

Physics (1)	Code & No:	PHY 104
	Credits:	<u>3(2,2,1)</u>
	Pre-requisite:	PPHS 128
	Co-requisite:	None
	Level:	3

Course Description:

This course will cover the following topics: The Motion in one and two dimensions. The law of motion, Newton's laws of motion, the linear momentum and collisions. The rotation of a rigid object about a fixed axis: angular position, velocity, and acceleration. rotational kinematics, calculation of moments of inertia, relationship between torque and angular acceleration, work, power and energy in rotational motion, Static equilibrium, condition of equilibrium, elasticity, Hooke's law, Young's modulus, stress and strain, shear stress. Vibration and waves: Simple Harmonic Motion (SHM), energy in SHM, period, frequency, velocity, acceleration as function of time. Simple pendulum, wave motion and types of wave, reflection, refraction, interference and diffraction.

Course Aims:

1. Knowledge of the basic concepts of and principles of Physics.
2. Understand the basic concepts and principles of Mechanics.
3. Analyse the physical problem and learn to express mathematical equations.
4. Able to measure fundamental and physical quantities and design standard instruments.

Student Outcomes (SOs):

- (a) An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline
- (b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- (c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs
- (d) An ability to function effectively on teams to accomplish a common goal
- (e) An understanding of professional, ethical, legal, security and social issues and responsibilities
- (f) An ability to communicate effectively with a range of audiences
- (g) An ability to analyze the local and global impact of computing on individuals, organizations, and society

(h) Recognition of the need for and an ability to engage in continuing professional development

(i) An ability to use current techniques, skills, and tools necessary for computing practice.

(j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices. [CS]

(k) An ability to apply design and development principles in the construction of software systems of varying complexity. [CS]

(j) An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, and web systems and technologies. [IT]

(k) An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation, and administration of computer-based systems. [IT]

(l) An ability to effectively integrate IT-based solutions into the user environment. [IT]

(m) An understanding of best practices and standards and their application. [IT]

(n) An ability to assist in the creation of an effective project plan. [IT]

Course Learning Outcomes (CLOs):

1. Gain knowledge of the basic concepts and principles of Mechanics, which is relevant to their further studies.
2. Understand the concepts and principles of Mechanics.
3. Analyse the physical problem and learn to express mathematical equations.
4. Able to apply basic principles of Mechanics in solving problems in a structured process.
5. Gains ability to measure physical quantities, design and work with standard instruments.

SOs and CLOs Mapping:

CLO/SO	a	b	c	d	e	f	g	h	i	j	k	l	m	n
CLO1	√													
CLO2	√													
CLO3		√												
CLO4		√												
CLO5									√					

No.	Topics	Weeks	Teaching hours
1	The Motion in one and two dimensions and law of motion.	1	3
2	Newton's laws of motion, the linear momentum and collisions. Problem solving techniques	2	6
3	The rotation of a rigid object about a fixed axis: angular position, velocity, and acceleration. rotational kinematics .	2	6
4	calculation of moments of inertia, relationship between torque and angular acceleration, work, power and energy in rotational motion	2	6
5	Static equilibrium, condition of equilibrium elasticity,	1	3
6	Hooke's law, Young's modulus, stress and strain, shear stress.	2	6
7	Vibration and waves: Simple harmonic motion (SHM), energy in SHM, period, frequency, velocity, acceleration as function of time.	2	6
8	Simple pendulum, wave motion and types of wave, reflection, refraction, interference and diffraction	2	6
Total		14	42

Textbook:

- Physics, 6th Edition, Douglas C Giancoli, Pearson International Edition, 2014

Essential references:

- Physics for Scientists and Engineers with Modern Physics, 6th Edition, Raymond A Serway and John W Jewett, Thomson Brooks/Cole, 2014.