

PHY112: Physics UG Lab

Programme: B.Tech. (1st year)

Year: 2016-17

Semester : January - May

Course : Core Laboratory

Credits : 2

Hours : 36

Course Context and Overview :

This course involves laboratory work on standard experiments based on basic Physics topics in the fields of Classical Mechanics, Optics, Electrodynamics, Wave Mechanics and Semiconductor Physics. The experiments are chosen on the basis of their relevance to the Physics core courses undertaken by the UG students, and are meant to enhance their understanding of theoretical concepts by applying them to experimental scenarios.

Prerequisite Courses: None

Course outcomes (COs):

On completion of this course, the students will have:
CO1: Hands-on experience with standard Physics experiments commensurate with the knowledge imparted in the basic Physics core courses
CO2: The benefit of observing the actual demonstration and application of physical phenomena, and the resultant ability to correlate between theory and experiment
CO3: A knowledge of the techniques of laboratory work in terms of using measuring instruments correctly and ensuring accuracy
CO4: An understanding of the concept of experimental determination of physical quantities, with a special emphasis on error analysis and the sources of experimental errors, which is crucial for any real-life measurement
CO5: The ability to process information obtained from experiment outputs, present it in the form of graphs and derive results congruent with standard values

Course Topics:

S.No	Experiments to be conducted
1.	Error analysis and graph plotting

2.	Measurement of acceleration due to gravity with Bar Pendulum
3.	E/m of electron by Thomson Method
4.	Measurement of semiconductor band gap by Four Probe Method
5.	Measurement of refractive index of glass with Prism
6.	Measurement of wavelength of sodium light by Newton's Rings
7.	Magnetic field study with Helmholtz Coils
8.	Study of Electromagnetic Induction by Faraday setup
9.	Study of Mechanical Waves
10.	Single-slit Fraunhofer Diffraction
11.	Diffraction Grating

Textbook references:

1. UG Physics Lab Manual (prepared by LNMIIT Physics Dept)
2. For Mechanics experiments: An Introduction to Mechanics, D. Kleppner (Cambridge University Press)
3. For Optics experiments: Optics, A. Ghatak (Tata Mc.Graw-Hill)
4. 3) For Electromagnetics experiments: Introduction to Electrodynamics, D.J. Griffiths (Prentice Hall International)
5. 4) For Semiconductor Physics experiments: Semiconductor Physics and Devices, D.A. Neaman (Tata Mc.Graw-Hill)

Additional Resources (NPTEL, MIT Video Lectures, Web resources etc.):

- Video lectures prepared by the faculty members of LNMIIT Physics Department.

Evaluation Methods:

Item	Weightage
Lab Record and class performance	40
End Semester Exam	60

Instructors:

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