

**SARDAR PATEL UNIVERSITY**  
**Programme & Subject: M.Sc (Electronics & Communication)**  
**Semester: I**  
**Syllabus with Effect from: June - 2011**

<b>Paper Code: PS01CELC01</b>	<b>Total Credit: 4</b>
<b>Title Of Paper: Electromagnetic Theory</b>	

Unit	Description in Detail	Weightage (%)
I	Scalar and vector, vector algebra, the rectangular coordinate system, vector components and unit vector, the vector field, dot product, cross product, cylindrical coordinate system, spherical coordinate system, Integration of vector, line integral, surface integral, circulation work & flux, volume integral, green's theorem, stoke's theorem, divergence theorem, del applied to function.	20%
II	Experimental law of coulomb; Electric field intensity; Field of a continuous volume charge distribution, line charge and sheet of charge; Streamlines and sketches of fields. Electric flux density; Gauss's law; Application of gauss's law; Some symmetrical charge distributions; Maxwell's first equation	20%
III	Energy expended in moving a point charge in an electric field; Line integral; Definition of potential difference and potential; Potential field of a point charge and system of charges; Potential gradient; Dipole; Energy density in electrostatic field. Dielectrics and capacitance; Current and current density; Continuity of current; Conductor properties and boundary conditions; Nature of dielectric materials; Boundary conditions for perfect dielectric materials; Capacitance; Several capacitance examples.	20%
IV	Poisson's and Laplace's equations; Uniqueness theorem; Examples of solution of Poisson's, Examples of solution of Laplace's equation.	20%
V	Biot-savart law; Ampere's circuit law; Magnetic flux and magnetic flux density; Scalar and vector magnetic potentials. Faraday's law; Displacement current; Maxwell's equations in point form; Maxwell's equations in integral form	20%

**Basic Text & Reference Books:-**

- Engineering Electromagnetics: William H. Hayt, McGraw Hill, 5th Edition, 1992, 7th Reprint 1995.
- Elements of Engineering Electromagnetics: N. Rao, Prentice Hall, 3rd Edition, 1992.
- Theory and Problems of Electromagnetics: Joseph A. Edminister, McGraw Hill, 2nd Edition, 1993.

