

FIRST YEAR

Electrical Engineering I	COE102
Prerequisite : None	(4-3-1-3)

Basic Concepts: Systems of Units, Charge and Current, Voltage, Power and Energy, Circuit Elements, Dependent and Independent Sources, Electrical Resistance and Conductance, Types of Resistors. Basic Laws: Nodes, Branches, and Loops, Planar and Non-planar Circuits, Ohm's Law, Kirchhoff's Laws. Circuit Transformations: Series Resistors and Voltage Division, Parallel Resistors and Current Division, Wye-Delta Transformations, Source Transformations. Methods of Analysis: Mesh Analysis, Nodal Analysis. Circuit Theorems: Superposition, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer, Millman's Theorem, Substitution Theorem, Reciprocity Theorem. Magnetic Circuits: Magnetic Circuit, Definitions, Magnetic Field Strength (H), Magnetic Potential, Flux per Unit Pole, Flux Density (B), Absolute Permeability (μ) and Relative Permeability (μ_r), Intensity of Magnetization (I), Susceptibility (K), Composite Series Magnetic Circuit, How to Find Ampere-turns, Comparison Between Magnetic and Electric Circuits, Parallel Magnetic Circuits, Series-Parallel Magnetic Circuits, Leakage Flux and Hopkinson's Leakage Coefficient, Magnetization Curves.

Practical part: DC Voltage Measurement. Using the Ohm-meter. Resistor Characteristics. DC Current measurement. Ohm's Law. Power in a DC Circuit. Series- Parallel network and Kirchhoff's Law. Superposition, Thevenin's and Norton's Theorems.