Miami Dade College

Course Description

PHY3101L | Modern Physics Laboratory | 1.00 credit

This course is a laboratory course designed to enhance the student's practice and understanding of areas of physics that lie beyond the scope of classical mechanics, thermo-dynamics and electromagnetism. These areas are covered in PHY 3101. While the main purpose of the course is to promote scientific understanding, the student will also acquire and demonstrate skills in the observation, measurement, recording, analysis, and reporting of experimental data. Prerequisites PHY 2049, MAP 2302; corequisite: PHY3125.

Course Competencies

Competency 1: The student will demonstrate knowledge and comprehension and application of laboratory techniques by:

1. Handling laboratory equipmentaccording to operating instructions and safety guidelines.
2. Recording data in a laboratory notebook in a clear organized manner, following accepted guidelines.
3. Recording data with the proper number of significant figures.
4. Obtaining results whose precision and accuracy are appropriate for thespecific activity and offering careful explanation when they are not.
5. Performing appropriate statistical analysis of experimental results.
6. Reporting experimental resultsfollowing accepted guidelines.

Competency 2: The student will demonstrate knowledge, comprehension, analysis and application of the scientific process by:

1. Writing experiment conclusions, which properly connect theoretical predictionand experimental results.
2. Limiting the scope of experiment conclusions to that justified by experimental results.
3. Adjusting experiment design as circumstances require in order to optimize experimental results and conclusions.

Competency 3: The student will demonstrate knowledge, comprehension and analysis of the selected concepts in modern physics by:

1. Performing experiments in a manner consistent with an understanding of the underlying modern physics topics. Experiments include: The Michelson- Morley interferometer Measurement ofthe speed of light using different methods Determination of the charge of the electron Determination of the ratio e/m for the electron Analysis of atomic spectra, the photoelectric effect The Franck-Hertz experiment Nuclear magnetic resonance and electron spin resonance Microwave optics Radioactivity X-ray diffraction Bubble chamber simulations.
2. Writing lab reports which show evidence that the underlying concepts are well understood.
3. Designing an experiment that tests a selected modern physics topic.

Learning Outcomes:

1. Computer / Technology Usage
2. Critical Thinking
3. Information Literacy
4. Numbers / Data