Course code	Course Title	*C*	H	I	E	T
17U2PMC2	Electricity and electromagnetism	5	5	25	75	100

Unit 1 Electrostatics

Electric field and electric intensity – Force between a point charge and a linear charge distribution – Electrostatic potential – Potential and intensity at a point due to a dipole – Electric potential at a point due to an electric quadrupole – Electric potential at a point due to a charged sphere – Electric potential energy – Gauss's theorem – Application of Gauss's theorem – Coulomb's law – Mechanical force experienced by unit area a of a charged surface – Electrified soap bubble – Electrical images.

Unit 2 Capacitors and dielectrics

Capacity of a capacitor – Principle of a capacitor – Energy of a charged conductor – Sharing of charge between two charged conductors – Capacity of a spherical capacitor – Capacity of a cylindrical capacitor (with and without dielectrics) – Parallel plate capacitor (with and without dielectrics) – Capacitors in series and parallel – Types of capacitors.

Unit 3 Current measurement and thermoelectricity

Carey-Foster's bridge – Theory and experiment to find the temperature coefficient and specific resistance – Potentiometer – Measurement of thermo emf using potentiometer – Measurement of current and resistance – Calibration of low range voltmeter and ammeter– Seebeck effect– Law of successive temperatures and intermediate metals – Peltier effect – Peltier co–efficient – Thermodynamics of Peltier effect – Thomson effect – Thermoelectric power.

Unit 4 Magnetism

The Biot Savart law – Divergence of B – Calculation of B using Biot Savart law – Circular current loop – Field midway between two similar coaxial circuits – Field on the axis of a spinning charged disc – Field along the axis of a solenoid – Ampere' circuital law – Ampere's law and Curl B – Application of Ampere's law - Moving coil galvanometer – Ballistic galvanometer – Moving coil ballistic galvanometer – Correction for damping in ballistic galvanometer.

Unit 5 Electromagnetic induction

Faraday's laws of electromagnetic induction – Lenz's law – Self and mutual inductance – Determination of resistance AC Bridges –Anderson, Owen's bridges – Theory and experiments – Charging of a condensers through resistance and inductance – Charging and discharging of a condenser through L and R – Series and parallel resonance circuits – Power in an AC circuit (circuits containing only resistance, capacitance and inductance) – Maxwell's displacement current – Maxwell's equation.

Text Book(s):

1. Brijlal & N. Subramanyam, Electricity and magnetism, 2000, Ratan Prakashan Mandir Publications.
   Unit 1: Chapters 5.2–5.8, 6.1–6.7.
   Unit 2: Chapters 7.1–7.7.
   Unit 3: Chapters 13.32, 13.35, 13.38, 13.40, 13.41, 17.1–17.5, 17.7, 17.8, 17.10.
   Unit 4: Chapters 12.4–12.7, 12.9.
   Unit 5: Chapters 18.1, 18.2, 18.6–18.7, 18.13, 18.18–18.22, 20.10, 20.11, 20.12, 20.18, 20.19, 20.20, 20.25, 20.26.

2. D.C. Tayal, Electricity and magnetism, 2000, Himalaya Publishing House.
   Unit 4: Chapters 8.7, 8.8 (excluding f`), 8.9, 8.10.
   Unit 5: Chapters 12.1, 12.2.

References:

1. Segal, Chopra & Segal, Electricity and magnetism, 2000, Sultan Chand & Co.
2. R. Murugesan, Electricity and magnetism, Reprint - 2005, S.Chand & Co.
3. Dugel, Chopra, Electricity and magnetism, 2000, Sultan Chand & Co.