

Lesson Plan.

Name - Deepak Kumar

Class - B.Sc 2nd Sem.

Dept. - Physics.

GC Mahendragarh.

Week-1 :- Vectors background and Electric field :- Gradient of a scalar and its physical significance, Line, Surface and Volume integrals of a vector and their physical significance, Flux of a vector field, Divergence and curl of a vector and their physical significance.

Week-2 :- Gauss's divergence theorem, Stoke's theorem. Conservative nature of electrostatic field, Electrostatic potential, Potential as line integral of field, potential difference. Derivation of electric field E from potential as gradient.

Week-3 :- Derivation of Laplace and Poisson equations. Electric flux, Gauss's Law, Differential form of Gauss's Law and applications of Gauss's Law. Mechanical force of charged surface, Energy per unit volume.

Week-4 :- Magnetic field: Biot Savart Law and its simple applications: straight wire and circular loop, current loop as a magnetic dipole and its dipole moment.

Week-5:- Ampere's circuital law and its applications to (i) Solenoid and (ii) Toroid, properties of B : Curl and divergence.

Week-6:- Magnetic Properties of Matter; Force on a dipole in an external field, Electric currents in Atoms, Electron spin and magnetic moment, types of magnetic materials, Magnetization vector (M), Magnetic intensity (H), Magnetic susceptibility and permeability, Relation between B , H & M .

Week-7:- Electronic theory of dia and paramagnetism, Domain theory of ferromagnetism (Langevin's theory), cycle of Magnetization - B - H curve and hysteresis loop: Energy dissipation, Hysteresis Loss and importance of Hysteresis Curve.

Week-8:- Time varying Electromagnetic fields: Electromagnetic induction, Faraday's Laws of induction and Lenz's Law, self inductance, Mutual inductance, Energy stored in a Magnetic field.

Week-9:- Derivation of Maxwell's equations, Displacement current Maxwell's equations in differential and integral form and their physical significance.

Week-10:- Electromagnetic waves:- Electromagnetic waves, Transverse nature of electromagnetic wave, energy transported by electromagnetic waves, Poynting vector, Poynting theorem, Propagation of plane electromagnetic waves in free space & Dielectrics.

Week-11:- DC Current circuits:- Electric current and current density, Electrical conductivity and ohm's law (Review). Kirchhoff's Law for D.C. networks.

Week-12:- Network theorem's: Thevenin's, Norton, superposition theorem.

Week-13:- Alternating Current circuits: A resonance circuit, Phasor, complex Reactance and impedance, Analysis for RL, RC and LC circuits.

Week-14:- Series LCR circuit: (1) Resonance (2) Power dissipation (3) Quality factor (4) Band width, Parallel LCR circuit.