CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY
ELECTRICAL & ELECTRONICS ENGINEERING
B. E. II – Year

I – Semester

THEORY						
S. No	**Code**	**Subject**	**L**	**T**	**P/D**	**Credits**
1	MT 211	Fourier Analysis and Partial Differential Equations	4	0	0	3
2	EE 211	Electrical Circuits – I	4	1	0	3
3	EE 212	Electrical Measurements & Instruments	4	0	0	3
4	ME 218	Principles of Mechanical Engineering	4	0	0	3
5	EC 214	Electronic Engineering – I	4	0	0	3
6	EE 213	Electromagnetic Theory	4	1	0	3
PRACTICALS						
7	EC 217	Electronic Engineering Lab – I	0	0	3	2
8	EE 214	Circuits & Measurements Lab	0	0	3	2
TOTAL			**24**	**2**	**6**	**22**

Service Courses offered to other Departments

I-Semester

THEORY						
S. No	**Code**	**Subject**	**L**	**T**	**P/D**	**Credits**
1	EE 215	Electrical Technology (for BE 2/4 ECE I - Sem)	4	0	0	3
2	ME 219/ EE 216	Basics of Mechanical & Electrical Engineering Part-B(for B.Tech 2/4 Chemical I-Sem)	2	0	0	1 ½
PRACTICALS						
3	EE 217	Electrical Technology Lab(for BE 2/4 ECE I- Sem)	0	0	3	2
4	ME 210/ EE 218	Mechanical & Electrical Engineering Lab Part-B (for B.Tech 2/4 Chemical I- Sem)	0	0	1 ½	1

MT 211

FOURIER ANALYSIS AND PARTIAL DIFFERENTIAL EQUATIONS
(common to all branches except Biotech)

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

Course Objectives:
1. Introduce the concepts of Fourier analysis & z-transforms in engineering applications.
2. Introduction of boundary value problems and their applications in Heat Transfer and wave propagation.

Course Outcomes:
1. Students must be able to apply mathematical concepts of Fourier series, Fourier Transforms in solving one dimensional wave equation, Heat equation and the two dimensional Laplace equations.

UNIT– I
Fourier Series:
Dirichlet's conditions - expansion of a given function in Fourier series. Expansion of even and odd functions in Fourier series. Change of interval, half range sine and cosine series. Complex form of Fourier series.

UNIT– II
Fourier Transforms:
Fourier integral (statement only)-Fourier transform, Inverse Fourier transform, Fourier sine and cosine transform, definitions and properties.

UNIT– III
Partial Differential Equations:
Formation of Partial differential equations by elimination of arbitrary constants and by elimination of arbitrary functions. Partial differential equations of First Order- Lagrange's Linear equation and its solution. Partial differential equations of First order but of any degree-Standard types: I- $f(p,q)=0$, $II-f(z,p,q)=0$, III- $f(x,p)=f(y,q)$ and IV- $z=px+qy+f(p,q)$ .General Method of solution: Two independent variables - Char pit's Method; three or more independent variables - Jacobi's method.

UNIT– IV
Applications of Partial Differential Equations:
Solutions of Partial differential equations by the method of separation of variables- boundary value problems. One dimensional Wave equation, one dimensional Heat equation- related problems. Laplace equation

UNIT – V
Z- Transforms: Introduction, Basic theory of Z-transforms. Z-transforms of some standard sequences, Existence of z-transform. Properties of z-transforms: Linearity, Translation, scaling properties. Initial and final vale theorems. Differentiation of Z-transforms, convolution theorem, Solution of difference equations using Z-transforms.

Text Books:
1. Kanti B Datta "Mathematical Methods of Science and Engineering (Aided with MATLAB)" CENGAGE Learning.
2. B.S.Grewal "Higher Engineering Mathematics", Khanna Publishers 42nd Edition.2013
3. M.D.Raisinghania , Text Book of ODE and PDE , S.Chand publishers 4th -2012

EE 211

ELECTRICAL CIRCUITS – I

Instruction	4L + 1T Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks
Credits	3

Course Objectives:

1. To understand the nature of different circuit elements, fundamental circuit laws and network theorems.
2. To be acquainted with electrical circuit analysis, which is the foundation for all subjects of the Electrical Engineering discipline.
3. To understand poly-phase circuits and measurement of three phase power.
4. To Study transient response of circuits with initial conditions & forcing functions and also basics of network topology.

Course Outcomes: The student will be able to:

1. Acquire concepts of the nature of different circuit elements, network theorems and electrical circuit analysis.
2. Have knowledge of transient response of circuits and network topology.
3. Have knowledge of poly-phase circuits and measurement of three phase power.

UNIT –I

DC Circuit Analysis: Nodal, loop and mesh circuit analysis; Network theorems: Superposition, Thevenin's, Norton's, Maximum Power Transfer, Reciprocity, Milliman's and Tellegen's Theorems with DC excitation.

UNIT – II

AC Circuit Analysis: Review of AC fundamentals & Power Calculations; Nodal, loop and mesh circuit analysis; Network theorems: Superposition, Thevenin's, Norton's, Maximum Power Transfer, Reciprocity, Milliman's and Tellegen's Theorems with AC excitation.

UNIT – III

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

Network Topology: Network Graph concept, Oriented graph, Node, Branch, Complete incidence matrix, Tree and its properties, Co-tree, Tie-set, Fundamental tie-set matrix, Cut-set, Fundamental cut-set matrix; Duality.

UNIT – IV

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 and Sinusoidal functions.

UNIT – V

Poly Phase Circuits: 3-phase circuit analysis, Star and delta connected systems, Calculations of voltage, current and power in 3-phase circuits with star and delta connected loads and generator, Balanced and unbalanced loads. Measurements of 3-phase power by two wattmeter method

Text Books:

1. M. E. Van Valkenburg, Network Analysis, Prentice Hall of India Publications, 3rd edition, 1995.
2. W. H. Hayt, J .E. Kemmerly, Engineering Circuit Analysis, McGraw Hill Publications, 8th edition, 2013.
3. Charles K. Alexander & Matthew N. O. Sadiku, Fundamentals of Electric Circuits, TMH Publications, 5th edition, 2013.

Suggested Reading:

1. A. Sudhakar & Shyammohan Palli, Network Analysis, Tata Mc-Graw Hill Publications, 4th edition, 2010.
2. N.C. Jagan & C. Lakshminarayana, Network Analysis and Synthesis, B. S. Publications, UPTU edition, 2010.
3. Roy Chowdary, Networks & Systems, Newage Publications, 2nd edition, 2010.

EE 212

ELECTRICAL MEASUREMENTS AND INSTRUMENTS

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

Course Objectives:

1. To understand the electrical and magnetic measurements of different parameters followed by its respective Instruments to measure
2. To know different types of transducers which are applicable to Electrical Engineering.

Course Outcomes: The student will be able to

1. Know electrical and magnetic measurements with respective Instruments to measure
2. Identify and work with different types of transducers which are applicable to Electrical Engineering

UNIT – I

Principles of Measurement and Instrumentation: Objectives of measurements, Performance characteristics, Static and dynamic characteristics, Accuracy, Precision, Significant figures, Type of errors, Standard cell and standard resistance.

Instruments: Single Phase Induction type Energy meter, Driving torque and braking torque equation, Errors and testing compensation, Single-phase Electrodynamometer power factor meter, Weston type frequency meter, Electrodynamometer (Weston) type Synchroscope, Phase Sequence Indicators, Introduction to digital Instruments-DVM, Bidirectional meters.

UNIT – II

Measurement of Resistance, Inductance and Capacitance: Measurement of low, medium and high resistance, loss of charge method, Measurement of Inductance and Capacitance using Maxwell's inductance bridge, Maxwell's inductance and Capacitance Bridge, Anderson's bridge, De-Sauty's bridge, Schering bridge, Related problems, shielding of bridges, Wagner's Earthing device.

UNIT – III

Magnetic Measurements: Ballistic galvanometer, Calibration using Hibbert's magnetic standard, Ballistic tests, Measurement of flux density, Magnetizing force, Determination of B-H curve and Hysteresis loop, Measurement of Leakage Factor with Flux meter, Lloyd-Fischer square for measuring iron loss, Testing of magnetic material with oscillographic method.

UNIT – IV

Potentiometers and Instrument Transformer: Potentiometers, Classification-Crompton DC and AC polar type, Applications, Measurement of impedance. Calibration of ammeter, voltmeter and wattmeter, measurement of frequency, phase and amplitude with oscilloscope. Construction and theory of Instrument Transformers, Equations for ratio and phase angle error of C.T and P.T (Elementary treatment only)

UNIT – V

Transducers: Definition, classification and selection of transducers, Strain gauges, LVDT, Inductive and capacitive transducers, Thermostats, Thermocouple, Piezoelectric transducers, Photovoltaic, Photo conductive cells, Photo diodes and photo transistors.

Text Books:

1. A.K.Sawhney-"A Course in Electrical and Electronics Measurements and Instrumentation", Dhanapat Rai & Sons, New Delhi, 19th edition, 2011.
2. Transducers and Instrumentation by D.V.S Murthy, Prentice Hall of India Publications, 2nd edition, 2011.

Suggested Reading:

1. Helfrick, Albert D., Cooper, William D., "Modern Electronic Instrumentation and Measurement Techniques", PHI Learning Publications, 1990.
2. F.W.Golding and Widdis., "Electrical Measurements and measuring Instruments" , A. H. Wheeler & Co.,5th edition

ME 218

PRINCIPLES OF MECHANICAL ENGINEERING

(EEE)

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

Course Objectives: Students will acquire basic knowledge in thermodynamics and its applications, mechanisms of power transmitting devices and can understand the working principles of hydraulic turbines and pumps.

Course Outcomes: Students can understand the working principles of I.C engines, refrigerators, reciprocating air compressors and estimate the power transmitted by belts and gear trains, Student can specify power developed by turbine and power required for pump.

UNIT – I Heat Transfer: Modes of heat transfer–conduction and convection, radiation, steady state conduction–heat transfer through plane walls, cylinders, critical radius of insulation for cylinders, concept of black body radiation.
Heat Exchanger: Classification, industry applications, LMTD for parallel flow and counter flow.
Refrigeration System: COP, ton of refrigeration, air refrigeration, simple vapour compression cycle and properties of refrigerants, eco friendly refrigerants, introduction to psychometry, psychrometric processes, simple problems using psychrometric chart.

UNIT – II IC Engines: Working of four–stroke and two–strike petrol and diesel engines with P–v diagrams, calculation of indicated power, brake power, specific fuel consumption, mechanical and thermal efficiencies.
Reciprocating air compressors: Uses of compressed air, principle of working and work done of single stage compressor–without and with clearance, multistage compressors, advantages, intercoolers and aftercooler.
Generation of Steam: Classification of boilers, Fire tube boilers–Locomotive boilers, Cochran boiler, Water tube boiler–Babcock & Wilcox boiler.
Gas Turbines: Classification, performance of simple gas turbine cycle (Joule cycle).

UNIT – III Gears: Classification, Gear trains, types–single compound, Inverted & epi cyclic gear trains, belt& rope drives, open and cross belt, length of belt, ratio of tensions for flat belts, condition for maximum power.

UNIT – V Fluid Dynamics: Introduction to Bernoulli's equation, applications–venturi meter, orifice meter, flow through pipes–Hagen's formula, frictio n loss in pipes, Darcy's formula, Reynolds number and its significance.
Hydraulic Turbines: Classification-working principle-Francis, Kaplan, Pelton Wheels, work done, power output, efficiency, specific speed, Unit quantities, Draft Tube, Performance characteristic curves.

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

Text Books:

1. R.K.Rajput, Thermal Engineering, Laxmi Publications (P) Ltd, 8th edition, 2011
2. Thomas Bevan, Theory of machines, CBS Publishers, 2010
3. P.N.Modi & S.M.Seth, Hydraulics and Fluid Mechanics including Hydraulic machines, Standard Book House, 18th edition, 2011

Suggested Reading:

1. Mahesh M Rathor, Thermal Engineering, Tata Mc.Graw-Hill Publishers 2013
2. S.S.Rattan, Theory of Machines, Tata Mc.Graw-Hill Publishers 3rd Edition, 2009
3. Jagdish Lal, Hydraulics & Fluid mechanics, Metropolitan Book Co. Pvt. Ltd., 2004

EC 214

ELECTRONIC ENGINEERING – I
(EEE)

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

Course Objectives:
The aim of this course is to:
1. To introduce the fundamental concepts of semiconductor devices.
2. To understand the operation of different types of electronic devices and their corresponding applications.
3. To provide a conceptual foundation on amplifiers that can be used as a basis for further study.

Course Outcomes:
From this course student will be able to:
1. Demonstrate a systematic and critical understanding of the theories and principles of electronic devices.
2. Analyze the circuit behavior for various required characteristics.
3. Creatively apply the concepts behind various semi-conductor devices in their mini projects.

UNIT – I
Semiconductor diodes and Rectifiers: p-n junction diode: V-I characteristics, temperature dependence of V-I characteristics; Breakdown of junctions-Zener and Avalanche; Half wave, fullwave, bridge rectifiers, L, C, pi-section filters; Regulation and Ripple characteristics.

UNIT – II
Bipolar Junction Transistor: Current components; CE, CB, CC Configurations, characteristics; Transistor as an amplifier, operating point, bias stabilization circuits.

UNIT – III
Field Effect Transistors: V-I characteristics of JFET and MOSFET; Depletion and Enhancement modes, Biasing of JFET's and MOSFET's: Self-bias, biasing for zero current drift, biasing against device variations, biasing the enhancement MOSFET.

UNIT – IV
Low frequency amplifier Circuits: Small signal low frequency analysis of amplifier in 3 configurations using BJT and FET, Frequency response- effect of C_E/C_S and C_C on frequency response, Miller's theorem.

UNIT – V
CRO: Constructional details of CRO and its applications.
Special devices: Elementary treatment on the functioning of Tunnel/Backward diode, Varactor diode, Photo diode, Light Emitting diode. Liquid Crystal Display, Working of UJT, photo transistor.

Text Books:
1. Jacob Millman and Christos C. Halkias, Electronic Devices and Circuits, McGraw Hill, 3rd Edition, 2010
2. Jacob Millman and Christos C. Halkias, Integrated Electronics, McGraw Hill, 1991

Suggested Reading:
1. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", PHI, 10th edition, 2006
2. David Bell, “Fundamentals of Electronic Devices and Circuits”, 5th edition, Oxford University press, 2008
3. Beng Streetman and Sanjay Banerjee, “Solid state electronic devices” 6th edition, Pearson education, 2005

EE 213

ELECTROMAGNETIC THEORY

Instruction	4L +1T Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks
Credits	3

Course Objectives:

1. To understand various coordinate systems and applications of vector calculus
2. To comprehend the electrostatic field concepts and applications
3. To assimilate the concepts and applications of magnetic fields
4. To know the significance of EMI & EMC

Course Outcomes: The student will be able to

1. Distinguish between the field applications of electro statics and magneto statics using vector analysis
2. Identify the effects of EMI, significance of EM wave and applications of Maxwell's equations

UNIT – I

Orthogonal Coordinate Systems & Review of Vector Calculus: Rectangular, Cylindrical, Spherical coordinate systems; Line, Surface and Volume integrals; Operator Del, Gradient, Divergence, Curl & Laplacian of a field; Divergence, Stokes' theorems.
Electrostatic fields: Various charge configurations, Coulomb's law, Electric field intensity and flux density of different charge distributions, Gauss law, Integral and Point form of Maxwell's Electrostatic Equation.

UNIT – II

Electrostatic Field in Materials: Electrical Potential, Capacitance of Parallel plate capacitor, Equi-potential lines, Properties of materials, convection and conduction currents, conductors, dielectric constant, continuity equation and relaxation time, boundary conditions, Poisson's and Laplace's equations, Uniqueness theorem.

UNIT – III

Magneto Static Fields: Biot-Savart's law, Ampere's law, Displacement current, Magnetic scalar and Vector Potentials, boundary conditions, Forces in Magnetic fields, Lorentz force equation, Force between parallel conductors, Inductance Calculations (Solenoid, Toroid), Mutual Inductance.

UNIT – IV

Time Varying Electromagnetic Fields: Faraday's laws of electromagnetic induction, Final forms of Maxwell's Equations, Power and Poynting theorem, Time-Harmonic Electromagnetic fields, Wave equations (One dimension), Plane Wave, Propagation in perfect and lossy dielectrics.

UNIT – V

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

Text Books:

1. Hayt, W.H and J.A Buck, Engineering Electromagnetics, Tata Mc-Graw Hill, 7th edition, 2006.
2. Sadiku, M.N.O, Principles of Electromagnetics, Oxford University press, 4th edition, 2006.

Suggested Reading:

1. S. P. Seth, Elements of Electromagnetic Fields, Danpat Rai & Co,2007
2. David K. Cheng, Field and Wave Electromagnetics, Pearson Education. 2nd edition 2,004
3. Ashutosh Pramanik, Electromagnetism Theory and Applications, PHI pvt. Ltd, 3rd edition ,2008

EC 217

ELECTRONIC ENGINEERING LAB – I

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks
Credits	2

Course Objectives:

The main objectives of this course are to teach:

1. Fundamental concepts of semiconductor diodes and transistors.
2. Applications of various semi-conductor devices.
3. V-I Characteristics of special devices.
4. Transistor circuit behavior and their characteristics.

Course Outcomes:

The student will be able to:

1. Learn the overview of principles and operation of various electronic components and equipment
2. Verify the working of PN Junction diodes, transistors and their characteristic behavior
3. Build an amplifier and find its voltage gain

List of Experiments:

1. Study of RLC components, Bread board, Regulated power supply, Function generator
2. Measurement of phase, frequency and sensitivity with CRO
3. V-I characteristics of semiconductor diodes (Germanium, Silicon and Zener)
4. Static Characteristics of BJT (CE)
5. Static Characteristics of BJT (CB)
6. Static Characteristics of FET (CS)
7. Design of Half wave and Full wave Rectifier with and without filters
8. Design of rectifiers with C, L, LC & Pi-filters
9. Static characteristics of SCR
10. Static characteristics of UJT
11. Biasing of BJT and FET
12. Emitter Follower
13. Source Follower
14. Frequency Response of CE amplifier
15. Frequency Response of CS amplifier

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.

General Note:

1. There should not be more than 2 students per batch while performing any of that lab experiment.
2. Mini project cum design exercise:
   a. The students must design, rig-up, and test the circuits wherever possible and should carry out the experiments individually.
   b. This exercise carries Sessional marks of 10 out of 25, while the remaining 15 marks are for the remaining lab exercise.

EE 214

CIRCUITS AND MEASUREMENTS LAB

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks
Credits	2

Course Objectives:

1. To understand thoroughly the fundamental concepts of all theorems.
2. To comprehend the basic principles of operation of measuring various circuit parameters.
3. To become familiar in operating the various instruments in different contexts.

Course Outcomes: The student will be able to:

1. Identify the suitable technique to be adopted for the analysis of the given circuit.
2. Become familiar with simulation aspects of circuit analysis.
3. Know the right instruments and its usage for a given circuit parameter.

List of Experiments:

PART – A: CIRCUITS

1. Transient response of first order circuits.
2. Frequency response of a RLC series circuit.
3. Determination of two port network parameters. (Z, Y, h & ABCD)
4. Verification of Thevenin's & Norton's Theorems.
5. Verification of Superposition & Reciprocity Theorems.
6. Verification of Maximum power transfer theorem.
7. Transient response of series RLC circuit.
8. Simulation of Thevenin's equivalent using PSpice.
9. Simulation of Transient response of series RLC circuit using PSpice.

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 Schering bridge.
5. Measurement of Iron losses using Epstein's square bridge.
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**.**
9. Measurement of frequency using Lissajous figures

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

EE 215

ELECTRICAL TECHNOLOGY
(BE 2/4 ECE I-SEM)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks
Credits	3

Course Objectives:

1. Know the fundamentals of DC & AC machines.
2. Understand the concepts of power systems.

Course Outcomes: The student will be able to:

1. Distinguish between DC machines & AC machines in respect of concepts, control and applications
2. Identify the various sources of generation of electricity and its transmission technologies.

UNIT-I

D.C. Generators: Constructional details, Simple lap & wave windings, Methods of excitation, Induced EMF, Basic ideas of armature reaction and commutation, Characteristics of shunt, series and compound generators and their applications.

DC Motors: Significance of back EMF, Torque developed in motors, Three point starter, Characteristics of shunt, series and compound motors, Speed control of DC motors.

UNIT-II

Poly Phase System: Advantages of three phase system, Star and delta connections, Relationship between line and phase quantities, Measurement of power by Two Wattmeter method.

A.C. Generators: Construction, EMF equation, Armature reaction, Synchronous impedance, Regulation.

UNIT-III

Transformers: Single Phase transformer, Construction, Working principle, EMF equation, Ideal transformer, Phasor diagram under no load and loaded conditions, OC and SC tests on transformer, Efficiency and regulation, Working principle of auto transformer.

UNIT-IV

Induction Motors: Construction, Production of rotating magnetic field, Slip, Slip-torque characteristics, Starting methods of 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 diagram of power systems, Transmission using high voltages, Advantages, Basic idea of line parameters of short lines.

Text Books:

1. H. Cotton, Electrical Technology,CBS Publishers and distributors,7th edition,2005.
2. V.K.Mehta, Principles of Electrical Engineering, S.Chand & Co,2nd edition,2004.
3. M.L. Soni, PV Gupta and VS Bhatnagar, A course in Electrical Power, Dhanpat Rai and Sons, 4th edition,2008.

Suggested Reading:

1. P.V. Prasad & S. Siva Nagaraju, Electrical Engineering: Concepts & Applications, Cengage Learning, 1st edition, 2012
2. B.L.Theraja, Electrical Technology Vol.I & Vol.II, S.Chand & Co, 23rd edition.
3. M.S.Naidu and Kamakshaiah – Electrical Technology –TMH Publications,1st edition,2007

ME-- / EE 216

BASICS OF MECHANICAL & ELECTRICAL ENGINEERING
(B. Tech 2/4 Chemical I-SEM)
PART-B
ELECTRICAL ENGINEERING

Instruction	2 Periods per week
Duration of University Examination	1½ Hours
University Examination	37 Marks
Sessionals	13 Marks
Credits	1½

Course Objectives:

1. To know the fundamentals of DC, AC circuits and AC machines.
2. To understand the concepts basic electronic devices.

Course Outcomes: The student will be able to:

1. Comprehend DC circuits & AC machines in respect of concepts and applications
2. Identify the characteristics of diode and transistor.

UNIT I

D.C. Circuits: Kirchhoff's laws, Mesh current and node voltage analysis. Electromagnetic induction: Faraday's law, Direction of emf and current. Energy stored in a magnetic field, Hysteresis and eddy current losses.
AC circuits: generation of alternating voltage and currents, Average and rms value of sinusoidal quantities.

Unit II

Single phase transformer: Constructional details, Working principle, EMF equation, practical transformers. Equivalent circuits, voltage regulation, losses and efficiency, open circuit and short circuit test.
Three phase induction motors: construction, principle, advantage and disadvantages, working principle. Torque– slip characteristics, losses and efficiency.

Unit III

Electronic devices and circuits. P-N junction, semiconductor diode, characteristics of diode, diode as rectifier, half wave & full wave rectifiers, bridge rectifier, filter circuits.
Transistor: construction, action, symbols, as an amplifier in CE arrangement, characteristics of common base connection.

Text Book:

1. V. K. Mehta -- Principles of Electrical Engineering and Electronics, Multi colour illustrative edition, 2006

Suggested Reading:

1. B. L.Theraja –A Text book of Electrical Technology, S.Chand & Co, 24th revised edition,2007.

EE 217

ELECTRICAL TECHNOLOGY LAB
(BE 2/4 ECE I-SEM)

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks
Credits	2

Course Objectives:

1. To comprehend various characteristics of DC machines.
2. To understand the characteristics of different AC machines.
3. To become familiar with the operation of various electrical apparatus.

Course Outcomes: The student will be able to

1. Know the right instrument and its usage for the given circuit.
2. Identify the suitable machine for required application.

LIST OF THE 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 shunt 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 motor.
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

ME--- / EE 218

MECHANICAL & ELECTRICAL ENGINEERING LAB

(B.Tech 2/4 Chemical I-SEM)

PART-B

ELECTRICAL ENGINEERING LAB

Instruction	3 Periods per week
Duration of University Examination	1 ½ Hours
University Examination	25 Marks
Sessionals	13 Marks
Credits	1

Course Objectives:

1. To understand the basic technique of measuring various circuit parameters.
2. To infer the accuracy of energy measurement.
3. To comprehend the characteristics of diode and transistor.

Course Outcomes: The student will be able to

1. Identify the suitability of circuit solving technique for given network.
2. Make out percentage error in reading of an energy meter.
3. Distinguish between various types of transistors.

1. Verification of Ohm's law.
2. Verification of KVL & KCL.
3. Verification of Voltage and current division rules.
4. Power factor measurement of and R-L series circuits
5. Calibration of single phase energy meter
6. Brake test on induction motor
7. Open circuit & short circuit tests on single phase transformer
8. Static characteristics of junction diode
9. Static characteristics of a common base transistor circuit.
10. Static characteristics of common emitter transistor circuit

Note: At least **4** Experiments should be conducted in the semester

CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY
ELECTRICAL & ELECTRONICS ENGINEERING
B. E. II – Year

II – Semester

THEORY						
S. No	**Code**	**Subject**	**L**	**T**	**P/D**	**Credits**
1	EE 221	Electrical Circuits – II	4	1	0	3
2	EC 225	Electronic Engineering – II	4	0	0	3
3	EE 222	Power Systems – I	4	1	0	3
4	EE 223	Electrical Machinery – I	4	1	0	3
5	EE 224	Digital Electronics and Logic Design	4	0	0	3
6	CE 228	Solid Mechanics	4	0	0	3
PRACTICALS						
7	EC 228	Electronics Engineering Lab – II	0	0	3	2
8	ME 225	Mechanical Engineering Lab	0	0	3	2
9	EG 221	Soft Skills and Employability Enhancement	0	0	2	1
TOTAL			**24**	**3**	**8**	**23**

Service Courses offered to other Departments

II-Semester

THEORY						
S. No	**Code**	**Subject**	**L**	**T**	**P/D**	**Credits**
1	EE225	Electrical Circuits and Machines (for BE 2/4 Mech. & Prod.II-Sem)	4	0	0	3
2	EE226	Electrical and Mechanical Technology (for BE 2/4 Civil II-Sem)	2	0	0	1 ½
PRACTICALS						
3	EE227	Electrical Circuits & Machines Lab (for BE 2/4 Mech. & Prod. II-Sem)	0	0	3	2

EE 221

ELECTRICAL CIRCUITS – II

Instruction	4L + 1T Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks
Credits	3

Course Objectives:

1. To understand the application of Laplace Transforms for analysis of Electrical Circuits
2. To comprehend the application of Fourier series and Fourier transform representation of periodic signals
3. To study the aspects of network synthesis and analysis of two port networks

Course Outcomes: The student will be able to

1. Apply Laplace transform and Fourier transform for circuit analysis and also able to draw the pole zero plots.
2. Find network functions and two port parameters
3. Able to synthesize the RL and RC circuits

UNIT – I

Laplace Transform Method: Laplace transforms of common time functions in particular delta, Unit Step, Ramp, Sinusoidal and Exponential functions; building of Laplace Transform tables, Laplace transform theorems relating time shifting; Differentiation, Integration and Convolution of time functions, Initial and Final value theorems, Partial fraction expansion method of obtaining inverse transforms.

UNIT – II

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

UNIT – III

Two port parameters: Z, Y, ABCD and h-parameters, their interrelationships; series, parallel and cascade connection of two port networks, image & iterative impedances, terminated two port networks.

UNIT – IV

Fourier series: Representation of periodic functions using both trigonometric and exponential functions; Symmetry conditions, Fourier transform representation of a periodic 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, Cauer form of reactive networks-RL network synthesis by Foster and Cauer form of representation-RC network synthesis by Foster and Cauer method.

Text Books:

1. M.E. Van Valkenburg, Network Analysis, Prentice Hall of India Publications, 3rd edition, 1995.
2. W.H.Hayt, J.E.Kimmerly, Engineering Circuit Analysis, McGraw Hill, 8th edition, 2013.

Suggested Reading:

1. N.C. Jagan & C.Lakshminarayana, Network Analysis and Synthesis, B.S.Publications, UPTU edition, 2010.
2. Franklin F. Kuo, Network Analysis And Synthesis, 2nd Ed, Wiley Publications,2009.

EC 225

ELECTRONIC ENGINEERING – II
(EEE)

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

Course Objectives:

1. To learn working of feedback amplifiers, oscillators, multistage amplifiers, power amplifiers and linear and non-linear wave shaping circuits.
2. To have in depth knowledge of basic electronic devices and circuits
3. To pursue any advance level course in electronics.

Course Outcomes: The student will be able to:

1. Design feedback amplifiers and various kinds of oscillators.
2. Analyze and Design various multistage amplifiers.
3. Design of power amplifiers, clipping, clamping and comparator circuits.

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, Voltage regulators.

UNIT – III

Multistage amplifiers: Cascade and cascode configuration, High input impedance transistor circuits, frequency response of RC coupled amplifiers, Transformer coupled amplifiers, Step response, effect of cascading on bandwidth.

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, push pull amplifiers, complementary symmetry, Phase inverters

UNIT – V

Wave shaping circuits: RC low pass and high pass circuits; response to step, pulse, Ramp, Exponential and Square wave inputs; clipping circuits for single level and two levels; clamping circuits, Comparators

Text Books:

1. Jacob Millman and Christos C. Halkias, "Integrated Electronics", McGraw Hill, 1991
2. Jacob Millman and Christos C. Halkias, "Electronics Devices and Circuits", McGraw Hill, 3rd Edition, 2010
3. Jacob Millman and Taub: Pulse, "Digital and Switching wave forms", McGraw Hill, 2003

Suggested Reading:

1. Sedra and Smith, "Microelectronic Circuits", Oxford University. Press, 5th Edition, 2009
2. S. Salivahanan & N. Suresh Kumar, "Electronic Circuit Analysis", McGraw Hill, 2nd Edition, 2011

EE 222

POWER SYSTEMS – I

Instruction	4L + 1T Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks
Credits	3

Course Objectives:

1. To introduce Generation of energy through conventional sources such as: Thermal, Hydro and Nuclear, also gives insight into the generation of power through non-conventional sources along with economic aspects.
2. To familiarize mechanical design of transmission lines and cables.
3. To familiarize present practices in tariff calculations.
4. To develop knowledge to understand classification and connection schemes of distribution systems

Course Outcomes: The student will be able to

1. Gain knowledge of construction and operation of conventional and non-conventional sources of energy along with financial management.
2. Know the effects sag on transmission lines.
3. Acquire the concepts to study the performance of insulators and cables.
4. Gain knowledge in calculating the current practices in tariff.
5. Develop knowledge to classify connection schemes of distribution systems.

UNIT-I

Thermal- Hydro -Power Plants: Principles, Choice of site, layout and various parts of generating stations, Brief description of Hydro Power Plant Dam, Spillways, Head works, Surge tank, Penstocks, Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, ash and flue gasses, Brief description of TPS components: Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and Cooling towers.

UNIT-II

Nuclear Station: Schematic Arrangement of Nuclear Power Station, Advantages and disadvantages, Types of Nuclear reactors, Gas Turbine Power Plant, Schematic arrangement of Gas Turbine power plant, Advantages and disadvantages, Introduction to Non-Conventional Energy Sources: Solar, Wind and Tidal.

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 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

Economics of Power Generation-Load curve, Load demand and diversified factors, Base load operation, Types of costs and depreciation calculations; Tariffs, different types of tariffs; Methods of power factor improvement.

UNIT-V

General Aspects of AC and DC Distribution Systems: Underground, Overhead lines, Classification of Distribution Systems, Connection Schemes of Distribution System, Requirements of a Distribution System, Types of D.C. Distributors, D.C. Distribution Calculations for Distributor fed at one end, distributor fed at both ends. AC distribution systems, Distributor fed at one end, distributor fed at both ends.

Text Books

1. C.L. Wadhwa, Electrical Power Systems, Wiley Eastern Ltd,5th edition,2009.
2. M.L.Soni, P.V.Gupta, V.S.Bhatnagar and A.Chakraborti, A Text Book on Power System Engineering DhanpatRai& Co. Pvt. Ltd,4th edition,2008
3. V.K Mehta and Rohit Mehta, Principles of Power Systems, S.Chand& Company Ltd., New Delhi, 24th edition,2006
4. S.N.Singh, Electric Power Generation, Transmission and Distribution, Prentice Hall of India Ltd., Newdelhi, 2nd edition, 2011

Suggested Reading

1. M.V. Deshpande, Elements of Power Station design ,Eastern economy edition, 2010.
2. P.P. Walsh, P.Fletcher, Gas turbine performance, Blackwell Publisher,2ND edition,2004.

EE 223

ELECTRICAL MACHINERY – I

Instruction	4L + 1T Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessionals	25 Marks
Credits	3

Course Objectives:

1. To study the principles of electro mechanical energy conversion, Armature reaction and commutation in DC machines.
2. To understand types of DC generators and motors, and their characteristics and applications.
3. To discuss different methods of speed control of DC motors and Testing of DC Machines.
4. To familiarize the construction details, principle of operation, prediction of performance, methods of single and three phase transformers.

Course Outcomes: The student will be able to:

1. Apply basic principles of electromagnetic laws and energy conversion
2. Acquire knowledge about operating characteristics of generators, speed control of DC machines and their application in Industry and domestic appliances.
3. Acquire the concept of single phase and three phase transformers and their applications.

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 Machines: Brief description of constructional features, Armature windings, simple lap and wave windings, Brush position, Classification of DC Machines. DC Generators: Generated EMF, Methods of excitation, Armature reaction, Theory of commutation, Types of generators and their characteristics, Series and parallel operation.

UNIT – III

DC Motors: Generation of electromagnetic torque, Types 6fmotors and their characteristics, Application of motors, Starting and speed control methods of DC motors. Testing of DC Motors, Losses and efficiency, Swinburne's test, Hopkinson's test, Field 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 diagram, Equivalent circuit, Polarity test, O.C & S.C tests, Sumpner's test, Regulation & 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. Parallel operation of transformers

Text Books:

1. Nagrath I.J & Kothari D.P, Electrical Machines, Tata McGraw Hill Publications, Sigma series, 2006.
2. H.Cotton, Advanced Electrical Technology, Wheeler & Co,7th edition, CBS publishers,2005.
3. Theory and performance of electrical machines by J.B Gupta ,S.K. Kataria & Sons,14th edition,2014.

Suggested Reading:

1. P.S. Bhimbra Electrical machinery, Khanna Publications,7th edition,2003.
2. Fitzgerald, Kingsley, Umans, Electric Machinery, Tata Mc-Graw Hill Publications, 6th edition, 2002.
3. Electrical machines by Ashfaq husain, Danpatrai and sons, 2nd edition,2012

EE 224

DIGITAL ELECTRONICS AND LOGIC DESIGN

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

Course Objectives:

1. To understand the basics of combinational circuits, Boolean algebra and digital logic families
2. To know different types of flip-flops and learn the concepts of design of digital circuits.

Course Outcomes: The student will be able to

1. Work with Boolean algebra principles, build the combinational and sequential circuits
2. Design the different digital circuits based on the state diagram or state equation given

UNIT – I

Boolean Algebra: Boolean and combinational logic; AND,OR and NOT operations; Laws of Boolean Algebra, Minimization of Boolean expressions, Truth tables and maps, Sum of products and product of sums, Map method of reduction, Incompletely specified functions multiple output minimization.

UNIT – II

Tabular minimization: Digital logic families and IC's, Characteristics of Digital IC's, Introduction to RTL, DTL, TTL, CMOS, ECL families, Details of TTL logic family totem pole, open collector outputs, Wired AND operation, Comparison of performance, TTL subfamilies, multiplexer and de-multiplexer, Encoder and decoder, Code converters, Implementation of combinational logic using standard logic gates and multiplexers.

UNIT – III

Binary arithmetic and circuits: Half and Full adder, Subtractor and Magnitude comparator, Number complements, Two's complement arithmetic, Carry look ahead adder, Decimal numbers and their codes, BCD and Excess-3 arithmetic.

UNIT – IV

Synchronous Sequential Circuits: Basic latch circuit, Debouncing switch SR, JK, D and T flip-flops, Truth table and excitation table, Ripple and synchronous counters up/down counter, General BCD counter, Counter decoding, Shift registers, Ring counters.

UNIT – V

Design of Digital Systems: Concept of state, State diagram, Design of counters Sequence detector and generators, Design procedure, Synthesis' using D, JK, T flip-flops, Applications of registers, Concepts of programmable, LogicPROM, PLA, PAL.

Text Books:

1. Morris Mano M. -Digital Design, Prentice Hall of India,3rd edition, 2002.
2. Donald Pleach / Albert Paul Malvino / Goutam saba "Digital Principles and Applications " McGraw- Hill, 6th edition, 2006.

Suggested Reading:

1. Tocci & Widmer, Digital Systems, Principles and applications,10th edition, Pearson prentice Hall,2009.
2. B. Somnath Nair, Digital Electronics and Logic Design, Prentice Hall of India, Eastern economy edition,2006.

CE 228

SOLID MECHANICS
(EEE)

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

Course Objectives:

1. To enable the student understand the basic concepts of stresses and strains in various engineering materials, with a special focus on electrical engineering materials.
2. To enable the student appreciate the applications of the subject to electrical engineering context.
3. To motivate the student pursue the extension of the concepts of 'Solid Mechanics' at higher level education and research and make proper interpretation in the relevant electrical engineering topics.

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.

Text Books:

1. D. S. Prakash Rao, Strength of Materials _A Practical Approach, Universities Press. Hyderabad. 1999.
2. S.S. Bhavi Katti , Strength of materials, Vikas publications, 2003.

Suggested Reading:

1. G H. Ryder, Strength of Materials, Third Edition in SI units. Macmillan India Limited. Delhi. 2002.
2. A. Pytel and F. L. Singer. Strength of Materials, Harper & Row. Fourth Edition. New York. 1987.
3. Timoshenko & young "Strength of Materials", 3rd edition 2012.

EC 228

ELECTRONIC ENGINEERING LAB – II
(EEE)

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks
Credits	2

Course Objectives:

1. To give hands on experience of working with different feedback amplifiers, oscillators, wave shaping circuits.
2. To learn applications of different transistor circuits.
3. To understand practical issues in Electronic Engineering lab

Course Outcomes: The student will be able to

1. Analyze the circuit behavior for various required characteristics.
2. Understand the basics of feedback amplifiers, oscillators, wave shaping circuits and their applications.

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)
14. Voltage Comparators (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 carry out the experiments individually.
   b) This exercise carries sessional marks of 10 out of 25, while the remaining 15 marks are for the remaining lab exercise.

ME 225

MECHANICAL ENGINEERING LAB
(EEE)

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks
Credits	2

Course Objectives:
Student will acquire knowledge in evaluating the performance of IC engines, hydraulic turbines, pumps and can determine thermal conductivity of solids.

Course Outcomes:
Student is exposed to carry out the investigations on IC engines with varied engine parameters, can conduct performance studies on hydraulic turbines and pumps, and is exposed to the concept of multistage compression and conduction heat transfer.

List of Experiments:

1. Performance test on multi cylinder petrol or diesel engine
2. Measurement of discharge by venturimeter
3. Measurement of velocity by pitot tube
4. Measurement of discharge by orifice meter/ rotameter
5. Determination of flash and fire point of lubricants.
6. Determination of thermal conductivity of composite wall
7. Determination of heat transfer coefficient under natural convection phenomenon
8. Determination of volumetric efficiency of multi stage reciprocating air compressor
9. Study of construction details of a gear box
10. Performance of (a) Francis (b) Kaplan (c) Pelton Wheel turbines
11. Performance characteristics of reciprocating and centrifugal pumps

EG 221

SOFT SKILLS AND EMPLOYABILITY ENHANCEMENT

Instruction	2 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks
Credits	1

Course Objectives: To help the students

1. Participate in group discussions with confidence and to make effective presentations. Also to learn the art of communication.
2. With- resume packaging, preparing and facing interviews.
3. Build an impressive personality through effective time management & goal setting, self confidence and assertiveness.
4. Understand what constitutes proper grooming and etiquette in a professional environment. Also to understand academic ethics and value systems.

Course Outcomes: The students will be able to

1. Be effective communicators and participate in group discussions with confidence. Also be able to make presentations in a professional context.
2. Write resumes, prepare and face interviews confidently.
3. Be assertive and set short term and long term goals. Also learn to mange time effectively and deal with stress.
4. Make the transition smoothly from campus to corporate. Also use media with etiquette and know what academic ethics are.

Exercise 1

Communicative Competence – The Art of Communication, basic grammar, Indianisms, Effective listening skills, using English in different situations

Exercise 2

Group Discussion – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence

Elements of effective presentation – Structure of presentation – Presentation tools – Body language

Creating an effective PPT

Exercise 3

Interview Skills – Resume' writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skill-sets

Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, mock interviews

Exercise 4

Personality Development – Effective Time Management, setting realistic goals, self confidence and assertiveness, stress management, moral values.

Exercise 5

Corporate Culture – Grooming and etiquette, communication media etiquette

Academic ethics and integrity

Suggested Reading:

1. Madhavi Apte , "A Course in English communication", Prentice-Hall of India, 2007
2. Leena Sen , "Communication Skills", Prentice-Hall of India, 2005
3. Dr. Shalini Verma, "Body Language- Your Success Mantra", S Chand, 2006
4. Edgar Thorpe and Showick Thorpe , "Objective English", 2nd edition, Pearson Education, 2007
5. Ramesh, Gopalswamy, and Mahadevan Ramesh, "The ACE of Soft Skills", New Delhi: Pearson, 2010
6. Gulati and Sarvesh, " Corporate Soft Skills", New Delhi: Rupa and Co. , 2006
7. Van Emden, Joan, and Lucinda Becker, "Presentation Skills for Students", New York: Palgrave Macmillan, 2004
8. Covey and Stephen R, "The Habits of Highly Effective People", New York: Free Press, 1989

EE 225

ELECTRICAL CIRCUITS AND MACHINES
(BE 2/4 Mech. & Prod.II-SEM)

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

Course Objectives:

1. To understand the concepts of DC & AC circuits
2. To comprehend the need of DC & AC machines and their control aspects.
3. To know the features of special motors.

Course Outcomes: The student will be able to

1. Distinguish between DC & AC circuits in respect of its analysis.
2. Identify the compatibility of DC & AC machines for a given application.

UNIT-I

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

UNIT-II

Poly Phase Systems: Production of 3-phase voltages, Analysis of 3-phase balanced circuits, 3-phase power measurement by two wattmeter method.

Transformers: Construction, Working principle, EMF equation, Ideal transformer, Equivalent circuit of transformer on no load and on load, Efficiency and regulation of transformer, OC and SC tests, Introduction to auto transformer.

UNIT-III

D.C. Generators: Constructional details, Simple lap & wave windings, Methods of excitation, Induced EMF, Armature reaction, Characteristics of shunt, series and compound generators and their applications.

DC Motors: Significance of back EMF, Torque developed in motors, Three point starter, Characteristics of shunt, series and compound motors, Speed control of DC motors.

UNIT-IV

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

UNIT-V

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

Text Books:

1. Kothari and Nagrath, Basic Electrical Engineering, Tata McGraw Hill Publications, 2nd edition,2007.
2. V.K.Mehta, principles of Electrical Engineering, S.Chand & Co,1st edition,2003.

Suggested Reading:

2. B. L.Theraja –A Text book of Electrical Technology, S.Chand & Co, 24th revised edition,2007.
3. M.S.Naidu and Kamakshiah – Electrical Technology –TMH Publications,1st edition,2007

EE 226

ELECTRICAL AND MECHANICAL TECHNOLOGY
(BE 2/4 Civil II-SEM)
PART-A
ELECTRICAL TECHNOLOGY

Instruction	2 Periods per week
Duration of University Examination	1 ½ Hours
University Examination	38 Marks
Sessionals	12 Marks
Credits	1 ½

Course Objectives:

1. To understand the concepts of DC & AC circuits
2. To comprehend the need of AC machines.
3. To know the features of measuring instruments and illumination.

Course Outcomes: The student will be able to

1. Distinguish between DC & AC circuits in respect of its analysis.
2. Identify the compatibility of AC machines for a given application.
3. To recognize the principles of measuring instruments and illumination.

UNIT-I

Introduction: SI units, and practical units of current, voltage, power and energy Conversion of mechanical and heat units to electrical units and vice versa.

D.C.Circuits: Ohm's Law, Kirchhoff's Laws, resistance networks; series, parallel and series–parallel circuits with D.C. Sources, Power loss in resistive elements. Measurement of direct current and voltage.

Alternating Currents: Principles of production of AC wave form, frequency, effective value and form factor. Measurement of effective value of currents and voltages, vector representation, behavior of pure inductance, capacitance, and resistance with A.C sinusoidal sources, Impedance and admittance, simple A.C. network with R.L.C. elements under steady state; circuits under balanced conditions. Star-delta connections Power in balance three–phase circuit.

UNIT-II

Measurement: Working principle of ammeter, voltmeter, wattmeter and energy meters. Measurement of power in 3-phase circuits.

Transformers: Ideal transformers, principle of transformation, working of actual transformer – under no load and local conditions. Approximate equivalent circuit, principle and use of auto transformers.

UNIT-III

Induction Motors: Production of rotating magnetic field – synchronous speed, torque production, slip and speed of motor, slip-torque characteristics . Power factor on load condition. Starting of induction motors . Basic ideas of single phase induction motors and applications.

Illumination: Nature and production of light. Units of light measurement. Coefficient of utilization and depreciation. Polar curves, Calculations of street lighting.

Text Books:

1. V.K. Mehta, Principles of Electrical Engineering and Electronics, S. Chand& Co.,Multi colour illustrative edition, 2006
2. H. Cotton, Electrical Technology,CBS Publications, 7th edition,2005.

Suggested Reading

1. M.S. Naidu and S. Kamakshaiah, Introduction to Electrical Engineering, Tata McGraw – Hill publishing Co., 12th reprint,2007.

EE227

ELECTRICAL CIRCUITS & MACHINES LAB
(BE 2/4 Mech. & Prod. II-SEM)

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessionals	25 Marks
Credits	2

Course Objectives:

1. To understand the basic technique of measuring various circuit parameters.
2. To comprehend various characteristics of DC machines.
3. To understand the characteristics of different AC machines.

Course Outcomes: The student will be able to

1. Know the right instrument and its usage for the given circuit.
2. Identify the suitable machine for required application.

List of Experiments:

1. Verification of Thevenin's & Norton's Theorems.
2. Study of three phase balanced and unbalanced circuits.
3. Measurement of three-phase power by two wattmeter method.
4. Study of single phase circuits.
5. Study of self and mutual inductance of coils and their inter connections, study of capacitor and their inter connections.
6. To determine the Magnetization curve of a separately excited DC generator.
7. To determine the load characteristics of a shunt generator.
8. To determine the performance characteristics of a shunt motor.
9. To determine the performance characteristics of a compound motor.
10. Speed control of DC shunt motor.
11. O.C. and S.C. tests on single phase transformer.
12. Load test on a three phase induction motor.
13. Regulation of alternator.
14. Speed control methods of induction motor.
15. To determine the load characteristics of a DC series motor.

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