1/4 B.Tech FIRST SEMESTER

EE1T3 BASIC ELECTRICAL ENGINEERING Credits: 4

Lecture: 4 periods/week **Internal assessment: 30 marks**
Tutorial: 1 period /week **Semester end examination: 70 marks**

Objectives:

- To impart the basic knowledge about the Electric and Magnetic circuits
- To inculcate the understanding about the AC fundamentals
- To understand the working of various Electrical Machines
- To know about various measuring instruments and house wiring

Learning outcomes:

At the end of the course the students will have:

- Basic knowledge about the Electric and Magnetic circuits
- Understanding about the AC fundamentals and the working of various Electrical Machines

UNIT – I: Fundamentals of Electricity

Introduction – Modern Electron theory – Unit of charge – Electric current – Electric Potential difference – Concept of EMF and potential difference – Resistance – Factors upon which Resistance depends – Specific Resistance or Resistivity – Conductance – Effect of Temperature on Resistance – Temperature co-efficient of Resistance

UNIT – II: D.C.circuits

Introduction – Ohm's law - Electric power – Electrical Energy – Resistances in Series – Resistances in Parallel – Series parallel circuit – Special case of parallel circuit – Kirchhoff's laws – Illustration of Kirchhoff's Laws – Method to solve circuits by Kirchhoff's Laws - Numerical problems on series and parallel circuits.

UNIT – III: Work, Power and Energy

Introduction –S I Units for unit of power, work and energy – Mechanical work or energy – Electrical energy – Thermal energy – Units of power – Expression for power – Heating Effect of electric current – Relationship between thermal, mechanical and electrical units

UNIT- IV: Electrostatics

Introduction – Coulomb's Law of Electrostatics – Absolute and relative permittivity - Electric field – electric flux – Electric Intensity or Field strength(E) – Electric Flux Density – Electric Potential – Electric Potential Difference –Potential Gradient.

UNIT – V: Capacitance

Introduction – Capacitor – Capacitance – Dielectric constant or Relative Permittivity – Parallel Plate Capacitor with uniform Medium – Capacitors in Series – Capacitors in Parallel – Energy stored in a capacitor, charging of a capacitor – Time constant – Discharging of capacitor

UNIT – VI: Electromagnetism

Introduction – Magnetic field – Magnetic flux – Magnetic flux density – Magnetizing force – Absolute and relative permeability – Relation between B and H – B H curve - Magnetic circuit – Comparision between magnetic and electric circuits — Magnetic Hysteresis – Importance of Hysteresis Loop

UNIT – VII: Electromagnetic Induction

Introduction – Electromagnetic Induction – Faraday's Laws of Electromagnetic Induction – Direction of Induced EMF and current – Induced EMF – Dynamically induced EMF – Statically induced EMF – Self Inductance – Mutual Inductance - Coefficient of coupling – Inductances in Series – Inductances in parallel – Energy stored in a magnetic field

UNIT-VIII: Chemical Effects of Electric Current

Introduction – Electrolytes – Electrolysis – Faraday's Laws of Electrolysis – Cell - types of cells – Lead acid cell – Construction of a Lead acid Battery – Chemical changes during charging and discharging –Characteristics of a lead acid cell – Indications a fully charged cell –construction of Nickel iron Cell – Construction and Characteristics of nickel cadmium cell.

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.