

BASIC ELECTRICAL & ELECTRONICS ENGINEERING
(Common to ME, CE during I B.Tech., II Semester)
Course Code(s): CE2T5, ME2T5 Credits: 3

Internal assessment: 30

Lecture: 3 periods/weekmarks

Semester end examination: 70

Tutorial: 1 period /week marks

Objectives:

- To impart the basic knowledge about the Electric circuits
- To understand the working of various Electrical Motors
- To know about working of various Electronic devices and operation
- To impart the basic knowledge about methods of electric power generation

Learning outcomes:

At the end of the course the students will have:

- Basic knowledge about different methods of electric power generation
- Basic knowledge about the Electric circuits
- Understanding about the working of various Electrical Motors
- Understanding about the operation of Diode and Transistors

UNIT I

GENERATION OF ELECTRIC POWER

sources for generating electric power – conventional and non conventional

Conventional sources :

Hydel stations, thermal stations and gas turbine stations - general layout of hydro electric plant and function of each component – thermal power station – layout of modern thermal plant – brief description of each component - layout of gas turbine power station – components of gas turbine power plant –

Non conventional sources : Solar energy – solar constant – layout of solar thermal power plant – photovoltaic cell – power from solar modules - PV system design – power generation using wind energy

UNIT II

ELECTRICAL CIRCUITS:

Basic definitions, Types of elements, Classification of different sources, Ohm's Law, Kirchhoff's Laws, Resistive networks, Inductive networks, capacitive networks, Series, Parallel circuits and Star-delta and delta star transformations. (simple problems)

UNIT – III ELECTRICAL MOTORS

(a) Three phase AC MOTORS:

Construction and principle of operation of a 3 phase induction motor, Types of Rotors- Torque equation- Slip Torque Characteristics, Types of starters. (descriptive treatment only)

(b) Single phase AC motors

Construction and principle of operation of single phase induction motor viz: capacitor start, capacitor start and run, split phase, shaded pole and universal motor – speed torque characteristics and their industrial applications

UNIT IV

TRANSFORMERS:

Classification of transformers based on construction, Principle of operation of single phase transformers – emf equation – losses – efficiency and regulation

Welding transformers :

Introduction to Arc welding - construction and principle of single phase welding transformer – and Dc welding generator and their application – comparison between AC and DC welding

UNIT V

DIODES AND TRANSISTORS:

Semiconductors, Types, Construction and working of P-N junction diode, symbol, Diode Applications, Rectifiers – Half wave, Full wave and Bridge rectifiers (Descriptive treatment only), Principle of Zener diode and application.

Construction and working P-N-P and N-P-N Junction transistor, Transistor as a switch and amplifier, Single stage CE Amplifier, Frequency response of CE amplifier. (descriptive treatment only)

Learning resources

Text books:

1. A course in Power systems by JB Gupta, Kataria publications
2. Principles of Electrical and Electronics Engineering, (1st edition) by Mehta, V.K., S. Chand & Co, 2012.

Reference books:

1. Introduction to Electrical Engineering by Naidu, M.S. and Kamakshaiah, S., Tata McGraw-Hill, 1995.
2. Basic Electrical Engineering, (3rd Edition) by Kothari and Nagarath., Tata McGraw-Hill, 2009.

e-learning resources:

<http://nptel.ac.in/courses.php>

<http://jntuk-coeerd.in/>