1/4 B.Tech. SECOND SEMESTER

EM2T4 BASIC ELECTRICAL ENGINEERING Credits: 3

Lecture: 3 periods/week **Internal assessment: 30 marks**
Tutorial: 1 period /week **Semester end examination: 70 marks**

Course Objectives:

- To understand basic principles underlying the behavior of "Electric circuits and Magnetic circuits".
- Different forms of representation of AC quantities and DC Machines, AC machines.
- Transformers and types of instruments used for measuring electrical quantities**.**

Learning Outcomes:

The Student will be able to

- Analyze the electric circuits.
- Analyze the magnetic circuits.
- Gain the knowledge regarding generation of electrical energy by DC & AC Machines.
- Know how the power will be transformed.
- Know the different types of measuring instruments.

UNIT - I

Introduction to Electrical Engineering : Essence of electricity, Conductors, semiconductors and insulators (elementary treatment only); Electric field; electric current, potential and potential difference, electromotive force, electric power, ohm's law, basic circuit components,

UNIT- II:

Introduction to Electromagnetism: Electromagnetism related laws, Magnetic field due to electric current flow ,force on a current carrying conductor placed in a magnetic field, Faradays laws of electromagnetic induction. Types of induced EMF's.

UNIT-III

Magnetic Circuits : Basic definitions, analogy between electric and magnetic circuits, self inductance and mutual inductance, coils connected in series and parallel

UNIT-IV

Transformers : Principles of operation, Constructional Details, Ideal Transformer and Practical Transformer, Losses, Efficiency and Regulation definitions (elementary treatment).

UNIT-V

Direct current machines : Principle of operation of dc machines, Operation of a dc machine as a generator, operation of a dc machine as a motor and torque production

UNIT-VI

A.C Machines : Three phase induction motor, principle of operation, slip and rotor frequency, torque (simple problems).

UNIT- VII :

Special Machines: Shaded pole motors, Capacitor motors, AC servomotor, AC tachometers, Synchros, Stepper Motors – Characteristics. Universal motor, permanent magnet DC motor

UNIT VIII

Basic Instruments : Introduction, classification of instruments, operating principles, essential features of measuring instruments, Moving coil permanent magnet (PMMC) instruments, Moving Iron Ammeters, Voltmeters and Dynamometer Wattmeter (elementary Treatment only), Introduction to Digital meters and micro controller base meters.

Learning resources

TEXT BOOKS :

1. Principles of Electrical Engineering by V.K Mehta, S.Chand Publications.

2. Basic Electrical Engineering - By M.S.Naidu and S. Kamakshiah – TMH.

REFERENCES :

1. Theory and Problems of Basic Electrical Engineering by D.P.Kothari & I.J. Nagrath PHI.

2. Basic Electrical Engineering –By T.K.Nagasarkar and M.S. Sukhija Oxford University Press.