

**Physics 0110**  
**Introduction to Physics 1**  
**Spring Term 2014-2015 (2154)**

**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 you 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 includes: translations, rotations, collisions, vibrations, mechanical waves, properties of fluids and gases, and heat transfer.

A primary learning goal is to identify and correctly apply Physics principles in real-life situations and in the context of other disciplines. A secondary goal is the acquisition of competencies that indicate the development of scientific reasoning. Initially, you should be equipped with basic algebra and trigonometry. Other mathematical tools might be sparingly introduced during the term, focusing on their application.

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**Recitation Instructors (Teaching Assistants):**

Christof Keebaugh  
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**Undergraduate Teaching Assistants:**

Bingxi Li, [bil21@pitt.edu](mailto:bil21@pitt.edu)  
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**Text:** The official textbook is Physics, 9th Edition by John D. Cutnell and Kenneth W. Johnson, ISBN 978-0470879528 or Physics (abridged custom edition) by John D. Cutnell and Kenneth W. Johnson, ISBN 978-1118472118. Please note that the material might not always be presented in the same style or order as the textbook.

**CourseWeb:** There is a CourseWeb site associated with this course. It can be accessed through <https://courseweb.pitt.edu/> This site has:

- Important announcements.
- Materials such as lecture slides, exam solutions, announcements, tutorials, etc.
- A link to WebAssign for homework assignments.
- Grade information.

- A discussion board (good for discussing problems).

**Lectures:** Before each lecture, you are expected to study the lecture preview (and possibly answer brief questions therein) as well as read the corresponding sections of textbook. If you do so, you will benefit from in-class activities and more comfortably keep up with the pace of the course.

Lectures will be conducted in a highly interactive fashion. The instructor will very often trigger discussions about physical phenomena with and among students. You will use hand-held radio transmitters (clickers) to answer multiple choice conceptual questions or make predictions on an upcoming experiment.

Each numbered clicker is uniquely assigned to a student, from beginning to end of the term. For your instructor, clickers have the two main functions of facilitating discussions and giving a measure of the collective (not individual!) depth of understanding of a given concept. Your clicker participation and responses will contribute to your grade.

You may not ever pick up a clicker not officially assigned to you. At the end of every lecture, you will return your clicker to its bin. If you fail to do so, disciplinary actions may be taken unless you promptly return the device to the classroom. Malfunction of a clicker is an extremely rare event: allegations of malfunction during a lecture will be carefully verified by the staff if made immediately after the lecture, but ignored if made at a later time.

**Homework:** Homework will be assigned using the WebAssign system. Typically, homework problems will be due weekly, at 11:59 pm on Sunday nights. It is your responsibility to do the homework before the recitation section as preparation for the weekly quizzes. The ability to understand and solve problems is essential for successful performance on the quizzes and exams.

To access WebAssign, go to <http://webassign.net>. You will need to self-enroll online for the course and pay the access fee. There is a two week grace period during which you have free access to the system (in case you drop the course, change sections, etc.). The Class Key for this course is **pitt 3079 3510**. Pricing details are at the Course Information page on Courseweb. **When registering with WebAssign, enter your Student ID (Peoplesoft number, not your ID card number) and use your pitt email address. You may not get credit for your homework if your Student ID is missing or incorrect.**

Each problem in WebAssign is generated uniquely for each student, so the problems assigned to you will be similar but not identical to those assigned to another student in your class. 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 little, hence performing very poorly at exams.

Extensions of up to 48 hours may be requested through WebAssign itself. They will be granted only if the request was sent well before the regular due date, and a point deduction for late submission not to exceed 20% of the maximum score will be applied.

**Recitation:** Your recitation section provides the opportunity to ask questions and discuss the material in a smaller group. You will also benefit from the alternative viewpoint of the recitation instructor. The intended format for the recitation is:

- Quick review of recent material (5-10 minutes).

- Questions / discussion / problem solving (25-30 minutes). It is highly desirable that most of the recitation period be used for active learning. For example, the recitation instructor can break up the group into smaller groups to do work sheets or guided problems, or ask students to work out problems on the board.
- Weekly quiz (10-15 minutes), usually on material from the previous week. These will contribute to your grade.

Please go to your assigned recitation section.

There will be no individual makeup assignments for missed recitations. 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.

**Examinations:** There will be two preliminary examinations, given during regular lecture periods. The scheduled dates are Feb. 13 (Friday) and March 27 (Friday). The comprehensive final examination is scheduled for Monday, Apr. 20 from 4:00pm to 5:50pm in Alumni Hall 343. For each examination, you will be permitted to bring in a calculator and an equation sheet consisting of a single sheet of paper with equations and constants of your choosing written on one side in human-readable format. You must notify me in advance if you will miss an exam for a foreseeable reason. I will attempt to make some kind of accommodation for unavoidable conflicts only.

**Grading:** Each preliminary examination will be worth 100 points. The final examination will be worth 150 points. The quizzes will be worth 70 points, the WebAssign homework questions and problems will contribute 60 points, and lecture participation (clickers) will contribute 20 points. One of your lowest quiz scores will be dropped. The total number of points for the course will be 500. Your score out of 500 will be converted into a letter grade.

Extra credit “experiments” will occasionally be available in the Physics Exploration center. Each individually complete report will be worth 3 points (turn completed assignments in to your TA).

To ensure uniformity of evaluation among sections taught by different instructors, a guideline has been set by the Department of Physics and Astronomy. This guideline informs the instructor of the acceptable range for the number of A+ to B- grades relative to the total number of grades, A to F. Wherever the boundary between C+ and B- letter grades may eventually fall for compliance, students who score > 93% or more may expect an A, and students who score < 45% or less may expect an F. Please consider that unless a material grading error was made by your instructor or TA, the final decision on your letter grade is not subject to appeal.

**Help:** There are many resources available for help in addition to the regular office hours of the instructor and teaching assistants. These include:

- Resource Room, 312 Thaw Hall: This room is staffed by graduate student teaching assistants for the introductory physics and astronomy courses. The hours will be posted on the departmental website. A link is available on the CourseWeb site under “Course Information”.
- Academic Resource Center, G1 Gardner Steel Conference Center (next to Thackeray Hall, across the street from Benedum): This free tutoring service is available to all students enrolled in Physics 0110 and 0111 (among other courses). The center is open Monday through Friday from 9 am to 4 pm. Tutoring sessions are generally one hour

long. Students are encouraged to make an appointment in advance by calling 412-648-7920 or stopping by the front desk.

- If you wish to hire a private tutor, contact the Physics departmental office, 100 Allen Hall.

**Classroom recording:**

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.

**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>

In particular, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators. Violations of integrity guidelines by a student may result in an immediate zero score for an examination or a failing grade for the entire course, depending on the seriousness of the offense.

**Disabilities:**

If you have a disability that requires special testing accommodations or other classroom modifications, you need to notify both the instructor and the Disability Resources and Services no later than the 2nd 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 648-7890 (Voice or TTD) to schedule an appointment. The Office is located in 216 William Pitt Union.

**Course Outline (Approximate)**

Week	Lecture dates	Tentative content
1	Jan 5, 7, 9	units, dimensional analysis, vectors, 1-D kinematics
2	Jan 12, 14, 16	free fall, 2-D kinematics, Newton's laws of motion
3	Jan 19*, 21, 23	catalog of forces, application of Newton's second law *no class
4	Jan 26, 28, 30	uniform circular motion; work and energy
5	Feb 2, 4, 6	conservation of mechanical energy, impulse, momentum, collisions
6	Feb 9, 11, 13*	rotational kinematics, torque, moment of inertia, rotational statics; *Exam 1
7	Feb 16, 18, 20	rotational dynamics, rotational energy, angular momentum
8	Feb 23, 25, 27	oscillations: spring; oscillations: pendulum
9	Mar 2, 4, 6	elastic energy, stress and shear deformation, pressure
10	Mar 9, 11, 13	SPRING BREAK
11	Mar 16, 18, 20	Pascal's principle, Archimedes' principle, ideal fluid flow, viscous flow
12	Mar 23, 25, 27*	temperature, thermal expansion, heat and phase changes, humidity; *Exam 2
13	Mar 30, Apr 1, 3	heat conduction, heat radiation, waves
14	Apr 6, 8, 10	speed of transverse wave, speed of sound, intensity, Doppler effect
15	Apr 13, 15, 17	constructive/destructive interference; diffraction; standing waves