

FPYE106	Physics-I	3-0-0	3
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#### Module-I

Motion of a system of particles: centre of mass, velocity, acceleration, momentum, Equation of motion, Kinetic energy and angular momentum of centre of mass. Conservation of linear momentum and angular momentum for system of particles, moment of inertia, parallel axis theorem perpendicular axis theorem. Moment of inertia of cylinder and sphere. Rotational kinetic energy and power, g by compound pendulum (bar pendulum). Gravitational force, field potential energy and potential, gravitational potential and field at a point due to a thin spherical shell and a solid sphere.

(10 hours)

#### Module-II

Central force motion, reduction of two body problems into an equivalent one body problem, general characteristics of central force motion. Derivation of Kepler's laws of planetary motion from gravitational force.

(10 hours)

#### Module-III

Relation between elastic constants. Torsion of a cylinder, bending of beams, expression for bending moment, equation for bending, depression occurring at nth e free ends of a light, heavy cantilever. Viscosity of liquids, laminar flow through a narrow tube and poiseuille's formula surface tension-pressure difference across curved membrane.

(12 hours)

#### Module-IV

Oscillation And Waves: Simple harmonic oscillator, damped harmonic oscillator, power loss, Q-factor, overdamped motion, critical damping, forced vibration, resonance, sharpness of resonance. Mathematical description of travelling waves, wave equation. Transverse waves in a stretched string longitudinal waves in a gaseous medium, composition of simple harmonic waves. Lissajous figures.

(8 hours)

#### Essential readings:

1. Classical Mechanics- H Goldstein (Narosa )
2. Classical Mechanics-Rana And Joag (TMH)
3. Introduction to Classical Mechanics- Takwale & Purnaik(TMh)
4. Mechanics- K R Simon (Addison Wesley)
5. Mechanics-D. S Mathur (S. Chand)
6. Properties of matter- Searle and Neaman (Arnold Publication)
7. Classical Mechanics- M. Das , P.K Jena (Sri krishna Publication)
8. Classical Mechanics- Kibble