Centre for High Energy Physics
Faculty of Science
University of the Punjab, Lahore

Course Outline

Program	BSCP	Course Code	CPHY 333L	Credit Hours	1

Course Title	Modern Physics Lab

Course Introduction

Provides the basics of modern physics and optics through Lab work.

Learning Outcomes

The Lab covers the advance experiments in modern physics and optics. After the completion of the Lab students will be able to:

1. Verify the various result in modern physics, optics, and nuclear physics.
2. Learns different techniques of analyzing and presenting scientific data.

Course Content

1	• Determination of e/m of an electron • Ionization potential of mercury
2	To study the characteristic curves of a G.M. counter and use it to determine the absorption co-efficient of Beta particle in Aluminum
3	• Determination of range of Alpha particles • Mass absorption coefficient of Pb for gamma using G.M. counter
4	Measurement of wavelengths of sodium light, difference of wave lengths and thickness of thin film e.g., mica using Michelson interferometer
5	• The study of spectra using Fabry-Perot interferometers • To study some aspects of Ferromagnetism by drawing B-H curve
6	Measurement of speed of light using laser source rotating mirror method
7	• To measure the wave length of light by Fresnel biprism • Study of sound with help of Noise-Level meter.
8	• To determine e/m of an electron using a fine beam tube • To study the Hall effect in an n-type/p-type semiconductor or a metal
9	• To measure the critical potential of mercury by Frank-Hertz Method. • To measure the Planck's constant by studying photoelectric effect.
10	• To measure work function of metal and verification of Richardson's equation. • Determination of dielectric constant of liquid and solid.
11	Determination of dielectric constant of liquid and solid.
12	To determine the characteristic of G. M. tube and measure the range and maximum energy of beta particles
13	To determine the charge of an electron by Millikan's oil drop method.

14	Characteristics of G.M. counter and study of fluctuations in random process.
15	• To determine half-life of radiative element. • To study random fluctuations in decay rate of unstable nucleus.
16	To study inverse square law of radiation propagation.
(Note: Any eight experiments can be performed subject to the availability of apparatus.)	

Teaching Learning Strategies

The instructor is required to give a background of the theory relevant to the experiments, working of the equipment used, and the analysis of the experimental data using Mathematica/Maple/Python/Excel. The students are required to apply various analysis techniques including errors, fitting, and visualization etc. They are also required to submit a report including their data, results of fits, plots or results of any analysis method applied.

Assignments: Types and Number with Calendar

At least two assignments and two quizzes. A course project may also be assigned.

Assessment

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester.At least fifty percent of the question paper would involve new problems related to the concepts learned in the course. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.