

# Common Course Outline

## PHYS 101

### Fundamentals of Physics I

4.00 Semester Hours

## The Community College of Baltimore County

### Description

**Fundamentals of Physics I** is a first semester course in the basic principles of physics. Topics include Newtonian mechanics, kinematics, dynamics, statics, momentum, energy, and heat energy. This course is appropriate for students expecting to apply to one of the health care professional schools (e.g. medical, physical therapy, pharmacy, dental, etc.) and also for students in certain technical programs which require physics (e.g. electronics, computer service, architectural drafting, etc.). Students who are intending to major in engineering, mathematics or physical sciences are required to take the PHYS 151, 251 and 252 sequence.

*4 credits: 3 lecture hours and 3 laboratory hours per week. Prerequisites: MATH 135 or any higher level Math course and RDNG 052 or ESOL 054 or LVR2. This lab course may be used to fulfill 4 credits of the General Education requirement in Biological and Physical Sciences.*

### Overall Course Objectives

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

1. Solve problems analyzing uniformly accelerated motion. (I, III, VI), (1, 3)
2. Apply Newton's Laws of Motion to problems of force analysis. (I, III, VI), (1, 3)
3. Analyze circular motion. (I, III, VI), (1, 3)
4. Apply Newton's Law of Universal Gravitation. (I, III, VI), (1, 3)
5. Solve the Conservation of Energy condition in mechanical systems. (I, III, VI), (1, 3)
6. Apply the Conservation of Linear Momentum for collision analysis. (I, III, VI), (1, 3)
7. Analyze rotational motion. (I, III, VI), (1, 3)
8. Apply force and torque analysis to static systems. (I, III, VI), (1, 3)
9. Solve elementary problems pertaining to the simple harmonic oscillator. (I, III, VI), (1, 3)
10. Perform vector addition by the graphical and component methods. (I, III, VI), (1, 3)
11. Be able to perform a slope and intercept analysis for linear, power law, and exponential data sets. (II), (2, 4, 5, 6)
12. Organize and carry out a laboratory investigation. (IV, III, VI), (1, 2, 3, 4, 6)
13. Understand and appreciate the merits of collaborative learning in the laboratory. (III, VI), (1, 2, 3, 4, 6)
14. Write a coherent and presentable laboratory report. (II, III), (2, 4, 5, 6)
15. Appreciate the universal applicability of the laws of physics making them the intellectual property of all cultures and segments of humankind. (I, V), (4, 7)
16. Apply the laws of physics. (I, IV), (4, 7)
17. Write coherent and presentable laboratory reports. (II,III,V,VI) (2,4,5,6,7)

## **Major Topics**

### **Introduction**

- The Nature of Physics
- Fundamental Quantities and Standard Units
- Dimensional Analysis
- Conversion of Units

### **Motion in One-Dimension**

### **Vectors and Motion in Two Dimensions**

### **Newtonian Dynamics**

### **Circular Motion and Universal Gravitation**

### **Work and Energy**

### **Linear Momentum and Collisions**

### **Rotational Dynamics and Statics**

### **Periodic Motion**

### **Temperature, Heat, and Internal Energy**

## **Course Requirements**

Grading/exams: Grading procedures will be determined by the individual faculty member but will include the following: a minimum of three examinations, quizzes, a final examination and laboratory reports. Written laboratory reports will be required on a more or less weekly basis.

## **Other Course Information**

This course is a General Education core course and a Biological and Physical Sciences elective.

This course is the first course in a two-course sequence.

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