Course Name Physics Laboratory

Course Code PH(EE)291

Course Credit 2

Contact Hour 3L

Prerequisite

Course Objective

The course objectives are:

1. To provide an adequate exposure and develop insight about the basic physics principles along with the possible applications.
2. The acquaintance of basic physics principles would help engineers to understand the tools and techniques used in the industry and provide the necessary foundations for inculcating innovative approaches.
3. To create awareness about the vital role played by science and engineering in the development of new technologies.
4. Necessary exposure to the practical aspects, which is an essential component for learning science.

Course Outcome

On completion of the course students will be able to

1. Define, understand and explain
   - various types of error appearing in experiments and related analysis
   - bending of light in grating
   - electron transition within atoms
2. Apply the knowledge of
   - superposition principle in Newton's ring, Fresnel's biprism, laser diffraction
   - Wheat stone bridge in Carey Foster bridge experiment
   - Basic circuit analysis in LCR circuits
3. Analyze
   - Why energy levels in an atom are discrete
   - Sources of error in different cases of measurements
4. Design and realize
   - LASER, Optical fibre
   - Interference by division of wave front, division of amplitude, diffraction grating, polarization of light
   - Quantization of electronic energy inside an atom
   - Torsional pendulum
5. Communicate effectively, write reports and make effective presentation using available technology
   - on presentation of laboratory experiment reports
   - on presentation of innovative experiments
6. Engage in independent self-study to formulate
   - experiments beyond the syllabus such as study of Cross grating, bending of laser beam etc.

CO Mapping with departmental POs

H: High, M: Medium, L: Low

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	√											
CO 2		√										
CO 3			√									
CO 4	√	√	√	√		√			√	√		
CO 5			√							√		

CO6			√	√	√	√			√			√

Course Content:

List of experiments:

General idea about Measurements and Errors (Mandatory):

Measurand (objects to be measured) precision, significant number., accuracy, certainty, resolution; Errors - types and sources of errors (definitions and examples), Systematic error, Random error, Ambiguity error, Dynamic error, with example of Slide calipers, Screw-gauge, Carrey Foster bridge. Study of different types of unit cells with model system.

Experiments on Classical Mechanics:

1. Study of torsional oscillation of torsional pendulum & determination of time period using various load of the oscillator.
2. Experiments on Lissajous figure (using CRO).
3. Study of LCR circuit using ac signal and determination of Q factor.

Experiments on Optics:

4. Determination of wavelength of light by Newton's ring method.
5. Determination of wavelength of light by Fresnel's bi-prism method.
6. Determination of wavelength of light by Laser diffraction method.
7. Determination of numerical aperture and the energy losses related to optical fibre experiment
8. Study of Hydrogen/ Helium spectrum using transmission grating and measurement of Rydberg Constant.
9. Inspection of Laser beam profile-to find beam divergence.
10. Study of half-wave and quarter wave plates.
11. Measurement of specific rotation of an optically active solution by polarimeter

Experiments on electromagnetic theory:

12. Measurement of nodal and antinodal points along a transmission wire and measurement of wave length.

Experiments on Quantum Mechanics I

13. Verification of Bohr's atomic orbital theory through Frank-Hertz experiment.
14. Measurement of Stopping potential using a photocell and determination of Planck's Constant.