



General Physics (1)

Course Code	Course Num.	Course Name	C.H.	Lec.	Lab.	Tut.	Pre-requisites	Co-requisites
PHY	111	General Physics (1)	3	2	0	2		

OBJECTIVES:

- Understand the motion in one, two and three dimensions as well as linear and circular motions.
- Understand and apply the Newton's law of motion, work, kinetic, potential energies and their conservation phenomena.
- Understand the concept of momentum in both linear and circular motions.

SYLLABUS:

Motion in One and Two Dimensions: Coordinate systems, Some properties of vectors, components of a vector and unit vectors, Position, Velocity, Acceleration, One-dimensional motion with constant acceleration, Freely falling objects, Two-dimensional motion with constant acceleration, Projectile motion, Uniform circular motion, Tangential and radial acceleration.

The Laws of Motion: Newton's first law and inertial frames, Newton's second law, Newton's third law, Forces of friction, Newton's second law applied to uniform circular motion, Non-uniform circular motion.

Energy of a System: Systems and environments, Work done by a constant force, Scalar product of two vectors, Work done by a varying force, Kinetic energy and the work-kinetic energy theorem, Potential energy of a system, Conservative and non-conservative forces, Relationship between conservative forces and potential energy, Energy diagrams and equilibrium of a system.

Conservation of Energy: Situations involving kinetic friction, Changes in mechanical energy for non-conservative forces, Power.

Linear Momentum and Collisions: Linear momentum and its conservation, Impulse and momentum, Collisions in one dimension, Collisions in two dimensions, Center of mass, Systems of many Particles, Deformable systems, Rocket propulsion.

Rotation of a Rigid Object About a Fixed Axis: Angular position, Velocity and acceleration. Rigid object under constant angular acceleration, Angular and translational quantities, Rotational kinetic energy, Calculation of moments of inertia, Torque, Rigid object under a net torque, Energy considerations in rotational motion, Rolling motion of a rigid object.

Angular Momentum: The vector product and torque, Angular momentum, Angular momentum of a rotating rigid object, Conservation of angular momentum, Motion of gyroscopes and tops.

TEXTBOOK:

Serway R.A. and Jewett J.W., Physics for Scientists and Engineers with Modern Physics, 9th Edition, Brooks/Cole, Belmont, CA, USA (2014).

REFERENCES:

Halliday D. and Resnick R., Physics, 9th Edition, John Wiley & Sons (2011).

