



## U754-103: General Physics I

**Course Format:** Online

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**Course credits:** 3

**Pre/Corequisites:** None; Appropriate for advanced high school and first-year or higher college students.

**Course Description:** General Physics I is a traditional, non-calculus-based, first semester physics course broken into three themes. You will study motion in one dimension, vectors and two-dimensional motion, and the laws of motion; work and energy, momentum and collisions, circular motion and the law of gravity, rotational equilibrium and rotational dynamics, and solids and fluids; and thermal physics, heat, the laws of thermodynamics, vibrations and waves, and sound.

### Required Course Materials

- R. A. Serway and C. Vuille, *Essentials of College Physics*, 1<sup>st</sup> ed. (Brooks/Cole, 2007). ISBN-13: 978-0495106197
- Scientific pocket calculator. A simple one will do (you don't need a graphical display model).

### Optional/Recommended Course Materials

- R. A. Serway and C. Vuille, *Student Solutions Manual/Study Guide, Volume 1*. ISBN-13: 978-0495107811

### Hardware Requirements

You will need a webcam, speakers, and microphone. You will complete your exams through an online proctor, requiring all three components.

### Course Learning Objectives

- Employ the equations of motion to determine how a force acts upon a point mass.
- Decompose vectors such as force, acceleration, and velocity into x- and y-components.
- Relate changes in energy (kinetic and potential) to the work done on an object, and also to determine how these changes in energy relate to the motion of an object.
- Employ the equations of motion to determine how a torque generates rotational momentum in an object.
- Decompose vectors such as torque and angular momentum into x- and y-components.
- Calculate the forces and torques necessary to either rotate an object at a constant speed, or to prevent it from rotating or moving at all.
- Solve equations dealing with heat transfer between two objects, using concepts such as specific heat.
- Relate concepts such as temperature and temperature to microscopic properties of a gas, such as the mean velocity of the molecules.
- Use concepts such as entropy and work to determine the efficiency of idealized heat engines (the Carnot cycle).
- Calculate the relation between work, energy, and motion for a simple harmonic oscillator.
- Calculate the properties of waves (sound) such as the relationship between frequency, wavelength, and velocity of a wave, and the effects motion on sound propagation.



### Course Overview

General Physics I is broken into three main topics, each of which consists of written assignments and an associated exam. The basic structure of the course is as follows:

MODULE #	MODULE TOPIC	EVALUATED ACTIVITIES
<b>Topic 1: Introduction to Mechanics</b>		
1	Introduction	Written Assignment
2	Motion in One Dimension	Written Assignment
3	Vectors and Two-Dimensional Motion	Written Assignment
4	The Laws of Motion	Written Assignment
	Exam: Introduction to Mechanics	Exam
<b>Topic 2: Mechanics Beyond Newton's Laws</b>		
5	Energy	Written Assignment
6	Momentum and Collisions	Written Assignment
7	Rotational Motion and the Law of Gravity	Written Assignment
8	Rotational Equilibrium and Rotational Dynamics	Written Assignment
9	Solids and Fluids	Written Assignment
	Exam: Mechanics Beyond Newton's Laws	Exam
<b>Topic 3: Thermodynamics; Vibrations and Wave Motion</b>		
10	Thermal Physics	Written Assignment
11	Energy in the Thermal Processes	Written Assignment
12	The Laws of Thermodynamics	Written Assignment
13	Vibrations and Waves	Written Assignment
14	Sound	Written Assignment
	Exam: Thermodynamics, Vibrations, and Wave Motion	Exam

### Evaluation Methods

Your final grade will be based on your performance on the following:

- 1) Average of Written Assignments (fourteen total) = 50%
- 2) Average of Exams (three total) = 50%

#### *Written Assignments (50% of course grade)*

There are twenty problems per written assignment. Each assignment includes both odd and even problems of varying levels of difficulty. Note that answers (though not solutions) to odd problems are given in the back of the textbook. Each problem counts for five points and points are taken off in the following way:

- -1 if the arithmetic is wrong
- -2 if the algebra/mathematics are wrong
- -3 if the basic physics is wrong
- -4 or -5 if the problem is completely wrong

Your written assignment average is calculated by summing the score for all fourteen regular assignments and then dividing by fourteen.



*Exams (50% of course grade)*

You will be allowed to take up to two attempts per exam. If you elect to take the second attempt, your exam score will be averaged between the two attempts. For example, if you score a 60% on your first attempt, and then a 90% on your second attempt, your exam grade will be 75%.

**Exam Method: Online with Proctoring Online**

This course requires all students to complete exams online through our proctoring service. Students receive two attempts on each exam. If you elect to take a second attempt, the average score of both exams will be recorded.

**Grading Scale**

The following grading scale is used to evaluate all course requirements and determine your final grade:

A = 93–100	B = 83–87.9	C = 70–77.9	D = 60–69.9
AB = 88–92.9	BC = 78–82.9		F = Below 60

*Pass/Fail Option*

Students who enroll in an Independent Learning (IL) course under the pass/fail option will receive a final grade of S in place of a final grade equivalent to an A, AB, B, BC, or C and a final grade of U in place of a final grade equivalent to a D or F.