

Common Course Outline

PHYS 151

General Physics I

4 Semester Hours

The Community College of Baltimore County

Description

PHYS 151 -- 4 Credits--General Physics I includes Newtonian mechanics, kinematics and dynamics of translational, rotational, and simple harmonic motions, momentum, energy and gravitation; serves as the first course in a set of three calculus-based courses in the basic principles of physics for students who plan to major in engineering, mathematics or physical sciences. The course demands a mathematical knowledge of algebra, trigonometry and calculus.

4 credits: 3 lecture hours per week and 3 hours of lab per week.

Prerequisites: MATH 251 and high school physics or PHYS 101 or instructor's permission

Overall Course Objectives

Upon completion of this course the student will be able to:

1. solve problems analyzing uniformly accelerated motion;
2. apply Newton's Laws of Motion to problems of force analysis;
3. analyze circular motion;
4. apply Newton's Law of Universal Gravitation;
5. solve the Conservation of Energy condition in mechanical systems;
6. apply the Conservation of Linear Momentum for collision analysis;
7. analyze rotational motion;
8. apply force and torque analysis to static systems;
9. solve the elementary equation of motion of the simple harmonic oscillator;
10. perform vector addition by the graphical and component methods;
11. analyze and execute vector scalar product and vector product operations;
12. appreciate the merits of collaborative learning in the assigned projects and investigations by working in groups;
13. appreciate the universal applicability of the laws of physics making them the intellectual property of all cultures and segments of humankind by using in various examples;
14. apply the laws of physics to study motion of objects, and
15. write coherent and presentable laboratory reports.

Major Topics

1. Measurement
2. Motion in One-Dimension

3. Vectors
4. Motion in Two and Three Dimensions
5. Force and Newton's Laws
6. Particle Dynamics
7. Work and Energy
9. Systems of Particles
10. Collisions
11. Rotational Kinematics
12. Rotational Dynamics
13. Angular Momentum
14. Equilibrium of Rigid Bodies
15. Oscillations
16. Gravitation

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member but will include the following:

Lecture: A minimum of three examinations, quizzes, and a final examination. This will make up 80% of the grade.

Laboratory work: A minimum of 10 Labs. This will make up 20% of the grade.

Writing: Written laboratory reports will be required on a weekly basis.

Other Course Information

This course may be used to fulfill four credits of the General Education requirement in Biological and Physical Sciences.

This course is the first course in a three-course set.

Individual faculty members may include additional course objectives, major topics, and other course requirements to the minimum expectations stated in the Common Course Outline.

Date Revised: 10/16/09