

Course Code	Course Name	Credits
26PH901	FOUNDATION COURSE IN PHYSICS	04

Course Objectives

- To provide students with a broad overview of physics before they engage in core courses
- To bridge the gap between the school curriculum and the undergraduate programme
- To introduce the fundamentals principles of waves, oscillations and light
- To develop an understanding of thermodynamics, electricity and magnetism
- To explore the foundational concepts of Modern Physics

Learning Outcomes

Upon successful completion of this course it is intended that a student will be able to:

- Explain the basic principles of optics, including reflection, refraction, lenses, mirrors, interference, diffraction, polarization, and LASER.
- Understand the laws of thermodynamics, heat transfer mechanisms, entropy, kinetic theory of gases, and the working principles of heat engines and refrigerators.
- Describe the basic concepts of electricity and magnetism, including electric fields, potential, capacitance, current electricity, magnetic fields, and electromagnetic induction.
- Explain the fundamental ideas of modern physics, including the photoelectric effect, atomic and nuclear structure, radioactivity, nuclear fission, and fusion.
- Apply appropriate physical units, formulas, and simple calculations to solve basic physics problems related to the topics covered.

Unit 1 - Waves and Oscillations (12 Hrs.)

Simple Harmonic Motion (SHM)-Damped and Forced Oscillations-Wave Motion: Transverse and Longitudinal Waves -Superposition Principle and Interference-Sound Waves and Doppler Effect- Relevant units of physical quantities and basic calculations.

Unit 2 – Optics (12 Hrs.)

Reflection and refraction: Laws, Snell's law, total internal reflection-Lenses, and mirrors: Thin lens formula, magnification-Wave optics: Interference, diffraction, polarization-LASER- Relevant units of physical quantities and basic calculations.

Unit 3 - Thermodynamics (12 Hrs.)

Laws of Thermodynamics-Heat, Work, and Internal Energy-Heat Transfer Mechanism-Entropy and Second Law of Thermodynamics-Kinetic Theory of Gases-Heat Engines and Refrigerators-Seebeck effect-Peltier effect - Relevant units of physical quantities and basic calculations.

Unit 4 – Electricity and Magnetism (12 Hrs.)

Coulomb's Law and Electric Fields-Gauss's Law -Electric Potential and Capacitance-Current, Resistance, and Circuits-Magnetic Fields and Forces-Faraday's Law of Electromagnetic Induction- Relevant units of physical quantities and basic calculations.

Unit 5 - Modern Physics (12 Hrs.)

Photoelectric Effect and Dual Nature of Light -Atomic nucleus-atomic number, Mass number, Isotopes-nuclear binding energy-Radioactivity-Nuclear Force-Artificial radioactivity-nuclear fission-nuclear fusion.

Reference Books:

1. Halliday Resnick, (2009). Fundamentals of Physics, (8thEd) extended.
2. Verma, H. C. (2021). Concepts of physics. (Vol 1) and 1st Edition, BharatiBhawan (Publishers & Distributors).
3. Young, H. D., Freedman, R. A., & Ford, A. L. (2021). University physics with modern physics, (15th Ed.). Pearson Education.

Websites and eLearning Sources:

1. <https://nptel.ac.in/courses/112103108>
2. <https://www.youtube.com/watch?v=fkSsV5Wdprs>
3. <https://www.youtube.com/watch?v=RjukxPsaHsg>

COs and Bloom's Taxonomy Mapping – 26PH901

Course Outcomes	On successful completion of this course, students will be able to	BTL
CO1	Recall fundamental concepts of waves, optics, thermodynamics, electricity, and modern physics	K1, K2
CO2	Explain physical principles of oscillations, optics, and thermodynamic systems	K3
CO3	Apply physical laws and formulas to solve basic problems	K4
CO4	Analyze physical phenomena in electricity, magnetism, and modern physics	K5
CO5	Evaluate and design solutions using fundamental physics concepts	K6

BTL (Bloom's Taxonomy Level) - K1 – Remembering, K2 – Understanding, K3- Applying, K4 – Analyse, K5- Evaluate and K6 - Create

Relationship Matrix – 26PH901

Course Outcomes	Programme Outcomes (POs)						Programme Specific Outcomes (PSOs)						Mean Score of Cos
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	
CO1	3	2	1	1	1	1	3	2	1	1	1	1	1.50
CO2	3	2	2	1	1	1	2	2	2	1	1	1	1.67
CO3	3	3	2	1	1	1	2	2	3	2	1	1	1.92
CO4	3	3	2	2	1	1	2	3	3	2	2	1	2.08
CO5	2	2	3	2	2	2	2	2	3	2	2	2	2.17
Total													1.87

Mean Score: 3- High, 2- Medium/Moderate, 1-Low

