected loads and generator, Star- Delta transformation. Balanced and unbalanced loads. Measurement of 3-phase power by two wattmeter method.

***Suggested Reading:***


1. Van Valkenburg, *NetworkAnalysis,* Prentice Hall of India, 3rdEdition, 1992.
2. W.H.Hayt, J.E.Kimmerly, *Engineering Circuit Analysis,* McGrawHill, 5th Edition, 2000
3. Charles K.Alexander & Matthew N.O.Sadiku, *Fundamental of ElectricCircuits,* TataMcGraw-Hill, 2003.
4. Joseph A Edminister, *Electric Circuits,* Sham's outline series.
5. Gopal G Bhise, Prem R Chadha & Durgesh C Kulshreshtha, *Engineering Network Analysis & Filter Design*, Umesh Publications.






**CE 222**

## ENVIRONMENTAL STUDIES

(Common to all Branches)

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

**UNI-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. GL. Karia and R.A. Christian, *Waste Water Treatment, Concepts and Design Approach*, Prentice Hall of India, 2005.
4. Benny Joseph, *Environmental Studies*,TataMcGraw-Hill, 2005
5. V. K. Sharma, *Disaster Management*, National Centre for Disaster Management, IIPE, Delhi, 1999.






**EE 204**

## ELECTRICAL MEASUREMENTS AND INSTRUMENTS
## (Common for EEE & IE)

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

**Unit-I**

**Principles 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 a moving element.

**Instruments:** Ammeter, Voltmeter. Expression for torque of moving coil, moving iron, dynamometer, induction and electrostatic instruments. Extension of range of instruments wattmeter, Torque expression for dynamometer instruments. Reactive power measurement.

**Unit-II**

Energy meters, single phase and poly phase, Driving torque and braking torque equations. Errors and testing compensation, maximum demand indicator, power factor meters, frequency meters, electrical resonance and Weston type of synchroscope.

**Unit-III**

Bridge Methods: Measurement of inductance, capacitance and resistance using Bridge.

Maxwell's Anderson, Wein, Heaveside Cambell's Desauty's, Schering's bridges, kelvin's doublebridge, price guard wire bridge loss of charge method, Megger, Wagners Earthing device.

**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 hysteresi loop using CRO, determination of leakage factor.

**Unit-V**

Potentiometers and Instrument Transformers: Crompton's DC and AC pola and coordinate types. Applications, Measurement of impedance. Calibratio of ammeter, voltmeter and wattmeter. Use of Oscilloscope in frequency, phas and amplitude measurements. Instrument transformers. Ratio and Phase angl errors and their reduction.

***Suggested Readings:***


1. A.K.Sawhney, *A Course in Electrical and Electronics Measurement and Instruments*- Dhanpat Rai and Sons,Delhi,2005.
2. Umesh Sinha, *Electrical and Electronics Measurements & Instrumentation,* Satya Prakashan.
3. F.W.Golding and Widdis, *Electrical Measurements and Measurin Instruments,* 5th Edition-2010.






**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. Single half wave, full wave, bridge rectifiers, L,C, pisection filters; Regulation and ripple characteristics.

**UNIT-II**

**Transistors and their biasing :** BJT, current components; CE, CB, CC configurations; characteristics; Transistor as an amplifiers; 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 and CS amplifier.

Biasing of JFET's and MOSFETs 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 resistance transistor circuits, cascade configuration, Difference amplifier.

UNIT-V

**Multistage amplifiers :** Classification of amplifiers, Distortion in amplifier Frequency response of RC coupled amplifiers, Transformer couple amplifiers, step response, Bandwidth of cascaded stages. Effect of emitt (source) by pass capacitor on LF response.

***Suggested Reading :***


1. Jocob Millman & Christos C. Halkias, *Electonic Devices and Circuit* McGraw Hill,3/e,2010.
2. Jocob Millman & Christos C. Halkias, *Integrated Electronics,* McGra Hill, 1991.
3. Donald L Schilling & Charles Belove, *Electronics Circuits : Discret & Integrated,* McGraw Hill International Edition, 3rd Edition, 198






ME 223

## PRINCIPLES OF MECHANICAL ENGINEERING

| | | |
|---|---|---|
| nstruction | 4 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 75 | Marks |
| Sessional | 25 | Marks |

UNIT-I

**Laws of Thermodynamics** : Steady flow energy equation-conditions of eversible and irreversible process-Modes of Heat transfer-conduction and onvection, radiation - concept of black body radiation - steady state onduction - Heat transfer through plane walls, cylinders, critical radius of nsulation for cylinders.

**Heat Exchanger** : Classification, Industry applications, LMTD calculations, arallel and counter flows.

**Refrigeration System** : Types, co-efficient of performance and ton, SVC & ir refrigeration and properties of refrigerants, eco friendly refrigerants, Psychometric Processes for summer and winter A/c only.

UNIT-II

**Principles of IC Engines** : Petrol and Diesel, 2 stroke / 4 stroke and load haracteristics, compressors - concept of multi stage compression, Types, oad characteristics, Calculation of mechanical and thermal efficiencies.

**Generation of steam** : Boilers - Gas Turbines - types - classification - constant ressure.

UNIT-III

**Gears** : Classification, Gear trains, types - Single, compound, Inverted & Epi cyclic gear trains, Belt & rope drives, open and cross belt, length of belt, atio of tension flat belts, condition for maximum power.

UNIT-IV

ntroduction to Bernoulli's equation, applications - Venturi meter, Orifice neter, Flow through pipes - Hagen's formula, Friction loss in pipes, Darcy's ormula, Reynolds number and its significance.

**Hydraulic Turbines** : Classification - working principle - Francis, Kaplan Pelton Wheels, Work done, power output, efficiency, specific speed, Un quantities, Draft Tube, Performance characteristic curves.

**UNIT-V**

**Pumps** : Working principles and construction details of Centrifugal an reciprocating pumps, Effect of friction, acceleration head, work done, powe required with and without air vessels, Problems faced in pumps, precaution cavitation, primary velocity triangles of centrifugal pumps.

***Suggested Reading :***


1. R.K. Rajput, *Thermal Engineering*, Laxmi Publications, 2005.
2. Thomas Bevan *Theory of Machines*, CBS Publishers, 1995.
3. Yadav, *Steam and Gas Turbines*, Central Publishing House Ltd., 2004
4. S. Ramamrutham, *Hydraulic Machines*, Dhanpat Rai and Sons, 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 |

**Experiments on the following :**

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 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. RC coupled amplifier BJT frequency response
12. RC coupled amplifier FET frequency response
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 desig approach,* Wheeler publishing, 1998.

**General Note:**

i) There should not be more than 2 students per batch while performin any of the lab experiment.

ii) Mini Project cum design exercise:
   a) The students must design, rig-up, and test the circuits whereve possible and should carry out the experiments individually.
   b) This exercise carries sessional marks of 10 out of 25, while th remaining 15 marks are for the remaining lab exercises.





**EE 242**

## CIRCUITS & MEASUREMENTS LAB

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

**List of Experiments:**

**PART – A: CIRCUITS**

1. Charging discharging characteristics of RC series circuit
2. Locus diagram of RC/RL circuit
3. Frequency response of a RLC series circuit
4. Parameters of two port network
5. Verification of Theorems (a) Thevenins Theorem (b) Norton Theorem (c) Super Position Theorem (d) Max power transfer theorem
6. Characteristics of Linear/ Non-linear and bi-lateral elements
7. Transient in RLC circuits
8. Application of PSPICE to electrical 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 Andersons bridge
4. Measurement of capacitance by DeSauty's bridge
5. Measurement of Iron losses by Lloyd Fischer square
6. Use of DC Potentiometer for measurement of unknown voltage and impedance
7. Calibration of three phase energy meter(Electromagnetic/Static) by direct loading
8. Use of Oscilloscope and plotting BH curve and calculation of Iron loss

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

EE 222

## ELECTRICAL TECHNOLOGY

| | | |
|---|---|---|
| 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 operation, 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, 2002.
2. M.L. Soni, P.V. Gupta and V.S. Bhatnagar, *A Course in Electrical Power*, Dhanpat Rai and Sons, Delhi, 2005.





## SCHEME OF INSTRUCTION & EXAMINATION
## B.E. II YEAR
## ELECTRICAL & ELECTRONICS ENGINEERING

### SEMESTER - II

| Sl. No. | Syllabus Ref. No. | SUBJECT | Scheme of Instruction | | Scheme of Examination | | |
|---|---|---|---|---|---|---|---|
| | | | Periods per week | | Duration In Hours | 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 253 | Power Systems - I | 4 | - | 3 | 75 | 25 |
| 4. | EC 271 | Electronic Engineering-II | 4 | - | 3 | 75 | 25 |
| 5. | EE 252 | Electromagnetic Theory | 4 | - | 3 | 75 | 25 |
| 6. | EE 254 | Electrical Machinery - I | 4 | - | 3 | 75 | 25 |
| | | **PRACTICALS** | | | | | |
| 1. | EC 291 | Electronic Engg. Lab-II | - | 3 | 3 | 50 | 25 |
| 2. | ME 291 | Mechanical Technology Lab. | - | 3 | 3 | 50 | 25 |
| | | TOTAL | 24 | 6 | - | 550 | 200 |

## SCHEME OF INSTRUCTION & EXAMINATION
## B.E. II 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 Hours | Maximum Marks | |
| | | | L | D/P | | Univ. Exam | Sessionals |
| | | **THEORY** | | | | | |
| 1. | EE 221 | Electrical Circuits and Machines (For CSE, ME & PE) | | | | | |
| 2. | EE 271 | **Part - A :** Electrical Technology (For CE) | 3 | - | 1.5 | 38 | 12 |
| | | **PRACTICALS** | | | | | |
| 1. | EE 291 | Electrical Circuits & Machines Lab. (For ME & PE) | - | 3 | 3 | 50 | 25 |
| 2. | EE 292 | Electrical Technology (For ECE) | - | 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**

**Transient Response:** Initial conditions in Zero-Input response of RC, RL and RLC networks. Definitions of unit impulse, Unit step and Ramp functions. 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-II**

**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-III**

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

**Unit-IV**

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-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- Cau form of reactive networks-RL network synthesis by Foster and Cauer for of representation-RC network synthesis by Foster and Cauer method.

***Suggested Reading:***


1. M.R. Van Valkenburg, *Network Analysis,* Prentice Hall of India, 3 Edition, 1995.
2. W.H.Hayt, J.E.Kimmerly, *EngineeringCircuitAnalysis,* McGrawHil 6th Edition, 2002.
3. N.C. Jagan & C. Lakshminarayana, *Network Analysis and Synthesi* B.S.Publications, 2004.
4. M.R. Van Valkenburg, *Introduction to Modern Network Synthesi* Wiley, New York, 1960.
5. Charles K.Aleximder & Matthew N.O.Sadiku, *Fundamental of Electri Circuits,* TataMcGraw-Hill, 2003.
6. Gopal G Bhise, Prem R Chadha & Durgesh, C. Kulshreshth *Engineering Network Analysis & Filter Design*, Umesh Publication






**CE 223**

## SOLID MECHANICS

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

**UNIT - I**

**Simple Stresses and Strains :** Definitions types of stresses and strains. Hooke's 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 catilever, 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 Approac* Universities Press, Hyderabad, 1999.
2. G.H. Ryder, *Strength of Materials,* Harper & Row, Fourth Edition, Ne York, 1987.
3. A. Pytel and F.L. Singer, *Strength of Materials,* Harper & Row, four Edition, New York, 1987.
4. S.S. Bhavakatti, *Strength of Materials,* Vikas Publications, 2003.






**EE 253**

## POWER SYSTEMS – I

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

**UNIT-I**

Thermal, Hydel, Nuclear Power generation Principles, Choice of site, layout and various parts of Generating Stations.

Estimation of power in hydel, flow duration curve, hydrograph, mass curve etc. Types of Hydel stations. Nuclear Stations, PWR, BWR, FBR GAS Turbines, GAS power stations, Combined cycle power stations. MAJOR DISASTERS around the world in Power plants – lessons learnt.

**UNIT-II**

Non Conventional energy generation methods: Solar, Wind, Ocean Thermal Energy Conversion (OTEC), Tidal, Geo Thermal.

Solar cells, Efficiency, Manufacturing Technology, Solar Radiation, calculation of insulation, solar collectors, Concentrators. Wind generators, Wind turbine types, rotors construction, Hybrid power generation.

**UNIT-III**

Construction of Over head lines – Over head line materials , Supports – types, Vibration Dampers, Arcing Horns , Ground Wires , Sag / Tension Calculations, Equal / Unequal supports , Effects of Wind , Ice / Erection Conditions Stringing Charts

Insulators – Types – Material for construction- new technological developments, Potential distribution over string of insulators, Equalizing of potential – Methods. Insulator testing , Insulated cables- Insulating Materials, Mechanical Protection ,EHV / HV / LV cables, Grading, Capacitance of 3 core cables

## UNIT-IV

Inductance and capacitance of transmission lines, Single phase and thr phase symmetrical composite conductors, GMD, GMR, Transposition conductors, Bundled conductors, effect of earth capacitance.

## UNIT-V

Economics of Power Generation , Load curve, Load demand and diversifi factors, Base load operation, Types of costs and depreciation, calculation Methods of Power factor Improvement, Economics of p.f. Improvemen Tariffs.

General aspects of AC and DC distribution systems, Underground, Over hea lines

DC systems Ring main, Radial, Voltage drop calculations, Distributor fed one end, distributor fed at both ends. AC distribution systems.

***Suggested Reading:***


1. C.L. Wadhwa, *Electrical Power Systems,* Wiley Eastern Ltd. 5th Edition,2005.
2. C.L. Wadhwa, *Generation, Distribution and Utilization of Electrica Energy*, Wiley Eastern Ltd., 5th Edition,2005.
3. S.N. Singh, *Electric Power Generation, Transmission and Distribution* Prentice Hall of India Pvt. Ltd., New Delhi - 2003






**C 271**

# ELECTRONIC ENGINEERING - II

| | | |
|---|---|---|
| nstruction | 4 | Periods per week |
| Duration of University Examination | 3 | Hours |
| Jniversity Examination | 75 | Marks |
| Sessional | 25 | Marks |

## UNIT-I

**Feedback amplifiers:** Concept of Feedback, Feedback amplifier configurations, 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, lJifferential Amplifier.

## UNIT-IV

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

## 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. Jocob Millman, Christos C. Halkias and Chetan Parikh, *Integrated Electronics,* TMH, 2/e., 2009.
2. Jocob Millman, Christos C. Halkias and Satyabrata Jit, *Electronics Devices and Circuits,* McGraw Hill, 3/e., 2010.
3. Jocob Millman & Herbert Taub, *Pulse, Digital and Switching waveforms,* TMH, 3/e.,2011.

**EE 252**

## ELECTROMAGNETIC THEORY

| | | |
|---|---|---|
| Instruction | 4 | Periods per wee |
| Duration of University Examination | 3 | Hours |
| University Examination | 75 | Marks |
| Sessional | 25 | Marks |

**Unit-I**

**Electrostatic fields**: Brief review of vector analysis- Introduction to differe coordinate systems- Coulomb's law (point charges and charge distribution Electric field and flux density- Gauss law- Gauss divergence theore Potential Energy and Electrical Potential- Relationship between E and Dielectric Materials- Capacitance (Parallel plate, Two wire transmission lin - Electric and Equipotential plots- Integral and Point form of Maxwel Electrostatic Equation.

**Unit-II**

**Magneto static Fields** : Electrical Currents( Conduction and Convectio Calculations of Magnetic fields using Biot-Savart's law and Amperes la Magnetic scalar and Vector Potentials-Magnetic Materials- Forces in Magne fields- Lorentz force equation- Force between parallel conductors- Magne Torque and Dipole Moment- Inductance Calculations( Solenoid, Toro Parallel transmission line)- Mutual Inductance- Integral and Point forms Maxwell's Magneto static equation.

**Unit-III**

**Boundary Value Problems and Numerical Methods** : Boundary conditio for Electric and Magnetic Fields- Poisson's and Laplace equations- Analytic solutions- By direct Integration( One Dimensional)- Numerical solution One dimensional by Finite Difference method- Analytical solutions( Variab & separable) two dimensions- Numerical Solutions of two dimensional finite difference method- Introduction to Finite Element and Method Moments.

**Unit-IV**

**Time Varying Electromagnetic fields and Wave Propagation**: Faraday law of Induction- Equation of continuity- Displacement current- Final for



f Maxwell's Equations- Power and Poynting theorem- Time- Harmonic lectromagnetic fields- Wave equations (One dimension) - Plane Wave ropagation in perfect and Lossy Dielectric.

**Jnit-V**

**Electromagnetic Interference and Compatibility(Theoretical Aspects nly)**: Introduction to Electromagnetic Interference and Electromagnetic Compatibility ( EMI & EMC)- Sources and Characteristics of EMI- Control Techniques of EMI- Grounding- Shielding- Filtering.

***Suggested Reading:***


1. Hayt, W.H and J.A Buck, *Engineering Electromagnetics*, 7th Edition, Mc Graw Hill, 2006.
2. Sadiku, M.N.O, *Elements of Electromagnetics*, 4th edition, Oxford University press, 2007.
3. Karl E. Lonngren, Sava V.Savov, Randy J.Jost, *Fundamentals of Electromagnetics*, With MATLAB, PHI, NewDelhi.


---



**EE 254**

## ELECTRICAL MACHINERY - I

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

**UNIT–I**

**Principles of Electromechanical 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 e.m.f. and force.

**UNIT–II**

**D.C. Machines:** Brief description of constructional features – Armature windings- simple lap and wave windings – Brush position – Classification of D. C. Machines.

**D.C. Generators:** Generated E.M. F. – Methods of excitation – Armature reaction – Theory of commutation – Types of Generators and their characteristics – Series and Parallel operation.

**UNIT–III**

**D. C. Motors:** Generation of Electromagnetic torque – Types of motors and their characteristics – Application of motors – Starting and speed control of D.C.Motors – testing of D.C. Motors : Losses and efficiency – Temperature rise and Swinburne's Test – Hopkinson's Test – Field's Test for series motors – Retardation test – Separation of losses.

**UNIT–IV**

**Single phase Transformers :** Constructional Features, principle of operation-ideal transformer transformer on 'NO' load and 'ON' load – Vector diagrams – Equivalent circuit – losses – Testing – Polarity test, O. C. and S. C. tests – Sumpner's test – regulation and efficiency – All day efficiency – Separation of losses – Excitation phenomena of Transformers.

**UNIT–V**

**Three Phase Transformers :** Three Phase Transformers Connections Y-Y, Δ - Δ, Δ - Y, Y- Δ, V- V and Scott connections.

**Stepper Motors:** Types of Stepper Motors – parameters – characteristics – drive circuits and applications.

***Suggested Reading:***


1. Nagrath I. J. and Kothari D. P., *Electrical Machines*, Tata McGraw Hill, 1985.
2. H. Cotton, *Advanced Electrical Technology*, Wheeler & Co., 1995.
3. Kingsley Jr., *Electrical Machinery*, Tata McGraw Hill.






EC 291

## ELECTRONIC ENGINEERING - II LAB

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

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. Wein 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.


**General Note :**

i. There should not be more than 2 students per batch while performing any of the lab experiment.

ii. Mini Project cum design exercise :
   a) The students must design, rig-up, and test the circuits wherever possible and should carryout the experiments individually.
   b) This exercise carries sessional marks of 10 out of 25, while the remaining 15 marks are for the remaining lab exercises.

**ME 291**

## MECHANICAL TECHNOLOGY LAB

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

1. Performance test on multi-cylinder petrol or diesel engine
2. Measurement of discharge by Venturi meter
3. Measurement of velocity by Pitot tube
4. Measurement of discharge by Orifice meter / Rotameter
5. Determination of Flash and Fire points of lubricants
6. Determination of Thermal conductivity of a composite wall
7. Determination of Heat transfer coefficient under Natural convection
9. Determination of volumetric efficiency of multi stage reciprocating air Compressor
10. Study of construction details of a Gear box (for EEE only)
11. Performance of (a) Francis, (b) Kaplan and (c) Pelton wheel Turbines
12. Performance and characteristics of (a) Reciprocating and (b) Centrifugal Pumps.





**EE 221**

## ELECTRICAL CIRCUITS AND MACHINES

| | | |
|---|---|---|
| Instruction | 4 | Periods per week |
| Duration of University Examination | 3 | Hours |
| University Examination | 75 | Marks |
| Sessional | 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, Speed-torque characteristics, Methods of starting and Speed control of 3-phase induction motors,

**Unit-V**

**Single-Phase & Special Motors:** Various types of single phase motors, Spilt 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 271

## ELECTRICALTECHNOLOGY
## PART – A: ELECTRICAL TECHNOLOGY
### (For CE)

| | | |
|---|---|---|
| Instruction | 3 | Periods per week |
| Duration of University Examination | 1.5 | Hours |
| University Examination | 38 | Marks |
| Sessional | 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.
2. V.K. Mehta, *Principles of Electrical Engineering,* S.Chand & Co., 1995.





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 |
| Sessional | 25 | Marks |

**List of Experiments:**

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. Magnetization Curve of a Separately Excited DC Generator.
6. Load Characteristics of a Shunt Generator.
7. Performance Characteristics of a Shunt Motor.
8. Performance Characteristics of a Compound Motor.
9. 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.

**Note: At least 10 Experiments should be conducted in the semester**

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. Magnetization curve of a separately excited DC generator.
2. Load characteristics of a shunt generator.
3. Load characteristics of a series generator.
4. Performance characteristics of a DC shunt motor.
5. Load characteristics of a DC series motor.
6. Performance characteristics of a compound motor.
7. Speed control of DC motor.
8. O.C. and S.C. tests on single phase transformer.
9. Load test on single phase transformer.
10. 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.

**Note: At least 10 Experiments should be conducted in the semester**





## SCHEME OF INSTRUCTION & EXAMINATION
## B.E. IIIrd YEAR
## (ELECTRICAL AND ELECTRONICS ENGINEERING)

**SEMESTER-I**

| Sl. No. | Syllabus Ref. No. | SUBJECT | Scheme of Instruction | | Scheme of Examination | | |
|---|---|---|---|---|---|---|---|
| | | | Periods per week | | Duration In Hours | Maximum Marks | |
| | | | L/T | D/P | | Univ. Exam | Sessionals |
| | | **THEORY** | | | | | |
| 1. | EE 301 | Power Systems - II | 4 | - | 3 | 75 | 25 |
| 2. | EE 302 | Electrical Machinery - II | 4/1 | - | 3 | 75 | 25 |
| 3. | EE 303 | Power Electronics | 4/1 | - | 3 | 75 | 25 |
| 4. | EE 304 | Digital Electronics and Logic Design | 4 | - | 3 | 75 | 25 |
| 5. | EE 305 | Linear Integrated Circuits | 4 | - | 3 | 75 | 25 |
| 6. | EE 306 | Linear Control Systems | 4 /1 | - | 3 | 75 | 25 |
| | | **PRACTICALS** | | | | | |
| 1. | EE 331 | Electrical Machines Lab-I | - | 3 | 3 | 50 | 25 |
| 2. | EE 332 | Control Systems Lab | - | 3 | 3 | 50 | 25 |
| | | **Total** | **24/3** | **6** | **24** | **550** | **200** |