PHYC 143 General Physics 2 Laboratory

Course Description

The laboratory component to accompany PHYC 142. Similar in content to the laboratory that is integrated with PHYCS 122. Online laboratory experiments are performed. (1 credit hour)

Prerequisite or parallel: PHYC 142.

Not open to students who have credit in PHYC 122.

Course Objectives

This course represents the laboratory component that traditionally accompanies the general physics courses. In contrast with PHYC 122 in which the laboratory component is integrated within the single course, PHYC 143 (together with the companion course PHYC 142) decouples the laboratory from the content part of the course. By so doing, additional scheduling flexibility is provided to the student. Also, the combination of PHYC 142 and PHYC 143 is designed to facilitate the use of self-paced individualized learning environments through the extensive use of computer technology. The objectives for this approach remain the same as the traditional laboratory setting - to have the student learn how laboratory work and measurement play key roles in the development and verification of physical laws and theories.

Course Rationale

Laboratory exercises will consist of a combination of computer simulations and hands-on work. There may be a necessity for students to perform a couple of experiments on campus at the Department of Physics and Astronomy teaching laboratory. Others may be accomplished in whole or in part through computer simulation. Lab reports will be prepared by the students and may be delivered either by electronic or traditional mail.

Course Content, Format, and Bibliography

Content

The Ideal Gas Law

Equipotentials and Electric Fields

Measurement of Electrical Resistance and Ohm's Law

Voltmeters and Ammeters

The RC Time Constant

Kirchhoff's Rules

Magnetic Induction of a Current-Carrying, Long, Straight Wire

Alternating Current LR Circuits

Alternating Current RC and LCR Circuits

Reflection and Refraction with the Ray Box

Focal Lengths of Lenses

Diffraction Grating Measurement of the Wavelength of Light

Geiger Counter Measurement of the Half-Life of 137Ba (Optional)

Absorption of Beta and Gamma Rays (Optional)

Methods of evaluating student performance

Course grades will be based on the student's performance on two exams (midterm and final) and laboratory reports submitted for each of the lab exercises. The lab reports will typically be prepared in a formal fashion using word processor and spreadsheet tools. Exams may, in part, be laboratory based.

Format

Experiments to be performed will be selected from the following illustrative list. One laboratory exercise will be accomplished for each major topic in the content part of the course. An important component of this laboratory will be the use of computer simulations for electrical circuit experiments.

Bibliography