

Physics-I: Course Content

1. Faculty: FPS
2. Course Code: PHY001
3. Course Title: Physics-I
4. Number of Credits: 3 (2+1)
5. Course objectives: Physics-I imparts knowledge to understand the basic concepts of nature around us and to implement this knowledge for analysing and solving various critical problems. The course is designed for students with no experience in Physics, make them understandable to the point where they can gain knowledge from the natural phenomenon occurring and apply this basic knowledge to solve the practical problems. The course introduces the fundamental concepts in order to understand the advances in technology for practical applications. At the end of the course, the students will be able to discuss the basic characteristics of light and describe the basic difference between diffraction, interference, and polarisation. The students will be able to understand the dual nature of light through these topics. Minimum prerequisites for taking this course, if any: Higher secondary education qualified from any government-approved education board
6. Course structure with units, if applicable:

Module I: Interference

Interference of waves: Interference of light by amplitude division, Interference of light by division of wavefront, Young's double slit experiment, Phase difference, Path difference, Conditions for interference, Types of interference, Theory of interference fringes, Interference in thin films, Newton's ring experiment, Fresnel's biprism experiment, Radius of dark fringes, radius of bright fringes, path difference and phase difference in both type of fringes, Michelson's interferometer.

Module II: Diffraction

Diffraction: Diffraction due to single slit, Diffraction due to double slit, difference between Interference and diffraction, Types of diffraction, diffraction grating, Dispersive power of a grating, Diffraction due to n-slits, analytical treatment of bright and dark bands, resolving power of a telescope and grating.

Module II: Polarisation

Polarisation of light, Polarized and unpolarized light, Brewster's law, Law of Malus, Phenomenon of double refraction, uniaxial & biaxial crystals, positive and negative crystals, Nicol prisms as a polarizer and analyser, Quarter wave plate, half wave plate, Polarimeter, specific rotation, Laurent's half shade and full shade Polari meter.

5. READING SUGGESTIONS:

- John W. Jewett & Raymond A. Serway (2017). Physics for Scientists and Engineers. Cengage India Private Limited
- Jacob Millman & Charistos C. Halkias (2017). Integrated Electronics. Mc-Graw Hill.
- Eugene Hecht (2019). Optics. Pearson.

- Halliday D., Resnick R. & Walker J. (2020). Fundamentals of Physics. Wiley Publications.

ASSESSMENT CRITERIA:

- Quiz-1: 10%
- Quiz-2: 10%
- Lab assignments: 20%
- Mid-Semester Examination: 20%
- End-Semester Examination: 40%

Physics Lab-I
Course code: PHY310

List of Experiments:

1. (a) To measure the diameter of a small spherical/cylindrical body by using vernier calipers.
(b) To measure the diameter of a wire by a screw gauge and find its volume.
2. To determine the acceleration due to gravity by using a simple pendulum.
3. To determine the value of “g” by Bar Pendulum.
4. To determine the frequency of A C mains using Sonometer.
5. To determine the wavelength of He-Ne laser using a diffraction grating.
6. To find the wavelength of sodium light by Newton’s ring experiment.
7. To determine the resolving power of a telescope.
8. To calibrate a polarimeter and hence to determine the concentration of sugar solution.

