

**CORE COURSE VI  
ELECTRICITY, MAGNETISM AND ELECTRO MAGNETISM**

**Unit I Electrostatics**

Coulomb's inverse square law – Gauss theorem and its applications (Intensity at a point due to a charged sphere & cylinder) – Principle of a capacitor – Capacity of a spherical and cylindrical capacitors – Energy stored in a capacitor – Loss of energy due to sharing of charges.

**Unit II Current Electricity**

Ampere's circuital law and its applications - Field along the axis of a circular coil and Solenoid – Force on a conductor in a magnetic field – Theory of Ballistic Galvanometer – Figure of merit – Damping Correction – Wheatstone network – Carey Foster's Bridge – Potentiometer - Measurement of current, resistance and low voltage.

**Unit III Electromagnetic Induction**

Laws of electromagnetic induction – Self and mutual induction – Self inductance of a solenoid – Mutual inductance of a pair of solenoids – Coefficient of coupling – Experimental determination of self and mutual inductance (Rayleighs method) Growth decay of current in circuit containing Land R – Growth and decay of charge in circuit containing C and R – High resistance by leakage – Charging and discharging of capacitor through Land R.

**Unit IV AC Circuits**

Alternating EMF – Alternating EMF applied to circuits containing L and R – C and R – Alternating EMF applied to circuits containing L, C and R – Series and Parallel resonance circuits – Sharpness of resonance – Q factor – Power in AC circuits – Power factor – Wattless current

**Unit V: Magnetism**

Intensity of magnetization - Susceptibility – Types of magnetic materials – Properties para, dia and ferro magnetic materials – Cycle of magnetization – Hysteresis – B-H curve – application of BH curve– Magnetic energy per unit volume.

**Books for Study**

1. Brij Lal and Subramaniam – Electricity and Magnetism – S.Chand & Co.
2. R.Murugesan, Electricity and Magnetism, S.Chand & Co.

**Books for Reference:**

1. Narayanamoorthy and Nagaratnam, Electricity and Magnetism NPC, Chennai.