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| **EC3502** | **Electromagnetic Field Theory** | **L-T-P: 3-0-0; Total 42 Lectures** |

**Unit I: Basic Mathematical Concepts (5 Lectures )**

Cartesian, Cylindrical, Spherical Coordinate systems, Curvilinear Coordination System, Gradient, Divergence, Divergence Theorem, Curl, Stokes Theorem.

**Unit II: Maxwell’s Equations for Steady State and Time-Varying Field (8 Lectures )**

Magnetic Vector Potential, Laplace and Poisson’s Equation, Uniqueness Theorem, Faraday’s Law, Electromotive Force, Displacement Current, Continuity Equation, Inconsistency of Ampere’s Law, Boundary Conditions, Maxwell’s Equations in Point and Integral Form.

**Unit III: Electromagnetic Wave Propagation in Different Media (10 Lectures )**

Uniform Plane Wave Propagation, Wave Propagation in Free Space, Dielectric and Conductor; Skin Effect; Wave Polarization, Reflection of Plane wave (at normal and oblique) for conductor and dielectric, Surface Impedance.

**Unit IV: Poynting Vector (03 Lectures )**

Poynting Theorem, Instantaneous, Average and Complex Poynting Vector, Power Loss in Plane Conductor.

**Unit V: Transmission Lines (10 Lectures )**

Transmission Line Theory, Low Loss Transmission Line and UHF Transmission, UHF Lines as circuit Element, Q of Resonant Transmission Line, Quarter Wave Line as Transformer, Voltage Step Up in Quarter Wave Transformer, Smith Chart, Stub Matching.

**Unit VI: Guided Waves (06 Lectures)**

Waves between parallel planes, TE and TM wave Analysis, TEM and hybrid mode Analysis, Attenuation in Parallel Plane Guides, Wave Impedance, Relation between vp,vg and v0.

**Text Book**

1. Electromagnetic Waves and Radiating System, E. C. Jordan, K. G. Balmain, PHI

**Reference Books**

1. Engineering Electromagnetics, W. H. Hayt, J. A. Buck, 7th Edition, TMH.
2. Principles of Electromagnetics, Matthew N.O. Sadiku, Oxford University Press.
3. Electromagneitc Waves by J D Kraus