Semester-I
Course: B.Sc. (Hons) IT
Paper Code: BSIT-103
Nomenclature: Fundamental of EM Waves

Max. Marks: 40+10*
Time: 3hrs.

Unit 1

Vector background and electric field:- Mathematical expression and significance of Gauss's Divergence Theorem and Stokes Theorem; Electric Field as gradient of electric potential , Electric Flux , Gauss's law , concept of displacement current, Scalar and vector potential .

Unit 2

Electromagnetism:- Maxwell's equation in Differential and Integral forms, Plane wave equations in : Free space , Conducting media , Non conducting media , Transverse nature of electromagnetic waves , Skin effect, Poynting Theorem and Poynting vector.

Unit 3

A.C. Circuit analysis:- Capacitance and Resistance (CR) circuit, Inductance and Resistance (LR) circuit, Inductance and Capacitance (LC) circuit, Capacitance, Inductance and Resistance (LCR) circuit; Series and parallel resonance circuit, Quality Factor.

Unit 4

Fundamentals of EM waves:- EM spectrum, Reflection, Refraction, Diffraction Polarization. Fundamentals of Transmission lines, characteristics impedance, Losses in Transmission line, Quarter and half wavelength lines, Reactance properties of transmission lines.

Reference Books:

1. Electromagnetic Theory by B.B Laud
2. Foundations of Electromagnetic Theory by John R. Reitz.
3. Electricity, Magnetism, Electromagnetic Theory & Electronics Devices by V.K. Sharma
4. Electronic Communication by Wayane Tomasi

Note:

1. Syllabus in each Theory Paper is divided in 4 units.
   I. A Student is required to attempt 5 questions in all.
   II. Question No 1 is compulsory, consisting of short answer type questions based on all the 4 units.
   III. Two questions will be set from each unit. A student is required to attempt one question from each unit.
   IV. All questions carry equal marks.
2. Use of simple calculator is permissible.
3. Instructions should be imparted using SI system of units. Familiarity with CGS system of units should also be ensured.
4. Distribution of Marks: 40+10*= 50.
   * Each question paper will be of 40 marks and 10 marks in each theory paper are awarded through internal assessment in each semester.
5. Work load – 3 periods per week per theory paper.