

DEPARTMENT OF PHYSICS
LEHIGH UNIVERSITY

Physics 10: General Physics 1

Fall Semester 2016

SYLLABUS (Please read carefully)

Initial Competences Required for this course (what you should know already)

Before starting this course, students should already be able to do simple operations with vectors (including adding and subtracting vectors, scalar product, and vector product) and be able to use basics calculus (derivatives and integrals). Physics 10 requires a little less use of calculus compared to the course taken by engineering and physics majors (PHY 11), still you will need to use integrals and derivatives in some very simple applications. Some of you may also need to get back in shape with writing and solving algebraic equations: Do not worry if you will struggle the first couple of weeks with algebra, by seriously working at the homework you will automatically gain back your skills!

Course contents (what will be taught in this course)

Physics 10 is the first part of General Physics (General Physics I, General Physics II is taught in Physics 13). Physics 10 is a calculus based introductory course to physics, and it is meant mainly for students oriented for example towards the biological and environmental sciences, or pre-med students. Subjects covered include mechanics, energy, momentum, thermodynamics, and fluids. The purpose of this course is to introduce these topics, and learn to apply their underlying principles to the solution of concrete problems. Starting with simple problems, you will learn to develop strategies for solving more and more complex ones.

Competences expected after this course (what you will be able to do when done)

After this course, students should be able to analyze both conceptually and quantitatively various situations encountered in physics. At a minimum, they will be able to:

- calculate and predict the motion of projectiles, or rotating objects
- critically analyze situations of equilibrium and non-equilibrium, for translational and rotational motion, using Newton's Laws (with and without friction)
- set up equations based on energy conservation as applied to various kinds of situations involving different kinds of forces (from pulleys and weights to the oscillatory motion of springs and penduli, with and without friction).
- use momentum conservation to analyze different systems involving one and two-dimensional collisions between massive objects or the rotation of a solid body with changing moment of inertia. Included here is also the skill of discerning when to use or not to use energy conservation.
- analyse the physics of fluids in containers or flowing through pipes using the equation of continuity and Bernoulli's equation, including Archimedes principle.
- analyse, using the laws of thermodynamics, pressure-volume diagrams for an ideal gas, and the behavior of thermal machines.

Your performance will not only depend on how well you are able to acquire new physics concepts, but also on your ability to solve more and more complex problems. This last point is something you will learn by solving a lot of practical physics problems.

Instructor

Prof. Paola M. Cereghetti

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Office: LL 410

Office hours: I will be available Tuesdays and Thursdays 8:30am-9:00am and after the lecture 10:10am-10:40am. To schedule an appointment at a different time is easy, simply e-mail me and we will figure out a time, thanks!

Class Meetings

The lectures, attended by all students together, take place from 9:20am to 10:10am in LL316. Meetings in smaller sections will take place on Mondays and Wednesdays in LL514:

Recitation #1: PHY 010-112: 9:10am-10:00am

Recitation #2: PHY 010-110: 10:10am-11:00am

Recitation #3: PHY 010-111: 11:10am-12:00pm

Recitation #4: PHY 010-114: 12:10pm-1:00pm

Textbook and Class Notes

College Physics by Openstax College downloadable for free at <https://openstaxcollege.org/textbooks/college-physics/get> We will cover about half of the book. Class notes will be handed out in class. These notes are my calculus based extension of the College Physics textbook.

Homework

Homework is an essential component of this course, it will be assigned weekly, and it will be due in recitation every Monday. The homework for this class is known to be quite long; however, a big part of the HW problems will be partially solved in class, making class attendance critical for the student who wish to be successful. **START WORKING ON THE HOMEWORK ON SUNDAY NIGHT IS A VERY BAD IDEA, AND THEREFORE HIGHLY DISCOURAGED!**

Homework solutions and extra practice exercises

Homework solutions will be provided after the homework's deadline. Please make sure that you understand each problem that you have not been able to complete correctly. Practice packets (exercises with solutions) will be provided as a help to prepare for the hour exams and the final exam.

Work outside the classroom

This is a 4-credit class. It is standard practice that for every hour of class 3 hours are spent studying or doing homework. Although reading the online textbook and reviewing my and your notes, as well as coming to class are essential, many of you will notice that working on homework and on extra practice exercises is the key to reach proficiency and do well in the exams.

Attendance

Since physics is an intensive subject, keeping up to date is essential. Consequently, **you are expected to attend all classes and to do all assignments on time.**

Exams

There will be 4 hour exams held during recitation (tentatively set on Monday, September 12, on Wednesday, October 5, on Wednesday, November 2, and on Monday, November 21, 2016) and a final exam (TBD). The hour exams and the final exam are closed book; you can prepare a one-sided equation sheet for each hour exam and an additional one for the final exam. During the final exam, you will be able to keep 5 one-sided pages of equations.

Grading:

Your numerical grade in the course will be determined as follows:

Attendance	10
Homework	20
4 Hour Tests	20
Final Exam	20

Total	70

- The final exam is cumulative, the material from the entire semester will be tested.
- If you can justify with an official written excuse your absence during an hour exam, the grade for the hour exam that you missed will be taken from the grade of the corresponding section in the final exam.

Accommodations for Students with Disabilities:

If you have a disability for which you are or may be requesting accommodations, please contact both your instructor and the Office of Academic Support Services, Williams Hall, Suite 301 (610-758-4152) as early as possible in the semester. You must have documentation from the Academic Support Services office before accommodations can be granted.

The Principles of Our Equitable Community:

Lehigh University endorses The Principles of Our Equitable Community [http://www.lehigh.edu/~inprv/initiatives/PrinciplesEquity_Sheet_v2_032212.pdf]. We expect each member of this class to acknowledge and practice these Principles. Respect for each other and for differing viewpoints is a vital component of the learning environment inside and outside the classroom.

How not to loose points in the HW

DO NOT FORGET TO: Write your name and recitation number on the top of the first page.

Recitation #1: PHY 010-112: 9:10am-10:00am
Recitation #2: PHY 010-110: 10:10am-11:00am
Recitation #3: PHY 010-111: 11:10am-12:00pm
Recitation #4: PHY 010-114: 12:10pm-1:00pm

- 1) “Yes,” or “no” answers alone, or any short answer without explanation, are not accepted.
- 2) Show your calculations.
- 3) Results without units are considered wrong.
- 4) Algebraic expressions in a result have to be simplified as much as possible.
- 5) Give the results of your numerical calculations as decimal numbers, results with, for example, fractions or square roots in them are not acceptable, and the problem will not be graded.
- 6) If I see only the material I covered in class as the solution to an unfinished problem, you will not get credit for the problem. Always finish problems we started or did in class.
- 7) When using vectors, use the bracket notation.
- 8) This course covers material beyond the usual high school material. If you already covered some physics material in high school or elsewhere, make sure to always keep track of details about topics you may have already worked with that are new to you, and, especially, of new techniques to solve and approach problems, I expect you to be able to use them in tests and homework.
- 9) Write Clearly!