**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**

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| 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 ofvectors fieldOrdinary Differential Equations: First-order homogeneous differential equations, secondorder homogeneous differential equation with constant coefficients | 8 | 30-Aug to 19-Sep | Syllabus OverviewReference booksProblem-solvingDerivations 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 sphericalsymmetry, Conservation of momentum and energy, Conservative and non-Conservativeforces, work—energy theorem for conservative forces, force as a gradient of potentialenergy. | 10 | 20-Sept to 19-Oct | Derivations andNumericalsClass test on the unit endDiscussion ofImportant questions |
| **Unit 3: Rotational Dynamics and Oscillatory Motion**Angular velocity, angular momentum, torque, conservation of angular momentum, Momentof inertia, Theorem of parallel and perpendicular axes, Calculation of moment of inertia ofdiscrete and continuous objects (1-D and 2-D).Idea of simple harmonic motion, Differential equation of simple harmonic motion and itssolution, Motion of a simple pendulum, and compound pendulum | 14 | 20-Oct to 23-November | Derivations andNumericalsDiscussion ofImportant questionsHome 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 andNumericals |
| **Unit 5: Elasticity:**Concept of stress and strain, Hooke’s law, elastic moduli, twisting torque on a wire, tensilestrength, 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, timedilation, relativistic transformation of velocity, relativistic variation of mass, mass-energyequivalence | 05 | 13 December to 28 December |  Derivation, Numerical & Revision. Solving previous year's Question papers. |