**13EC2103-ELECTROMAGNETIC FIELDS AND WAVES**(Common to EEE and ECE)

Credits: 4 Lectures/Week: 4Hrs. Sessional Marks: 40  
Univ. Exam. Duration: 3Hrs Univ.Exam.Marks: 60

**UNIT I**

**ELECTROSTATICS:** Coulomb’s Law – Electric Field Intensity – Electric Flux Density –Gauss’s Law- Electric Potential-Potential Gradient-Energy Stored in Electric Field.

**UNIT II**

**CONDUCTORS AND DIELECTRICS:** Current and Current Density- Continuity Equation-Conductors-Ohms Law-Dielectrics: Dipole Moment-Polarization-bound Charge Densities-Boundary Conditions- Poisson’s and Laplace’s equations-Capacitance-Energy density

**UNIT III**

**MAGNETO STATICS:** Biot-Savart’s Law - Ampere’s circuital law – Lorentz Force Law – Magnetic field intensity H-Magnetic Vector Potential-Poisson’s and Laplace’s Equations-Dipole Moment-Bound Current Densities-Boundary Conditions-Energy Stored in Magnetic Field.

**UNIT IV**

**ELECTROMAGNETIC WAVES:** Faraday’s Law – Displacement Current – Modified form of Ampere’s circuital law – Maxwell’s Equations -Poynting theorem. Wave Equation – Uniform Plane Waves in Lossless Media and in Lossy Media.

**UNIT V**

**POLARIZATION, REFLECTION AND REFRACTION:** Linear, Elliptical and circular polarization – Reflection of Plane Wave from a conductor – normal incidence – Reflection of Plane Waves by a perfect dielectric – Normal and Oblique Incidence –VSWR- Brewster angle.

**TEXTBOOKS**

1. Matthew N.O.Sadiku: “Elements of Engineering Electromagnetics” Oxford University Press, 4th edition, 2007 (Unit I, II, III).

2. E.C. Jordan & K.G. Balmain “Electromagnetic Waves and Radiating Systems.” Pearson Education/PHI 4th edition 2006. (Unit IV, V)

**REFERENCES**

1. W H.Hayt & J A Buck: “Engineering Electromagnetics” TATA McGraw-Hill, 7th Edition 2007

2. Narayana Rao, N: “Elements of Engineering Electromagnetics” 6th edition, Pearson Education, New Delhi, 2006.

3. Ramo, Whinnery and Van Duzer: “Fields and Waves in Communications Electronics” John Wiley & Sons, 3rd edition 2003.

4. David K.Cheng: “Field and Wave Electromagnetics - Second Edition-Pearson

Edition, 2004.

5. G.S.N. Raju, Electromagnetic Field Theory & Transmission Lines, Pearson Education, 2006