

BASIC ELECTRICAL ENGINEERING

(Common to ECE&CSE)

Instruction	: 3 periods per week
Duration of University Examination	: 3 hours
SEE	: 70 Marks
CIE	: 30 Marks
Credits	: 3

Objectives :

1. To acquire knowledge in circuits and principle operation of electrical machines.
2. To be able to understand the tariff and safety measures.

Unit-I

DC & AC Circuits : Ohm's law, Kirchoff's laws, Series & parallel circuits, Star & Delta conversions, Thevenin's, Norton's and Superposition theorems (analysis with DC excitation only).

A.C. Circuits : Production of sinusoidal voltage, Phasor representation of sinusoidal quantities, Average & rms values, Form factor, RLC circuits excited by sinusoidal input. Active & reactive power, power factor.

Unit-II

3-Phase Balanced Circuits: Star & Delta connections, Measurement of 3-phase power by two-wattmeter method.

Single-Phase Transformer: Principle of operation, Constructional details, Transformer on no-load and on load, OC & SC tests, Losses, Efficiency, Regulation.

Unit-III

DC Generator: Principle of operation, Constructional details, EMF equation, Types of generators, Armature reaction, No-load & Load characteristics, Losses & efficiency, Applications.

DC Motor: Principle of operation, Types of motors, Torque equation, 3-point starter, Characteristics of DC motors, Speed control of DC shunt motor, Losses & efficiency, Applications.

Unit-IV

Three-phase Induction Motor: Production of rotating field, Constructional details. Types of motors, Torque-slip characteristics, Star-delta starter, Auto-transformer starter, Losses & efficiency, Applications.

Single-phase Induction Motors: Principle of operation, Capacitor run & Capacitor start motor, Applications.

Unit-V

Tariff & Electrical Safety Measures: Types of Tariff: Simple tariff, Flat demand tariff, Flat rate tariff, Step rate tariff, Block rate tariff, Two-part tariff. Types of consumers and their tariff. Power Factor: Disadvantage of low P.F., Causes of low P.F., Improvement of P.F. by using Static Capacitors.

Electrical Safety Measures: Earthing and its Importance, Safety practices, Basic ideas of Fuse, Circuit Breaker, and relay.

Suggested Reading

1. J.B.Gupta, "Fundamentals of Electrical Engineering and Electronics" S.K.Kataria & Sons Publications, 2002.
2. J.B.Gupta, "Utilization of Electric Power and Electric Traction" S.K.Kataria & Sons Publications, 2010.
3. Abhijit Chakrabarti, Sudipta Nath, Chandan Kumar Chanda, "Basic Electrical Engineering" Tata McGraw Hill, Publications, 2009.
4. Hughes, "Electrical Technology", VII Edition, International Student -on, Addison Welsey Longman Inc., 1995.