Introduction to Physics 1

PHYS 0110, section **10565**, **2014-15 Fall Term** (2151)

Meeting times: **Monday, Wednesday, Friday 12:00 - 12:50 pm**
Lecture hall: **Alumni Hall 343**

Instructor: **Dr. Matteo Broccio**
Office: Allen Hall 217
Office hours: Monday and Wednesday 3:30 - 4:30 pm, or by appointment
Email: *mbroccio@pitt.edu* (preferred means of contact)
Phone: 412-624-2755

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

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.

Website

The management site for this course (`http://courseweb.pitt.edu/`) may be accessed using your Pitt e-mail username and password (if you forgot either, contact the help desk at 412-624-4357). You are expected to visit the website at least three times a week in order to download lecture notes, do self-monitoring activities, find extra credit assignments, exam policies, and possible updates to the syllabus. You will also be able to check your grades.

Textbook

The official textbook is *Physics, 9th Edition* by John D. Cutnell and Kenneth W. Johnson, ISBN 978-0470879528. Please note that the material might not always be presented in the same style or order as the textbook.

Lectures

Before each lecture, you are expected to **study the lecture preview** (and 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. **Mere attendance is not graded**, but **effective participation** to in-class discussions will be rewarded with *extra credit* proportionally to the number of recorded correct answers (see Extra credit).
As a courtesy to your classmates and instructor, you will **come to class on time**. If *by the time the lecture is supposed to start you cannot find your clicker*, after searching also in nearby bins, please proceed to your seat and notify the instructor only *after* that lecture, to avoid disruptions. You **cannot** 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.

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.

Recitations

Recitations will be given weekly by teaching assistants Xi Cao (xic71@pitt.edu) and Nathan Herring (nmh48@pitt.edu). You are expected to participate actively in all recitations. For part of the recitation, the class will be broken down into **small groups**, which will collaborate on the solution of a short problem on material that was recently covered in lecture. All group members are expected to significantly contribute to the assignment. You will be asked to turn in a clearly commented solution not to exceed a page in length, then be given a brief individual quiz on the same concepts. At the end of the recitation, you will be given an **individual** follow-up assignment in the form of a quiz to be turned in in class the next day. Your recitation score will be composed of both your group assignment (30%) and follow-up quiz score (70%). After dropping the single lowest score, your total recitation score will be worth 10% of your course grade.
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.

Homework

Doing homework, you will apply the concepts you have learned in class and revised with your group in recitation. So this is a key part of your learning process. Every week, a problem set will be assigned online through WebAssign (`http://www.webassign.com/`), unless announced otherwise by the instructor. You will typically have 12 days to complete the assignment.
To set up an account for this course, use the above link, hit "I have a Class Key", type class key `pitt 8359 5062`, and follow screen prompts. When registering, you must use your full name (no nicknames). Pricing details are at the "Course Information" page on Courseweb.
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 before the regular due date, and a point deduction for late submission not to exceed 20% of the maximum score will be applied. The total homework score, after dropping the single lowest score, will be worth 18% of your course grade.

Exams

There will be three midterm exams, each worth 14% of your course grade, and a cumulative final exam worth 30% of your course grade. Exams will typically contain a mix of conceptual questions and quantitative problems, with an average difficulty comparable to the more difficult problems from your homework and recitations.
A missed exam will result in a zero score. If a **medical emergency** (or serious condition) occurs on (or persists through) the date of an exam, the student must **communicate** the situation to the instructor **no more than 24 hours after the exam time**, and he/she *may* be excused by bringing a signed physician note certifying the inability of that student to do any schoolwork on that date. Other kinds of emergencies or truly exceptional circumstances will be evaluated by the instructor on a case-by-case basis.
There will never be, under any circumstances, a makeup exam after the regular exam was missed. If a really inevitable schedule conflict is anticipated, the student must communicate that to the instructor as early as possible in the term, and reasonable accommodations *may* be sought. Last minute notice of a schedule conflict will make the student ineligible for accommodations.

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. Each new concept builds on earlier ones, so it is crucial to keep current with the material. If you are getting behind, seek **immediate** help from your instructor, the TA, or one of the undergraduate tutors. All office hours are displayed on Courseweb.

Self-monitoring tools

Frequently monitoring one's own thinking is crucial to the development of scientific reasoning, which is one of the learning goals of this course. Weekly *self-assessments* will be made available on Courseweb. These online tools will allow you to track your basic understanding of the content as well as the acquisition of broad competencies that go beyond the mere knowledge of content. Such competencies include: translate verbal statements into mathematical conditions, produce a correct free body diagram, recognize irrelevant variables, apply dimensional analysis.

Extra credit

There will be three sources of extra credit. The first one is individual **reports on experiments** done at the *Physics Exploration Center* (Thaw Hall 311). Schedule, instructions, and due dates will be posted on the "Extra Credit" page on Courseweb. Complete reports will be worth 5 points each. The maximum amount of extra credit earnable through lab reports will be 45 points.
The second source is **clicker responses**. Every incorrect clicker answer will be given only 30% the credit of a correct clicker answer, so this may be thought of as a measure of being focused on and up to date with the material, more than one of mere lecture attendance. Individual clicker data will be passed on to the instructor at the very end of the term, after all your regular coursework has been graded. Clicker responses will be worth up to a total of 15 points.
The third and last source will be your **participation in** pre- and post-instruction attitudinal and conceptual **surveys**. Participation in each pair of pre-/post- surveys will be worth 10 points, for a total of 20 points of extra credit. Total maximum extra credit is 80 points.

Grading

The maximum score due to your entire coursework is 1000 points, broken down as follows:

Coursework component	**Weight**
Recitations (lowest score dropped)	100 (10%)
Homework (lowest score dropped)	180 (18%)
Midterm exam 1	140 (14%)
Midterm exam 2	140 (14%)
Midterm exam 3	140 (14%)
Final exam	300 (30%)

Extra credit will be added to your score out of 1000 points at the end of the term. 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 $\sim 93\%$ or more may expect an A, and students who score $\sim 45\%$ 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.

Schedule

Week	Lecture dates	Tentative content
1	Aug 25, 27, 29	units, dimensional analysis, vectors, 1-D kinematics
2	Sep 3, 5 *	free fall, 2-D kinematics, Newton's laws of motion **Sep 1: no class*
3	Sep 9, 11, 13	catalog of forces, application of Newton's second law
4	Sep 15, **17***, 19	uniform circular motion; ***Exam 1**; work and energy
5	Sep 22, 24, 26	conservation of mechanical energy, impulse, momentum, collisions
6	Sep 29, Oct 1, 3	rotational kinematics, torque, moment of inertia, rotational statics
7	Oct 6, 8, 10	rotational dynamics, rotational energy, angular momentum
8	Oct *14*, **15***, 17	oscillations: spring; ***Exam 2**; oscillations: pendulum
9	Oct 20, 22, 24	elastic energy, stress and shear deformation, pressure
10	Oct 27, 29, 31	Pascal's principle, Archimedes' principle, ideal fluid flow, viscous flow
11	Nov 3, 5, 7	temperature, thermal expansion, heat and phase changes, humidity
12	Nov 10, **12***, 14	heat conduction, ***Exam 3**; heat radiation
13	Nov 17, 19, 21	waves, speed of transverse wave, speed of sound, intensity
14	Nov 24*	Doppler effect **Nov 26-28: no class*
15	Dec 1, 3, 5	constructive/destructive interference; diffraction; standing waves

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.

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 (Voice or TTD) to schedule an appointment. The Disability Resources and Services office is located in 140 William Pitt Union on the Oakland campus.