

EE-119 FUNDAMENTALS OF ELECTRICAL ENGINEERING

Electrical Elements and Circuits: Energy and energy transfer, Electric charge, electric current, potential difference & voltage, Electric power & energy, Electric circuits, Sources & element resistance, Ohm's Law Inductance, Capacitance, Fundamental circuits Laws, Kirchhoff's Laws, Direct application of fundamental laws to simple resistive networks, Node voltage and loop current methods.

Steady State AC Circuits: An introduction to periodic functions, RMS or effective, Average and maximum values of current & voltage for sinusoidal signal wave forms, An introduction to phasor method of analysis, Applications of phasor methods to simple AC circuits, Power and reactive power, Maximum power conditions.

Magnetic Circuits and Transformers: Magnetic effects of electric current, Magnetic circuit concepts, Magnetization curves, Characteristics of magnetic materials, Magnetic circuits with AC excitation, Hysteresis and eddy current losses, Introduction to transformer, The ideal transformer.

Electromechanical Energy Conversion: Basic principles, Generated voltage, Electromagnetic Torque, Introduction of Magnetic Fields, Alternating current generators, Commutator action, DC machines, Direct current Generators, Electric motors, Losses and efficiency, Machine Application consideration.

Sinusoidal Steady State Analysis: Network response to sinusoidal driving functions, Complex impedance and admittance functions, Development of concept of phasors, Power consideration, Complex power, Maximum power transfer, Tuned circuits, Series and parallel RLC tuned circuits, Definition of Quality factor.