

# Introduction to Physics 1

PHYS 0110, section 10530, Fall 2017 (2181)

Meeting times: **Mon/Wed/Fri 12:00-12:50 pm**

Lecture hall: **343 Alumni Hall**

Instructor: **Dr. Matteo Broccio**

Office: 217 Allen Hall

Office hours: Thursdays 2:00–2:55 pm, or by email appointment

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## Course description and goals

This *3-credit* course is the first half of a two-term algebra-based sequence (0110/0111) that presents the fundamentals of classical physics and some elements of modern physics. The most distinctive character of Physics is 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 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 correctly apply Physics principles in real-life situations as well as in the context of other disciplines. A secondary goal is the acquisition 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. This is a fast paced course, so issues with any of the mathematical prerequisites will have to be addressed immediately.

## Course website

The management website for this course is <http://courseweb.pitt.edu/>, accessible using your Pitt username and password (if you forgot either, contact help desk at 412-624-4357). Here you will find links to video units, study tips, extra credit policies, and any updates to this syllabus. You will also be able to check your grades during the term.

## Reference textbook

The reference textbook is *Physics, 10th Edition* by Cutnell, Johnson, Young and Stadler, ISBN 978-1-118-48689-4, published by Wiley. Please note that the material might not always be presented by the instructor in the same style or order as the textbook.

## Before-class activities

**Before the first class meeting** of any given week, you will **watch a set of short videos** hosted on *MyPittVideo* and take the corresponding **graded checkpoints** hosted on your online homework platform – both videos and checkpoints are linked from Courseweb. You will be able to pause, rewind, fast forward, and replay the videos at will. You are warmly encouraged to *take notes* electronically on the player (for later reference) and *consult the textbook* for additional examples or explanations before taking the checkpoints. The checkpoints will give you four attempts with successive 25% point deductions for each incorrect attempt. (Full credit is only given to a correct answer at first attempt.) The total checkpoints score will count for 8% of your grade.

If you carefully do all the before-class activities, you will then be prepared for in-class activities and be likely to keep up with the fast pace of this course. (Put in a negative form, skipping the pre-class activities will lead you to getting behind and compromising your chances of passing the course.) You will be also given the chance for feedback on the videos and the checkpoints.

## In-class activities

Classroom time will be entirely devoted to *active learning* practices. I will **demonstrate physical phenomena**, and trigger discussions among you and other students about the observations and their possible theoretical explanation. I will also show you how to combine concepts in sample problems and **coach you in independent problem solving** with a greater emphasis on conceptual understanding rather than mere technical procedures. You will be often asked to cooperate with your classmates in pairs. I will guide you throughout the process, facilitate your discussions, and advise on possible remedial activities. This coaching is actually vital for your learning.

You will be uniquely assigned a numbered radio transmitter (*clicker*) to submit answers, make predictions, or respond to opinion polls. You will use the same physical clicker from beginning to end of the term. *Successful participation* to in-class activities will be worth 4% of your grade.

Both as a courtesy to your classmates and instructor and to ensure your productive participation in the activities, you will always ***come to in-class meetings on time***.

### Clicker usage policy

If for any reason you do not find your assigned clicker, you *will not pick up a clicker not assigned to you*. Notify the instructor either before or after the class time, so to avoid disruptions. *At the end of every lecture*, you will promptly *return your clicker to its bin*. Failure to do so may result in disciplinary actions, unless you immediately return the device to the classroom. Malfunction of a clicker is an extremely rare event: allegations of clicker malfunction will be verified by the staff if made *immediately after the lecture in question*, but ignored if made at any later time.

### Classroom recording policy

To ensure the free and open discussion of ideas, students may *not* record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.

## Recitations

Recitations will be taught by my teaching assistants and myself, starting second week of classes. You are expected to participate actively in all recitations. For the most part of the recitation, the class will be broken down into **small groups**, which will collaborate on the solution of a real-life problem on material that was recently covered in class. During recitation, you will receive guidance and support for the development of problem solving skills. You will turn in a commented solution not to exceed one and a half pages in length. All group members are expected to equally contribute, and individual accountability will be ensured by having a random student present her/his solution. After dropping the lowest score, your recitation score will be worth 10% of your grade.

***There will never be, under any circumstances, a makeup assignment after the regular recitation was missed.*** If you anticipate an inevitable schedule conflict with a specific recitation meeting, communicate that to your teaching assistant or instructor *as early as possible* and you *may* be allowed to sit at a different recitation in the *same* week.

## Homework

Homework provides you with a chance to verify your conceptual understanding and practice problem solving. Each week, a problem set will be released on the online homework system and will be due Saturdays at 11:59 pm, unless announced otherwise by the instructor.

To sign up, use the Student Class Code given the first day of classes, and follow prompts. You will register once using your full name (no nicknames). Any duplicate account will be removed, and the instructor declines any responsibility for losses of work or earned credit.

Homework problems assigned to you will be similar to those assigned to another student. Your collaboration with classmates is encouraged, but eventually you are expected to set up and solve every problem individually. Copying another student's answers, besides any ethical considerations, results in actually learning very very little, hence performing very poorly on exams.

**Extensions of up to 24 hours** may be automatically obtained for a mere 10% point deduction. For longer extensions, though no longer than one week, please send an email with exact subject "0110 homework extension" **before the problem set due date**, indicating the specific reason for your request. Late requests for short-term extensions will be ignored. The total homework score counts for 14% of your course grade.

## Self-monitoring

Frequently monitoring one's own thinking is crucial to the development of both conceptual understanding and problem solving skills, which are the two learning goals of this course. Some *study tips* are available on Courseweb. Besides a clear understanding of the content, you will want to acquire a set of broad competencies that include: translating verbal statements into mathematical conditions; translating verbal statements into diagrams; distinguishing relevant from irrelevant information; formulating hypotheses; evaluating an answer to a problem.

Honest self-monitoring will also enable you to separate genuinely conceptual doubts from merely technical difficulties, to discuss any such difficulties more productively with your classmates, and to better relate to the explanations given by your instructor, teaching assistant or any of the undergraduate tutors at walk-in hours.

## Help resources

The Department of Physics and Astronomy maintains a *Physics Help Room* at Thaw Hall 312, where graduate teaching assistants will answer homework related questions, explain concepts, and help you with math. Undergraduate tutors, to be introduced to you the first day of class, will be available to help you check your understanding, at the walk-in hours posted on Courseweb by the end of Week 1. In Physics, each new concept builds on earlier ones, so it is crucial to keep current with the material. If you are getting behind, **immediately** seek help from your instructor or one of the undergraduate tutors – timing of interventions is important.

## Exams

There will be **three midterm exams**, each covering three or four book chapters of material, whose combined scores will count for 36% of your course grade, and a **cumulative final exam** worth 28% of your course grade. Exams will contain a combination of conceptual questions and quantitative problems, whose *average difficulty will be comparable to the most difficult problems from your homework and recitation work*.

**A missed midterm exam will by default receive a zero score.** A **medical emergency** (or serious condition) occurring on (or persisting through) the date of an exam must be **communicated by the student** to the instructor **no more than 24 hours after the regular exam time**, and he/she *may* be excused by bringing a signed physician note certifying the inability of that student to do any work on that date. Other kinds of emergencies will be evaluated on a case-by-case basis.

**There will never be a makeup exam after an in-class exam was missed for any reason.** If an inevitable schedule conflict with an exam is anticipated, the student must communicate that to the instructor as early as possible in the term, and reasonable accommodations *will* typically be found. Last minute notice of a schedule conflict will automatically make the student ineligible for accommodations.

## Extra credit

The first source of extra credit is through the submission of **lab reports for simple experiments** performed at the *Physics Exploration Center* (311 Thaw Hall), per schedule and instructions at the “Extra Credit” page on Courseweb. Each complete report will be worth 0.5% of extra credit. The second source is your **participation in conceptual surveys** on fundamental Physics ideas, which will be given both at the very beginning and at the very end of the semester. For the pre-instruction conceptual survey, you will earn 0.5% of extra credit for participation. For the post-instruction conceptual survey, you will earn up to 0.5% of extra credit, based on correctness. The third source is your **participation in an attitude survey** at the beginning of the term, which will be worth 0.25% of extra credit, as long as you answer all the questions.

## Grade

Your course grade will be calculated according to the following table.

Component of coursework	Percentage of grade
Pre-class checkpoints	8%
In-class activities	4%
Recitations (lowest score dropped)	10%
Homework (no lowest score drop)	14%
Midterm exams (all three combined)	36%
Cumulative final exam	28%

After the final exam, any earned extra credit will be added to your numerical score. Details about the letter grade boundaries will be provided after the third midterm exam. In any event, students who score overall  $\approx 93\%$  or more may expect to receive an A, and students who score overall  $\approx 45\%$  or less may expect to receive an F. Unless a typing or calculation error was made by your instructor, your letter grade is not subject to appeal.

## Course schedule

Week	Module	Topics
Aug 28	-	introduction; study tips; pre-instruction conceptual survey.
Sep 4	1	units, dimensional analysis, trigonometry, vectors.
Sep 11	2	velocity, acceleration, constant acceleration kinematics, free fall.
Sep 18	3	two-dimensional motion, projectile motion; Newton's three laws.
Sep 25	4	<b>Exam 1</b> ; gravitational force, normal force, tension, systems
Oct 2	5	frictional forces, air resistance; uniform circular motion.
Oct 9	6	work; kinetic and potential energy; conservation of energy; power.
Oct 16	7	momentum, impulse, momentum conservation; rotations.
Oct 23	8	<b>Exam 2</b> ; torque, rotational dynamics, angular momentum.
Oct 30	9	oscillations, ideal spring, elastic energy, pendulum; deformations.
Nov 6	10	pressure, fluid statics, equation of continuity, viscous flow.
Nov 13	11	temperature, heat, heat capacity, heat transfers; <b>Exam 3</b>
Nov 20	-	<i>Thanksgiving break: no classes or recitations</i>
Nov 27	12	mechanical waves, sound speed, sound intensity, Doppler effect.
Dec 4	13	interference, standing waves; post-instruction conceptual survey.

## Academic integrity

Students in this course 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, available at:

<http://www.provost.pitt.edu/info/acguidelinespdf.pdf>.

Violations of integrity guidelines by a student may result in an immediate zero score for an examination or even a failing grade for the entire course, depending on the seriousness of the offense.

## **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](mailto:drsrecep@pitt.edu) to schedule an appointment. The Disability Resources and Services office is located in 140 William Pitt Union on the Oakland campus.

## **Update policy**

Any update of any portion of this syllabus will have to be announced both in class and on Courseweb by the instructor himself to be actually in effect.