PHY 211/221/212/222: General Physics I and II

PHY 211/221/212/222
General Physics I and II
(8 credit sequence)
Class Size: 10-20

Faculty: Carl Rosenzweig, Professor Emeritus, Syracuse University
Administrative Contact: Eric Young, Senior Associate Director, Project Advance

Course Catalog Description

PHY 211, General Physics I: First half of a two semester introduction to classical physics including mechanics and thermal physics. Uses calculus. Knowledge of plane trigonometry required.

PHY 212, General Physics II: Second half of a two semester introduction to classical physics including electricity, magnetism and light.

PHY 221, General Physics Laboratory I: Techniques of laboratory work: treatment of random errors, graphical representation of data. Experimental demonstration of principles of mechanics, thermodynamics, and waves (of vector forces, conservation of momentum and energy, thermal properties of gases).

PHY 222, General Physics Laboratory II: Experimental study of principles of electromagnetism and their application in electrical circuits. Use of electronic instruments, such as the oscilloscope.

Course Overview

PHY 211 introduces the basic concepts in general physics, including kinematics, motion in 1D and 2D, Newton’s laws and rotational motion. After completing this course, students will be able to apply the basic principles of physics to describe, predict and analyze simple motion in a wide range of phenomena. Student co-register for PHY 221, the lab course that provides hands-on intuition about general physics covered in the PHY 211 lecture course while developing practical laboratory skills.

In Physics 212, you will learn about electricity, magnetism, and the unification of the two: electromagnetism. The objectives of this course are (1) To develop a basic understanding of the laws of electromagnetism; (2) to develop the ability to apply these new concepts, both qualitatively and quantitatively, to familiar and unfamiliar physical situations. Student co-register for PHY 222, the lab course that provides hands-on intuition about general physics covered in the PHY 212 lecture course while developing practical laboratory skills.

Pre- / Co-requisites

PHY 211 COREQ: (PHY 221 OR AP PHYSICS C (MECH) EXAM SCORE MIN 3) AND (MAT 285 OR MAT 295 OR AP MAT CALC AB EXAM SCORE MIN 3 OR AP MAT CALC BC EXAM SCORE MIN 4)

PHY 212 PREREQ: ((PHY 211 OR PHY 215) AND PHY 221) OR AP PHYSICS C MECH EXAM SCORE MIN 3

PHY 212 COREQ: (PHY 222 OR AP PHYSICS C ELEC & MAG EXAM SCORE MIN 3) AND (MAT 286 OR MAT 296 OR AP MAT CALC BC EXAM SCORE MIN 4 OR AP MAT AB EXAM SCORE MIN 4)

PHY 221 COREQ: PHY 211 OR PHY 215

PHY 222 COREQ: PHY 212 OR PHY 216

Course Objectives

- Demonstrate a basic understanding of the laws of Newtonian mechanics
- Be able to use these concepts to familiar and unfamiliar situations
- Be able to analyze and solve simple problems involving mechanical phenomena
- Understand the role that Newtonian mechanics plays in the laws of nature and modern society.
- Develop a basic understanding of the laws of electromagnetism;
- Develop the ability to apply these new concepts, both qualitatively and quantitatively, to familiar and unfamiliar physical situations

- Develop an appreciation for the essential role that electromagnetism plays both in our modern society and in the natural world

- Practice and develop mathematical tools for understanding scientific phenomena
- Practice and develop critical thinking skills, written, and oral communication skills

Laboratory

PHY 221 required concurrently with PHY 211 and PHY 222 required concurrently with PHY 212.

Required Materials

University Physics Volume 1 by OpenStax.
(Available in e-book form for free at https://openstax.org/details/books/university-physics-

volume-1)

University Physics Volume 2 by OpenStax (Available in e-book form for free at https://openstax.org/details/books/university-physics-volume-2)

Scientific calculator

Instructor Recommendations

N/A