Course Title: Physics (Properties of Matters)
Course code: PHY 1201
Credits: 3
Contact Hours: 3 Hours/Week

Introduction: Overview of units and dimensions, Newton's first law of motion, Second law of motion, third law of motion, principle of conservation of linear momentum, centripetal force, centrifugal force, centrifuge and its usage, rotational kinetic energy, moment of inertia and its physical significance, angular acceleration and momentum, torque;

Harmonic Oscillation and superposition principle: introduction, simple harmonic motion, differential equation of SHM, Kinetic energy of vibrating particles, simple harmonic oscillation of a loaded spring, superposition principle, composition of two simple harmonic motions in a straight line;

Gravity and Gravitation: definition, Kepler's laws of motion and derivation of gravitation, Newton's law of gravitation, determination of G, acceleration due to gravity, simple and compound pendulums, values and variations of g, concept of mass and weight, gravitational field and potential. Gravitational field and potential at a point due to spherical shell, uniform solid sphere, hollow sphere and thin circular plate, Satellites;

Elasticity: definition, stress-strain relationship, concept of various modulus, relation between elastic constants, work done in deforming a body, twisting of a cylinder, Statistical method for the determination of modulus of rigidity, torsion pendulum, bending of beams, basic assumption for theory of bending, Cantilever, determination of elastic constants by Searle's method;

Fluid Motion, Viscosity and Low pressure: introduction, energy of a liquid in motion, Bemoulli's theorem, viscosity, Stoke's law, Poiseulille's method for coefficient of viscosity, viscometer, viscosity of gases and kinetic theory, air pump, rotary oil pump, Pirani gauge, Knudsen gauge;

Surface Tension: Introduction, surface energy and surface tension, pressure difference across a spherical surface, a curved surface, angle of contact and its determination, Capillarity, vapour pressure over flat and curved surfaces, effect of curvature on evaporation and condensation, surface tension effect, U-tube method Osmosis, osmotic pressure;

Magnet & Magnetism: Concept and types of magnetic substances, properties magnetic materials, relation between B, H & I, Terrestrial magnetism, magnetic elements of earth.

References:

Fundamentals of Physics – David Halliday, Jearl Walker, and Robert Resnick
University Physics with Modern Physics – Hugh D. Young, Roger A. Freedman
Properties of Matter – Brij Lal, N. Subrahmanyam
Elements of Properties of Matter – D. S. Mathur

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