**CURRICULUM PLAN 2024-25**

Odd Semester: I, III, V

**Mr. Kapil Kumar**

Department of Physics

**B.Sc. (H) GE (Generic Elective) – I Year, I Sem,**

**Core Paper: Mechanics**

|  |  |  |  |
| --- | --- | --- | --- |
| Content | Allocation of Lectures | Month-wise Schedule followed | Tutorial/assignment/  presentation etc |
| **Mechanics** | | |  |
| **Unit 1:**  **Recapitulation of Vectors and Ordinary Differential Equation**  Vector algebra, scalar and vector product, gradient of a scalar field, divergence and curl of  vectors field  Ordinary Differential Equations: First-order homogeneous differential equations, second  order homogeneous differential equation with constant coefficients | 8 | 30-Aug to 19-Sep | Syllabus Overview  Reference books  Problem-solving  Derivations and Numerical. |
| **Unit 2: Fundamentals of Dynamics:**  Review of Newton’s laws of motion, dynamics of a system of particles, center of mass,  determination of the center of mass for discrete and continuous systems having spherical  symmetry, Conservation of momentum and energy, Conservative and non-Conservative  forces, work—energy theorem for conservative forces, force as a gradient of potential  energy. | 10 | 20-Sept to 19-Oct | Derivations and  Numericals  Class test on the unit end  Discussion of  Important questions |
| **Unit 3: Rotational Dynamics and Oscillatory Motion**  Angular velocity, angular momentum, torque, conservation of angular momentum, Moment  of inertia, Theorem of parallel and perpendicular axes, Calculation of moment of inertia of  discrete and continuous objects (1-D and 2-D).  Idea of simple harmonic motion, Differential equation of simple harmonic motion and its  solution, Motion of a simple pendulum, and compound pendulum | 14 | 20-Oct to 23-November | Derivations and  Numericals  Discussion of  Important questions  Home Register Checking |
| **Unit 4: Gravitation**  Newton’s Law of Gravitation, Motion of a particle in a central force field, Kepler’s Laws  (statements only), Satellites in a circular orbit and applications, geosynchronous orbits, and their physical interpretation.  Laplacian operator. Vector identities. | 05 | 24-Nov to 05-November | Derivations and  Numericals |
| **Unit 5: Elasticity:**  Concept of stress and strain, Hooke’s law, elastic moduli, twisting torque on a wire, tensile  strength, relation between elastic constants, Poisson’s ratio, rigidity modulus | 03 | 06 December to 12 December | Derivation, Numerical & Revision. Solving previous year's Question papers. |
| **Unit 6: Special Theory of Relativity**  Postulates of Special Theory of Relativity, Lorentz transformation, length contraction, time  dilation, relativistic transformation of velocity, relativistic variation of mass, mass-energy  equivalence | 05 | 13 December to 28 December | Derivation, Numerical & Revision. Solving previous year's Question papers. |