Introduction to Physics 1

PHYS 0110 (10485), **Fall 2020** (2211)

Meetings: synchronous, *Mon/Wed/Fri* 12:10–1:00 pm. Zoom meeting ID: 97373457300.
Instructor's contact: Dr. Matteo Broccio, `mbroccio@pitt.edu`
Instructor's office hours: held on *Zoom*, times to be determined
Teaching assistants: Emily Biermann, Qin Han.

Course description and learning goals

This *3-credit* course is the first half of a two-term algebra-based sequence that presents the fundamentals of classical physics and some elements of modern physics. The most distinctive character of Physics is certainly that a small set of principles allows to make predictions on a wide range of natural phenomena. Physiological and biological processes also obey physical principles, and current medical technology is rooted in techniques borrowed from various branches of Physics. The phenomena that you will explore in this course include: translations, rotations, collisions, vibrations, mechanical waves including sound, properties of fluids, temperature and heat transfers. A primary learning goal is to identify and apply Physics principles in various real-life situations and on occasion, in the context of other disciplines. A secondary goal is the development or refinement of competencies useful for problem solving. Initially, you are expected to be equipped with basic algebra and geometry. Basic trigonometry and vector algebra will be introduced during the term, focusing on their application. Beware that this is a relatively fast paced course.

Course portal

The management website and portal for all materials is `http://canvas.pitt.edu/`, accessible using your Pitt username and password (for access problems, contact help desk at 412-624-4357). You are expected to check announcements and material postings *every day*, or at the very least every other day. You will find links to my videos, assignments, and study tips, as well as grade feedback.

Textbook

My material is as self-contained as possible. A complementary resource for this course is OpenStax *College Physics,* freely downloadable from *https://openstax.org/details/books/college-physics*. We will cover Chapters 1-17, although the material will not always be presented in the same style as this textbook. Numerous illustrated examples and practice problems can be found in this book. The purchase of a print version is *not* required.

Video minilectures and checkpoints

Before each class meeting, you will be required to *watch some video minilectures* (linked from Canvas) and answer the embedded conceptual *checkpoints*. You will be able to pause, rewind, scan, and replay the videos at will. You are recommended to *take brief notes* and *reflect* on what you just watched before attempting these checkpoints. You will have five attempts. Full credit will be given to a correct answer at the first attempt, and successive 10% point deductions will be applied for each incorrect attempt. More details will be communicated directly by the instructor. The purpose of pre-class questions is to prepare you for the in-class activities (and recitations) where you will be asked to compare and contrast, apply, and combine concepts. Logically, these checkpoints will represent a first instrument for you to verify your basic understanding of the material. They will *not be representative* of assessment questions, unlike the in-class examples and recitation worksheets.

Virtual class meetings

The time we spend together in our virtual classroom on Zoom will be mostly devoted to *active learning*, after a brief review of the ideas. I will demonstrate physical processes, elicit *discussions* about observations and their possible explanations, and extensively model how to combine different concepts and how to check your own work. Overall, the goal is to gradually turn you into independent problem solvers via coaching and feedback. I will put emphasis on conceptual relationships and sense making of the equations, beyond the mere execution of a certain "recipe". Real-time surveys and questions asked on Zoom will count as a fraction of your grade.
Recording policy. To ensure the free and open discussion of ideas, students may *not* record classroom lectures without the advance written permission of the instructor. I will make the recorded speaker view available to you on Zoom after the fact, so it should be fine.

Virtual recitations

Recitations consist of both an asynchoronous part and a synchoronous part. At least three days before the recitation (with the exception of the very first recitation), you will find an group assignment that will be critical in your learning of material. This assignment will be solved offline and then submitted via Gradescope (you will get detailed instructions). In the actual recitation, you will be: a) given feedback on the assignment; b) shown a counter-example of the assigned worksheet or a relevant case involving the same concepts; c) individually tested via a *synchronous, timed quiz*. Your teaching assistant will give you enough guidance that should be conceptually prepared to take the quiz. Each week, your recitation grade will be made of the sum of your score on the take-home worksheet and the real-time quiz. At the end of the term, I will drop your three lowest recitation scores (totals of take-home and real-time components). For logistical reasons, we *will not be able to either process medical excuses or give later makeup assignments*. If you anticipate a *serious* problem, please write *to your teaching assistant, copying me* to let her/him know *as soon as you know*. In that case, we may be able to offer you to attend another recitation meeting the same week, but not a separate 'makeup' session (that is impossible!).

Homework

You will be assigned homework on Sapling Learning, *once a week* unless announced otherwise by the instructor. Homework generally allows to independently verify your conceptual understanding and practice problem solving. Your problems will be similar, yet not identical to those assigned to another student. Your collaboration with classmates is *not* discouraged, but eventually you will need to know how to set up and solve a problem of the same kind completely on your own. Copying other students' answers results in learning very, very little and performing poorly on exams.
Policies. To sign up for Sapling Learning, use the directions given the first day of class, and follow screen prompts. You will register using your full name (not a nickname). Extensions, each assignment will be automatically available for 7 additional days past the due date, with a *5% deduction per day late*. Any duplicate account or unauthorized account will be automatically removed, and the instructor declines any responsibility for losses of work or credit as a result of that removal. Requests for extensions made *after* the latest due date will be ignored. There are *no makeup homework sets*.

Exams

There will be *three learning assessments*, each covering about three modules of material – dates to be announced shortly. These assessments will contain both conceptual questions and quantitative problems, whose average difficulty will be comparable to the more difficult problems from your homework sets, recitation problems, and in-class examples. Details on the format and logistics will be given via Canvas by the end of the first week of class.
Absence policy. An unsubmitted assessment (for any reason) will earn a zero. If a *medical emergency* (or serious condition) occurs, the student has the obligation to *communicate it via email to the instructor* ***strictly no longer than 24 hours after the start time of the exam***. In health-related situations, the student *may* be excused from a single exam by sending a signed physician note certifying his/her inability to perform schoolwork at that time. Other kinds of emergencies will be evaluated on a case-by-case basis. In all the above cases, a zero on a missed assessment score may be dropped at the discretion of the instructor. Unfortunately, I will be **unable to offer makeup exams in any shape or form after a regularly scheduled assessment was missed** (for any reason). If you have questions about the policy, please do not hesitate to contact me sooner rather than later.

Students with disabilities

If you have a disability that requires special testing accommodations or other classroom modifications, you need to notify both the instructor and Disability Resources and Services no later than the second week of the term. You may be asked to provide documentation of your disability to determine the appropriateness of accommodations. To notify Disability Resources and Services, call (412) 648-7890 or send an email to `drsrecep@pitt.edu` to schedule an appointment. The Disability Resources and Services office is located in 140 William Pitt Union on the Oakland campus.

Academic integrity issues

All students will be expected to comply with the University of Pittsburgh's Policy on Academic Integrity. Any student suspected of violating this obligation for any reason during the term will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity, publicly available at:
`http://www.provost.pitt.edu/info/acguidelinespdf.pdf`.
For online assessments, every student will be required to sign a honor code before starting the assessment. Violations of integrity guidelines *will* result in the opening of an independent verification process, and once conrirmed, serious consequences ranging from a zero score on that entire assessment to a failing grade for the course, depending on the type of the offense.

Importance of self-assessment

In Physics, each new concept builds on earlier ones and this is a relatively fast-paced corse, so it is crucial to keep current with the material. Frequently checking one's reasoning is crucial to the development of conceptual understanding and problem solving skills, and in class you will receive many stimuli in those directions. Effective *study tips* are posted on Courseweb; other instruments for self-assessment will be made available by the instructor during the semester. Exploring areas out of one's current comfort zone is a normal part of learning, so it should never be viewed as threatening. Also, your comfort zone can be gradually expanded, because through regular exercise brain can grow, much like a muscle does through physical workout.
An honest self-assessment has several advantages. It allows you to: a) *realistically* monitor your progress; b) usefully distinguish conceptual issues from procedural difficulties; c) be in a better position to discuss concepts with classmates and teaching assistants; d) tak better advantage of feedback given by your instructor or teaching assistant.

Help resources

The following help resources are available to all students:

- Instructor's and teaching assistants's office hours on Zoom, mainly to help you check your conceptual understanding and determine the status of your progress. If you have another academic commitment class during *regular office hours*, you may send me an email to flexibly schedule a separate appointment, at a time that works for both of us.

- *Pitt Physics Server* of the Department of Physics and Astronomy. There, graduate teaching assistants will be able to virtually help you Mon–Fri with trickier homework questions or math. No appointment is needed. (Details to be posted.)

- *Study Lab.* There, undergraduate tutors will be able Mon–Fri to virtually help you with problems. Appointments can be scheduled thorugh the Study Lab website. (Details to be posted.)

Grade calculation

Your course grade will be calculated using the weights shown in the following table.

Part of graded coursework	**Percentage weight**
Pre-class checkpoints (two lowest scores to be dropped)	10%
Participation in at least 1/3 of virtual class meetings	10%
Recitations (three lowest scores to be dropped)	15%
Homework sets (two lowest score to be dropped)	15%
Online learning assessments (average of three)	30%
Final exam (in-person, details tbd)	20%

The actual letter grade cutoffs will be communicated just before the final exam. Unless a manual grading error or a genuine miscalculation was made, the final grade is *not* subject to appeal.

Update policy

Updates to any of the information shown in this document will have to be announced directly by me*both* in the virtual classroom and via Canvas to be actually in effect. In the first few weeks of class, I will also have a discussion board reserved for logistical questions and/or questions about policies or policy updates. Given the highly dynamic public health situation around us, I cannot rule out any future changes, but I can strongly reassure you they will *not* be major – especially when it comes to the grade breakdown. Under whatever scenario, I will work in a way that ensures a general fairness of evaluation. Thanks for your kind cooperation, in all events.