



Course Description

PHY2053L | Physics (without Calculus) 1 Laboratory | 1.00 credit

This laboratory course is designed to complement PHY2053. Students will engage in hands-on experiments that reinforce theoretical concepts related to kinematics, dynamics, energy, momentum, rotational motion, fluid dynamics, oscillatory motion, and waves. Through practical applications of algebra and trigonometry, learners will develop analytical skills while conducting experiments that illustrate key physical principles. The course emphasizes critical thinking and problem-solving as students collect and analyze data, interpret results, and communicate their findings effectively. This lab experience aims to deepen students' understanding of the scientific concepts covered in the parent course and their relevance to real-world situations.

Course Competencies:

Competency 1: The student will demonstrate proficiency in laboratory techniques by:

1. Setting up and calibrating experimental apparatus for various physics experiments
2. Conducting experiments to investigate principles of kinematics and dynamics
3. Measuring physical quantities accurately using appropriate tools and methods
4. Recording experimental data systematically and maintaining a detailed laboratory notebook
5. Implementing safety protocols while performing laboratory procedures
6. Troubleshooting experimental setups to ensure reliable results
7. Analyzing the consistency of measurements and identifying potential sources of error

Competency 2: The student will apply algebraic and trigonometric concepts to practical experiments by:

1. Designing experiments to test hypotheses related to motion and forces
2. Utilizing algebraic equations to analyze relationships between variables in experiments
3. Applying trigonometric functions to resolve vector components in motion studies
4. Investigating energy transformations through practical applications in experiments
5. Exploring fluid dynamics by measuring flow rates and pressure changes in controlled setups
6. Examining oscillatory motion through experiments with springs and pendulums
7. Analyzing wave properties by conducting experiments on sound or light waves

Competency 3: The student will develop data analysis and interpretation skills by:

1. Organizing and presenting experimental data using tables, graphs, and charts
2. Applying statistical methods to evaluate the precision and accuracy of measurements
3. Interpreting graphical representations of motion, such as position vs. Time graphs
4. Identifying trends and patterns in collected data related to physical principles
5. Drawing conclusions based on data analysis, supporting evidence, and theoretical concepts
6. Comparing experimental results with theoretical predictions to evaluate consistency
7. Communicating findings effectively through written reports and presentations

Competency 4: The student will enhance critical thinking and problem-solving abilities through laboratory activities by:

1. Formulating research questions based on experimental observations and outcomes
2. Applying analytical reasoning to solve complex physics problems encountered during experiments
3. Collaborating with peers to discuss experimental designs, methodologies, and results
4. Evaluating different approaches to address real-world physics problems through experimentation
5. Reflecting on the implications of experimental findings for broader scientific concepts
6. Integrating knowledge from the parent course to address interdisciplinary challenges in physics
7. Proposing innovative solutions based on experimental insights and theoretical understanding

General Education Learning Outcomes:

- Use quantitative analytical skills to evaluate and process numerical data
- Solve problems using critical and creative thinking and scientific reasoning
- Formulate strategies to locate, evaluate, and apply information