Lesson Plan

Class : B.Sc. 1st Year   **Semester :** 1st
Subject : Physics
Paper : Mechanics-I and Electricity,Magnetism & Electromagnetic Theory-I
Submitted By : Dr. Parveen Jain   **Session :** 2022-23
(Assistant Professor in Physics)

Month	Week	Topic
September	01/09/2022 to 03/09/2022	Vectors: Vector algebra, Scalar and vector products, Derivatives of a vector with respect to a parameter, Gradient of a scalar field and its geometrical interpretation, Divergence and curl of a vector field
	05/09/2022 to 10/09/2022	Laplacian operator, Vector identities,Line, surface and volume integrals of Vector fields, Flux of a vector field, Gauss's divergence theorem, Stokes Theorem and their applications (no rigorous proofs)
	12/09/2022 to 17/09/2022	Unit II- Ordinary Differential Equations: First Order Differential Equations and Integrating Factor, 1st order homogeneous differential equations, 2nd order homogeneous differential equations with constant coefficients (Assignment I)
	19/09/2022 to 24/09/2022	Laws of Motion: Frames of reference, Newton's Laws of motion and their applications. (Test I)
	26/09/2022 to 30/09/2022	UNIT-III Momentum and Energy: Conservation of momentum, Work and energy, Conservation of energy, Motion of rockets.
October	01/10/2022	Assignment II
	03/10/2022 to 08/10/2022	Dynamics of a system of particles:Elastic and inelastic collisions between particles, Centre of Mass and Laboratory frames
	10/10/2022 to 15/10/2022	Rotational Motion: Angular velocity and angular momentum, Torque, Conservation of angular momentum, Angular momentum as vector, Coriolis forces and its effect on motion
	17/10/2022 to 21/10/2022	Unit-IV:- Gravitation: Newton's Law of Gravitation, Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant), Kepler's Laws, Satellite in circular orbit and applications, Geosynchronous orbits, Weightlessness, Basic idea of global positioning system (GPS). (Test II)
	22/10/2022 to 28/10/2022	Diwali Vacations
November	02/11/2022 to 05/11/2022	Elasticity: Hooke's law - Stress-strain diagram - Elastic moduli- Relation between elastic constants - Poisson's Ratio-Expression for Poisson's ratio in terms of elastic constants

	07/11/2022 to 12/11/2022	EMT-I, Unit-I:- Electrostatics: Coulomb's law, Electrostatic Field, Electric flux, Gauss's theorem of electrostatics. Applications of Gausstheorem (1) Electric field due to point charge, infinite line of charge (2) due to uniformly charged spherical shell and solid sphere, (3) due to plane charged sheet (4) due to charged conductor, Divergence and curl of electrostatic field, Electric potential as line integral of electric field, Potential due to (1) a point charge (2) electrical dipole (3) uniformly charged spherical shell (4) solid sphere, Calculation of electric field from potential.
	14/11/2022 to 19/11/2022	Unit II:- Application of Electrostatics: Capacitance of (1) an isolated spherical conductor (2) Parallel plate (3) spherical and cylindrical condenser, Energy per unit volume in electro static field, Laplace and Poisson's equations for the electrostatic field, Multipole expansion of potential due to arbitrary charge distribution, Dielectric medium, Polarization, Bound charges in a polarized dielectric and their physical interpretation, Electric displacement, Gauss's theorem in dielectrics, Parallel plate capacitor completely filled withdielectric, Susceptibility, Permittivity and dielectric constant
	21/11/2022 to 30/11/2022	Unit-III:- Magnetism: Lorentz force law, magnetic forces, Magnetostatics: Biot-Savart's law & its applications (1) straight conductor (2) circular coil (3) solenoid carrying current, Divergence and curl of magnetic field, Magnetic vector potential, Ampere's circuital law and it's applications for simple current configurations, Magnetic vector potential. Unit-IV:- **Magnetization:** The field of a magnetized object, bound currents, physical interpretation of bound currents, Ampere's law for magnetized objects, The Auxiliary field (H).

(Dr. Parveen Jain)