

Syllabus for PHYS 0110 “Introduction to Physics” (Fall 2022)

General information:

- Lecture: Tuesday / Thursday 6:00–7:20 pm
- Location: Alumni Hall 343
- Textbook: OpenStax College Physics
- Instructor: Prof. X.L. Wu
- Phone: 412-624-0873
- Email: xlwu@pitt.edu
- Office: 219 OEH
- Office hours: Tuesday 7:20-8:20 pm and Thursday 7:20-8:20 pm or by appointment

Course description:

This class is the first half of a two-semester introductory physics courses for non-science majors. The second half is PHYS 0111.

Physics along with mathematics are the foundation of all natural sciences, including biology and medicine. Physics explains a large variety of observations and phenomena by a few fundamental laws. Importantly these laws are universal, meaning that they are applicable anywhere and at any time. Understanding and application of physics laws are essential for the development of many aspects of modern life: such as automobiles, airplanes, air conditioners, telecommunication, computers, smart phones, etc.

In this course, we will study laws of mechanics and their applications to motion of objects under the influence of applied forces. We will also develop concepts of continuum mechanics describing fluids in equilibrium and under flow conditions. Perturbation to these systems give rise to interesting phenomena, such as sounds and waves. The included subjects for this course are:

- One- and two-dimensional motion (kinetics)
- Newton’s three laws of motion and Newton’s law of gravitation (dynamics)
- The work-energy theorem and conservation of energy
- The impulse-momentum theorem
- Rotation and harmonic motion
- Fluid mechanics
- Oscillatory motion and waves

The goal of this course is not only to learn these subjects, but most importantly to develop critical thinking and mathematical skills for solving problems.

Even though this is a non-calculus based course, I would like to emphasize that math is very useful for describing and understanding physics. In fact, to many students, studying

physics makes learning math relevant and more fun. For you to do well in this course, you should be familiar with high-school level math, including algebra, simple geometry, trigonometry, logarithmic functions, and scientific notations. You shall not hesitate to revisit these subjects from time to time to solidify these math skills.

Recitations:

In addition to lectures, you must attend a weekly one-hour recitation session associated with the class. The recitations are led by teaching assistants (TA) who will give a short in-class quiz and discuss the current and/or next homework assignments. He/She will also answer questions from students concerning physical concepts and homework assignments. To make the best use of these recitation classes, prepare some questions before hand.

Homework:

There will be one homework assignment per week. New assignment will appear on Tuesday 7:30 pm and close on next Tuesday at 6:00 pm. We will be using MacMillan Learning Achieve platform (<https://www.achieve.macmillanlearning.com>) to manage the homework. This platform offers some nice features. For instance, you have multiple opportunities to find the correct answer to a given problem, an instant feedback on whether your answer is correct, and to complete your work in multiple sessions. Please complete the assignments on time; a late homework will be penalized for 50% within a week, and further delay is not permitted unless there is a good reason.

To be able to use Achieve, the first thing you need to do is to register and set up an account, which costs about \$35 for one term and about \$60 for two terms. The procedure of setting up the account is described in a separate handout, or see the posting on Canvas (<http://Canvas.pitt.edu>).

You must get familiar with MacMillan Learning system soon! The first homework is due on Tuesday Sept. 6. If you have a problem, please see your TA or me as soon as possible.

You are encouraged to form study groups with other students. This can make learning physics a little easier and hopefully more fun. However, you must do your own work, such as reading, thinking, and doing the homework. There is no substitute for your own effort; copying someone else's work is fast and "satisfying" in a short run, but you will do poorly in the exams and regret such practice.

Canvas and other resources:

This course is posted on Canvas (<http://canvas.pitt.edu>) where you can find useful materials, such as the course announcements, assignments, links, and grades.

You are strongly encouraged to take advantage of the **Physics Exploration Center (PEC)**, which is located at Thaw Hall 312. This room is generally open and staffed by a TA from 9 am to 4 pm, Monday through Friday. The PEC is a learning center where selected demonstration experiments will be set up for all students to explore. We plan to set up one new experiment each week. You are welcome to “play” with the demonstration experiments, which can deepen your understanding of physics concepts.

Inside the PEC you will also find **Physics Help Room** staffed with TAs who can answer all sorts of questions related to physics and math.

Grading scheme:

There will be two midterm exams and one cumulative final exam. You can bring a calculator and one (2-sided) handwritten letter-size formula sheet to each midterm exam, and three such sheets to the final exam. No books, laptop computers, smart phones, or other printed or electronic media are allowed. Makeup exams will not be given without a valid excuse.

Your final grade is determined as follows: quizzes in recitations 20%, homework 10%, midterms 2x20%, and the final 30%.

TA Information:

- Juntong Su (jus90@pitt.edu); Recitations H 5-5:50 and H 7:30-8:15; Office Hours: M 11-12 and W 2-3, 319 Allen Hall
- Chung-Wa Shum (chs357@pitt.edu); Recitation on T 5-5:50; Office Hours: T 4-5 and H 2-3, Zoom link: <https://pitt.zoom.us/j/95497310986>
- Youssef Tawfik (yot23@pitt.edu); Recitations T 5-5:50 and T 7:30-8:15; Office Hours: M 12-1 and T 3-4, 517 Allen Hall
- Xiao-Lun Wu (xlwu@pitt.edu); Office Hours: T&H 7:30-8 pm outside the lecture hall, Friday 12-1 pm, Zoom ID: 777 892 2593, passcode 951413.

Additional office time can be arranged, but in this case you need to send an e-mail to a TA for appointment.

We are fortunate to have a undergraduate teaching assistance (UTA) for this class. Rhea Abraham took this course a year ago and had done very well. She can tell you her personal experience about how to learn the subject and be good at it. Below is her contact information:

Rhea Abraham (RCA27@pitt.edu); Office Hours: W 12-1, 304 OEH (in person) or M 8-9 and F 8-9 (virtual). Here is the link for the virtual meetings:

[tps://nam12.safelinks.protection.outlook.com/?url=https%3A%2F%2Fdiscord.gg%2FYp6h3enUAh&data=05%7C01%7CRCA27%40pitt.edu%7Cda321e738df64aa2a78408da8abdb278%7C9ef9f489e0a04eeb87cc3a526112fd0d%7C1%7C0%7C637974844588906354%7CUnknown%7CTWFpbGZsb3d8eyJWljoiiMC4wLjAwMDAiLCJQIjoiV2luMzliLCJBTil6k1haWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=05tXCKNIwYmTxEi834OGMR41tQmoy%2BoSUwN5MH0Bh9U%3D&reserved=0](https://nam12.safelinks.protection.outlook.com/?url=https%3A%2F%2Fdiscord.gg%2FYp6h3enUAh&data=05%7C01%7CRCA27%40pitt.edu%7Cda321e738df64aa2a78408da8abdb278%7C9ef9f489e0a04eeb87cc3a526112fd0d%7C1%7C0%7C637974844588906354%7CUnknown%7CTWFpbGZsb3d8eyJWljoiiMC4wLjAwMDAiLCJQIjoiV2luMzliLCJBTil6k1haWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=05tXCKNIwYmTxEi834OGMR41tQmoy%2BoSUwN5MH0Bh9U%3D&reserved=0)

The link also allows you to speak to other UTAs. If you need individual appointments, please send Rhea an e-mail the night before, and she will then send you a zoom invitation.

Important dates:

August 29 (Monday): First day of class

September 5 (Monday): Labor Day (University closed)

October 6 (Thursday): FIRST MID-TERM EXAM

October 14 (Friday): Fall Break, No classes

November 10 (Thursday): SECOND MID-TERM EXAM

November 24-25 (Thursday-Friday): Thanksgiving Recess

December 9 (Friday): Last day for classes

December 15: FINAL EXAM

Academic integrity:

Students in this course are expected to comply with University of Pittsburgh Policy on Academic Integrity. Disciplinary action may be taken for bringing unauthorized materials to an exam, obtaining exam materials before the beginning of the exam, cheating during an exam, posting homework solutions on the web or any discussion board, and other violations described in the policy.

Disability resources and Services:

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and [Disability Resources and Services](#), 216 William Pitt Union, (412) 648-7890 / (412) 383-7355 (TTY) as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Course Outline:

Below is a tentative teaching plan for each week based on OpenStax College Physics. You are encouraged to read the materials ahead of lectures, but you must read them before attempting a homework assignment to make assure you understand.

Week beginning August 29

Introduction and Mathematical concepts, Reading: Chapter 1

Kinematics in one dimension, Reading: 1st part of Chapter 2

Week beginning September 5

Kinematics in one-dimension, Reading: 2nd part of Chapter 2

Week beginning September 12

Kinematics in two dimensions, Reading: Chapter 3

Week beginning September 19

Forces and Newton's laws of Motion, Reading: Chapter 4 and 1st part of Chapter 5

Week beginning September 26

Dynamics of circular motion and gravity, Reading: 2nd part of Chapter 5 and Chapter 6

Week beginning October 3

Work and energy, Reading: 1st part of Chapter 7; FIRST EXAM

Week beginning October 10

Work and energy; Reading: 2nd part of Chapter 7

Week beginning October 17

Impulse and momentum, Reading: Chapter 8

Week beginning October 24

Statics and torques, Reading: Chapter 9

Week beginning October 31

Rotational kinematics / dynamics, Reading: Chapters 10

Week beginning November 7 (one lecture)

Elasticity; Static Fluids, Reading: Reading: Chapter 11; SECOND EXAM

Week beginning November 14

Fluids Dynamics, Reading: rest of Chapter 12

Week beginning November 21 (one lecture)

Temperature and Heat, Reading: Chapter 13 and part of Chapter 14

Week beginning November 28

Simple Harmonic motion and waves, Reading: Chapter 16

Week beginning December 5

Sounds, Reading: Chapter 17

Week beginning December 12 (Final Week)

Final: 6-8 pm, Dec 15