

NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR

BASIC ELECTRICAL ENGINEERING

Code: N-IA/II B-105-

1st sem : - (A) Bio Med, Bio Tech, IT, Chemi, Elex & Tele, Electrical.

2nd sem: -(B) Civil, CSE, Meta, Mining , Mech.

Minimum number of Class tests to be conducted: 2

UNIT -1

CIRCUIT ANALYSIS (AC AND DC)

Node voltage and mesh current methods. Star- delta and Delta- star conversions.

Kirchhoff's voltage and current laws. Superposition, Thevenin's and Norton's theorems.

Source conversion.

UNIT – II

AC CIRCUITS (SINGLE PHASE AND THREE PHASE)

Single phase EMF generation, Effective & Average values of sinusoids and determination of form-factor, Analysis of simple series & parallel RLC circuits, series & parallel resonances.

Three phase EMF generation, Delta and star connection, line and phase quantities and relations,

Solutions of 3 phase circuits – balanced voltage and balanced load, phasor diagram.

UNIT -III

MAGNETIC CIRCUITS AND TRANSFORMER

Analogy between electrical and magnetic circuits, solutions of magnetic circuits. Constructional details, principle of transformer operation , EMF equation, Phasor diagram on no load and full load, Equivalent circuits, Open circuits and short circuit tests, regulation and efficiency, All day efficiency. Hysteresis and eddy current losses.

UNIT - IV

ELECTRICAL MEASURING INSTRUMENTS

Classification, indicating, recording and integrating type instruments. Deflecting torque, controlling torque, damping torque, Construction and working principle of single phase wattmeter and energy meter. Measurement of single phase and three phase power. Elementary idea about power generation, transmission and distribution.

UNIT – V

ELECTICAL MACHINES

DC machines : Construction, classification, emf and torque equation, characteristics and applications of dc motors. Basic concepts of AC machines. e.g : Synchronous & Induction machines (single and three phase) elementary introduction only.

Text Books :-

1. Basic Electrical Engineering:-Fitzerald and Higginbothom , Tata McGrawhill
2. Basic Electrical Engineering :- I.J Nagrath, Tata McGrawhill.

Reference Books: -

1. Basic Electrical Engineering :- B.L Thareja ,S.Chand Pub.
2. Advanced Electrical Technology:- H. Cotton ISSAC Pitman , London/ELBS.
3. Basic Electrical Engineering :- A.Y singhare.