Field Theory

Code : EE402 [EI] Contacts : 3L **Credits : 3**

Module I

Vector calculus – orthogonal Coordinate Systems, Transformations of coordinate systems; Del operator; Gradient, Divergence, Curl – their physical interpretations; Laplacian operator. [4]

Coulomb's law, electric field intensity, charge distribution.; Gauss' law, flux density and electric field intensity. Divergence theorem. Current Densities, Conductors, Poisson's & Laplace's equations, Uniqueness theorem, Biot-Savart law, Ampere's law, Relation between J & H, Vector magnetic Potential, Stokes' theorem. [6]

Module II

Faraday's law & Lenz's law, Displacement Current, J C – J D Relation, Maxwell's equations, Timeharmonic fields, Wave Equation, Boundary Conditions between media interface; Uniform Plane wave; Wave Propagation in Lossy Dielectric, Loss-less Dielectric, Free space. Poynting Theorem, Power flow, Poynting vector. Wave polarizations. [9]

Module III

Transmission Lines: Concept of Lump parameters and Distributed parameters, Line Parameters, Transmission line equations and solutions, Physical significance of the solutions. Propagation constant, Characteristic Impedance; Wavelength; Velocity of Propagation; Distortion-less Line, Reflection and Transmission coefficients; Standing Waves, VSWR, Input Impedance, Load Matching Techniques. [9]

Books:

1. Principles of Electromagnetics, 4th Edition, Matthew O H Sadiku, Oxford University Press.

- 2. Engineering Electromagnetics, 7thEdition-W.H.Hayt & J.A.Buck, Tata-McGraw-Hill
- 3. Theory and problems of Electromagnetic, Edminister, 2nd Edition, Tata-McGraw-Hill
- 4. Electromagnetic Field Theory & Transmission Lines, G.S.N. Raju, Pearson Education

5. Electromagnetic field theory fundamentals, Guru & Hizroglu, 2nd edition, Cambridge University Press.

- 6. Engineering Electromagnetics, 2ed Edition Nathan Ida, Springer India
- 7. Elements of Engineering Electromagnetic, N.N. Rao, 6th Edition, Pearson Education.
- 8. Electromagnetic Waves and Transmission Lines- by G.Prasad, J.Prasad and J.Reddy- Scitech