



General Physics (1)

Course Code	Course Num.	Course Name	Credit Hours	Lec	Lab	Tut	Prerequisites
PHY	101	General Physics (1)	4	4	2	0	

Objectives:

Students will develop an understanding of some of the fundamental laws of nature and their mathematical representation. This will provide them with skills in interpreting natural phenomena in terms of the motion and interaction of masses on macroscopic, microscopic and molecular levels. They will extend their understanding of macroscopic phenomena to include the effects of stationary and moving charges and the role they play in electromagnetic and atomic and nuclear interactions.

Syllabus:

- **Vectors:** Coordinate systems and frame of reference, vector and scalar quantities, some properties of vectors, components of a vector and unit vectors.
- **Motion in one dimension:** Displacement, velocity and acceleration, one dimensional motion with constant acceleration, freely falling objects, kinematics equations derived from calculus.
- **Motion in two dimensions:** Displacement, velocity and acceleration vectors, two dimensional motion with constant acceleration, projectile motion, uniform circular motion, tangential and radial acceleration, relative velocity and relative acceleration.
- **Particle dynamics:** the concept of force, Newton's first law, Newton's second law, Newton's third law, some applications of Newton's law, Newton's second law applied to circular motion, non uniform circular motion.
- **Electric field:** properties of electric charges, insulators and conductors, Coulomb's law, electric field created by one charge and group of charges, electric field lines, motion of charged particles in uniform electric field, the oscilloscope.
- **Electric potential:** potential difference and electric potential, potential difference in a uniform electric field, electric potential and potential energy due to point charges, potential of a charged conductor.
- **Current and resistance:** Electric current, resistance and Ohm's law, resistance and temperature, electrical energy and power.
- **Direct current circuits:** electromotive force, resistors in series and in parallel, kirchhoff's rules, RC circuits, electrical instruments.
- **Magnetic fields:** the magnetic field, magnetic force on a current-carrying conductor, torque on a current loop in a uniform magnetic field, motion of a charged particle in a magnetic field, the hall effect, the quantum hall effect.

References:

- **Physics for Scientists and Engineers (with modern physics)** –by Raymond A. Serway, and John W. Jewett – Brooks Cole, 2003.
- **Physics for Scientists and Engineers with modern physics**, Randall D. Knight,

