APPLIED PHYSICS(GS-102)

Pre-requisite: None
Credit Hours 02
Contact Hours 32

RECOMMENDED BOOK(S)

Sears and Zemansky's University Physics: Volume 1 – Mechanics, 12th Edition, Hugh D. Young & Roger A. Freedman
Sears and Zemansky's University Physics: Volume 2 – Electricity And Magnetism, 12th Edition, Hugh D. Young & Roger A. Freedman.

REFERENCE BOOK(S)

Physics by Resnick, Halliday and Krane: Volume 1 – 4th Edition

COURSE OBJECTIVES

Physics is the study of how the world works. This course provides an introduction to the physical world concepts that will be required in following Mechanical Engineering courses and in professional applications. The course objectives are as follows: 1. Working knowledge of fundamental physics and basic electrical and mechanical engineering principles to include advanced knowledge in one or more engineering disciplines. 2. The ability to identify, formulate, and solve engineering physics problems. 3. The ability to formulate, conduct, analyze, and interpret experiments in engineering physics

S. No.	CLO/PLOS MAPPING	DOMAIN	PLO
1	**Define** the fundamental laws of physics relevant to the engineering sciences (i.e. mechanical, electrical engineering etc.).	C1	01
2	**Apply** knowledge of basic physical laws to solve various problems of applied nature.	C3	02
3	**Analyze** different physical problems using the laws of physics from different areas like mechanics and thermodynamics.	C4	04

COURSE CONTENTS

Introduction: Scientific notation and significant figures. Units in different systems.

Vectors: Review of vectors, Vector derivatives, Line and surface integrals, Gradient of scalar.

Mechanics: Coordinate systems. Motion under constant acceleration, Newton laws and their applications, Uniform circular motion.Vortex Motion, Frictional forces.Work and energy.Potential energy, energy conservation, energy and our environment.

Electrostatics and magnetism: Coulombs law. Gauss's law.Electric field around conductors.Dielectrics.Magnetic fields.Magnetic force on current.

Semiconductor Physics: Energy levels in a semiconductor. Holeconcept. Intrinsic and extrinsic regions.Law of mass action.P-N junction.Transistor.

Waves and Oscillations: Free oscillation of systems with one degree of freedom. Classical wave equation.Transverse modes for continuous string.Standing waves.Dispersion relation for waves.

Optics and Laser: Basic introduction to Optics and Laser. Diffraction grating.Lasers, population in version.Resonant cavities.Quantum efficiency. He-Ne, Ruby and CO_2 lasers. Doppler Effect and sonic boom.

Modern Physics: Photo electric effect, Compton Effect. Bohr theory of hydrogen atom, atomic spectra, reduce mass, De-broglie hypothesis braggs law, electron microscope, Zeemaneffect, atomic nucleus, mass energy relation, binding energy, nuclear force sand fundamental forces. Exponential decay and half- life.