

# **AME09 ELECTROMAGNETIC ENGINEERING**

## **UNIT-1 COLOMB'S LAW AND ELECTRIC FIELD INTENSITY**

- 1.1 The Experimental Law of Coulomb, Electric Field Intensity, Field Due to Continuous Volume Charge Distribution

## **UNIT-2 ELECTRIC FLUX DENSITY, GAUSS' LAW, AND DIVERGENCE**

- 2.1 Electric Flux Density, Gauss' Law, Applications of Gauss' Law: Some Symmetrical
- 2.2 Charge Distributions, Application of Gauss' Law: Differential Volume Element,
- 2.3 Divergence, Maxwell's First Equation (Electrostatics), The Vector Operator  $\nabla$  and the Divergence Theorem

## **UNIT-3 ENERGY AND POTENTIAL**

- 3.1 Energy and Potential in a Moving Point Charge in an Electric Field, The Line Integral,
- 3.2 Definition of Potential Difference and Potential, The Potential Field of a Point Charge,
- 3.3 The Potential Field of a System of Charges : Conservative Property, Potential Gradient, The Dipole, Energy Density in the Electric Field

## **UNIT-4 CONDUCTORS, DIELECTRICS, AND CAPACITANCE**

- 4.1 Current and Current Density, Continuity of Current, Metallic Conductors, Conductor Properties and Boundary Conditions,
- 4.2 The Nature of Dielectric Materials, Boundary Conditions for Perfect Dielectric Materials, Capacitance

## **UNIT-5 POISSON'S AND LAPLACE'S EQUATIONS**

- 5.1 Poisson's and Laplace's Equations, Uniqueness Theorem, Examples of the Solution of Laplace's Equation,
- 5.2 Example of the Solution of Poisson's Equation, Product Solution of Laplace's Equation

## **UNIT-6 THE STEADY MAGNETIC FIELD**

- 6.1 Ampere's Circuital Law, Magnetic Flux and Magnetic Flux Density,
- 6.2 The Scalar and Vector Magnetic Potentials, Derivation of the Steady-Magnetic-Field Laws

### **Reference Book:**

1. Electromagnetic Fields and Waves, Publisher Katsons, Writer R. Goweri