Learning Objectives

- Provide an understanding of the physical laws derived from the fundamental concepts of electricity and magnetism.
- Apply the physical laws to solve simple problems in electro-magnetic theory.
- Develop the ability to analyze and interpret problems dealing with electromagnetic fields.
- Solve electromagnetic wave problems using Maxwell's equations for simple systems of charge and current distributions with boundary conditions.
- Apply vector calculus to understand the behavior of static electric fields in standard configurations.

Syllabus (52 Hours)


**Electrostatics: Electrostatic Fields (06 H):** Coulomb’s Law and field intensity, Electric fields due to continuous charge distributions, Electric flux density, Gauss’s Law, Applications of Gauss’s Law, Electric Potential, Relationship between E and V, Electric dipole, Energy density in Electrostatic fields.

**Electric fields in material space (10 H):** Properties of materials, Convection and conduction currents, Conductors, Polarization in Dielectrics, Dielectric constant and strength, Linear, isotropic and homogeneous dielectrics, Continuity equation, relaxation time, Boundary conditions. Electrostatic Boundary value problems–Poisson’s and Laplace’s Equations, Uniqueness Theorem, Resistance and capacitance [Parallel-plate, coaxial, spherical capacitors].
Magnetostatics and Maxwell’s equations (time varying field) (16 H):


Text Book:

Reference Books: