

## **Educational Goals for Physics Students & Assessable Learning Outcomes**

### **PHY 241 FUNDAMENTALS OF PHYSICS I LABORATORY / 1 credit**

Experimental techniques for Fundamentals of Physics I. Corequisite: PHY 240 (/210).

#### **Physics Program Objectives**

There are several general goals of the Physics program that students completing the physics program should have. A non-exhaustive list of these program objectives include:

- (a) Ability to perform a mathematical formulation of a physical system
- (b) Ability to discuss (mathematically and linguistically) a physical system drawing upon a well-developed foundation built upon physical fundamentals.
- (c) Ability to formulate complex arguments based upon physical foundations and which are testable by experimentation.
- (d) Ability to produce technologically enabled students with an understanding of the basis for experimental design.

#### **non-exhaustive list of intended learning outcomes follows**

- (a) Perform simple experiments designed to complement classroom material.
- (b) Analyze data collected in a systematic manner and explore the compliance of this data with anticipated theoretical results.
- (c) Write a detailed technical report covering the particular experiment at hand.
- (d) Ability to discuss with colleagues the physical system under study.
- (e) Develop an experiential-based method of inquiry leading to a scientifically creative individual.

The present incarnation of the lab experiments is composed of the following experiments:

- (1) Forces and Force Tables (hands-on experience with vectors)
- (2) Motion in 1 and 2 dimensions
- (3) Inclined planes and friction (statics, dynamics and non-conservative forces)
- (4) Atwood's Machine, Mechanical Advantage, Work and Energy
- (5) Centripetal Force and Hooke's Law.
- (6) Static Equilibrium
- (7) Simple Harmonic Oscillation
- (8) Standing Waves and Vibrations
- (9) Archimedes' Principle and Pressure
- (10) Thermodynamics (linear expansion and calorimetric measurements)