B. Sc. II Semester
Physics Open Elective
PHY:OET Elementary Physics

Contact Hours: 56 hrs Work load: 4 hours per week
Credit Points: 4

Unit I: Units and Measurement 12 hrs

Units of measurement; systems of units; SI units, fundamental and derived units. Length, mass and time measurements; accuracy and precision of measuring instruments; errors in measurement; significant figures. Dimensions of physical quantities, dimensional analysis and its applications.

Unit II: Kinematics 16 hrs

Frame of reference, Motion in a straight line: Position-time graph, speed and velocity. Uniform and non-uniform motion, average speed and instantaneous velocity. Uniformly accelerated motion, velocitytime and position-time graphs, relations for uniformly accelerated motion (graphical treatment). Elementary concepts of differentiation and integration for describing motion. Scalar and vector quantities: Position and displacement vectors, general vectors and notation, equality of vectors, multiplication of vectors by a real number; addition and subtraction of vectors. Relative velocity. Unit vectors. Resolution of a vector in a plane – rectangular components. Scalar and Vector products of Vectors. Motion in a plane. Cases of uniform velocity and uniform acceleration – projectile motion. Uniform circular motion.

Unit III: Laws of Motion 14 hrs

Concept of force. Inertia, Newton's first law of motion; momentum and Newton's second law of motion; impulse; Newton's third law of motion. Law of conservation of linear momentum and its applications. Static and kinetic friction, laws of friction, rolling friction, lubrication. Dynamics of uniform circular motion: Centripetal force, basic examples of circular motion

Unit IV: Work, Energy and Power 14 hrs

Work done by a constant force and a variable force; kinetic energy, work-energy theorem, power. potential energy, potential energy of a spring, conservative forces; conservation of mechanical energy (kinetic and potential energies); non-conservative forces; motion in a vertical circle, elastic and inelastic collisions in one and two dimensions.

Reference books

1. Concepts of Physics I by H C Verma
2. Concepts of Physics II by H C Verma
3. Mechanics by D S Mathur ties of matter by D.S. Mathur
4. Properties of matter by D.S. Mathur
5. Properties of matter by Brijlal & Subrmanyam
6. Physics for Degree Students (B.Sc. I year) by C.L. Arora and P.S Hemne
7. Physics Vol. I by Resnick by Halliday and krane