

COURSE DESCRIPTION

Title: Physics-I

Course Code: 10B11PH111

Objective

Broadly, the study of Physics improves one's ability to think logically about the problems of science and technology and obtain their solutions. The present course is aimed to offer a broad aspect of those areas of Physics which are specifically required as an essential background to all engineering students for their studies in higher semesters.

Learning outcomes

At the end of the course, the students will have sufficient scientific understanding of different phenomena associated with light, relativity, statistical physics, atomic physics, lasers.

Course Outline

Physical Optics:

Analytical treatment of interference, Intensity distribution of fringe system, Fresnel's biprism, Newton's rings, Diffraction (limited to Fraunhofer class) from Single slit, double slit and Diffraction grating, Polarization, Phenomenological understanding of Birefringence, compensators and wave plates, Production and analysis of completely polarized light. Optical activity.

Relativity:

Michelson-Morley experiment, Lorentz transformations, Addition of velocities, Mass variation with velocity, Mass-energy relation.

Statistical Distributions:

Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac distributions and their applications.

Radiation Physics:

Black body radiation, Wein's law, Rayleigh Jeans law, Planck's law of radiation, Compton scattering.

Atomic Structure:

Origin of spectral lines, spin and orbital angular momentum, Quantum numbers, Atoms in magnetic field, Zeeman effect.

Lasers:

Principle and working of laser, Different types of lasers (He-Ne Laser, Ruby Laser)

Methodology

The course will be covered through lectures supported by tutorials. In tutorials, apart from the discussion on the topics covered in lectures, assignments in the form of questions will be given. Students will be required to be regular in the course and complete the assignment by their own but if needed difficulties will be discussed in the tutorials. There will be at least two class tests/ surprise tests conducted in the whole semester.

Evaluation scheme

Instrument	Duration	Marks
Mid Semester test	2 hour	30
End Semester test	3 hour	45
Assessment	Full Semester	25

Text Books

1. H.K. Malik and A.K. Singh, Engineering Physics, Tata Mc Graw Hill International.
2. A. Beiser, Concepts of Modern Physics, Mc Graw Hill International.
3. BrijLal and Subramanyam, Hemne, Heat, Thermodynamics and Statistical Physics, S. Chand Ltd

Reference Books

1. Ghatak, *Optics*, Tata McGraw Hil
2. Serway, Moses, Moyer, Modern Physics, Cengage Books