
E - Introduction to Physics

PHYS-1100

Summer 2019 Sections 01, 03 4.0 Credits 06/01/2019 to 06/25/2019 Modified 06/12/2018

Description

This is the first semester of a two-semester sequence of interactive courses. Topics include linear and angular kinematics and dynamics, work and energy, momentum and collisions, forces and fields, gravitation, elementary electrostatics, and motion of charged particles in a magnetic field.

Requisites

MATH-1010 or equivalent or permission of instructor

Course Format: The course requires your preparation for class by working through the textbook. This can be done at your own pace but the assigned material is a prerequisite for the respective classes. Then, in class, your professor will give you a *short* summary lecture on that assigned material and answer any related questions. Following the lecture, you will solve short sample problems under the instructor's guidance. You will then work in teams on an in-class activity that applies and depends the material. Homework will be assigned based on the covered material and the activity, and is due the following class.

Objectives

I. Development of Transferable Professional Skills

- Ability to Work Well in a Group
- Research and Development Skills
- Use of Computer Tools

II. Applying Course Material to Improve Thinking Skills through Quantitative Problem Solving Involving the Application of:

- 1D and 2D motion with constant acceleration.
- Newton's second law in 1D and 2D.
- Conservation of momentum.
- Calculations of work done by a force.
- Spring forces.
- Potential energy.
- Conservation of energy.
- Rotational inertia.
- Conservation of angular momentum.
- Newton's universal law of gravitation.
- Electrostatic forces for point charges (Coulomb's law).
- Electric fields for point charges.
- Electric potential and electric potential energy.
- Forces on and motion of a charged particle in electric and magnetic fields.

III. Understanding of Principles and Theory / Robust Conceptual Understanding of ALL of the Above Topics and:

- Relationships among and definitions of displacement, velocity, acceleration and force.
- Newton's first and third laws.
- Variables important in rotational motion.

- Torque.
- Work-potential energy theorem.
- Impulse-momentum theorem.
- Electric Dipoles.
- Magnetic fields and forces.
- Lorentz forces.
- Scalar (dot) and vector (cross) products of vectors.

You are also expected to demonstrate ability to work well in a group, research and development skills, and knowledge of use of computer tools.

* Course Policies

Laptop Computers

Your laptop computer will be used only during Problems of the Day and Activities. Generally, each team will need only one laptop computer running the LoggerPro software available on the Studio Physics CD. Some activities will not require a laptop computer. These are activities with only a Word document and no other files listed.

All student laptops will be closed during the lecture part of class. Your instructor may give you permission to use your laptop to follow the lecture notes if you cannot see them well from your seat Please don't allow your laptop to be a distraction during lectures.

Because you will be working closely together with people of diverse cultures and backgrounds, please do not have wallpaper, screen savers, and other pictures visible on your laptop that you would be embarrassed to show to your grandmother. This is the same rule of common sense and courtesy you will find when you are working in any major corporation, university, or research laboratory.

Exams

There will be three major (1 hour) unit exams in this course. They will be held on Tuesday Sep. 25, Tuesday Oct. 30, and Tuesday Dec. 4. Exams will be held from 6:00 PM to 7:25 PM. Rooms will be announced.

In each exam, including the final, you will be given a formula sheet. You are allowed to use *only* those formulas (or equations that you derive in writing on the exam paper from those formulas) in the solution of exam problems. It is permitted to use standard math facts or formulas from algebra, trigonometry, etc. Constants will be provided on the formula sheet or in the problems as needed.

We give you 85 minutes for the exams but we aim for one hour's worth of questions. Normally, there are multiple-choice and true/false questions, graphing problems, and homework-type problems. To make sure that you get all the partial credit you are due - not to mention making it easier to grade - please present your work in a neat and logical format. **You must answer each question on the same page as the question, front only**

There will be no make-up exams, but there will be conflict exams for recognized events such as athletic games. The difference is that a make-up exam is a different exam given at a later date, while a conflict exam is the same exam but given at a different time. If you know ahead of time that you are going to miss an exam, for any reason, tell your instructor. Often these problems can be handled. This semester, Physics I was scheduled with a block of time for everyone on Tuesdays from 6-7:25 PM reserved for exams, reviews, and other purposes as needed. In theory, the need for conflict exams should be minimal. If you have a learning disability, you should come to a conflict exam so that we can give you extra time, even if you don't have a schedule conflict.

You may use only the following items to work on the exam: pens (black or blue only), pencils, erasers, rulers, straightedges, and calculators of any type. (Note that any communication between calculators is cheating as explained above. You may not store crib notes on calculators.) Personal items like paper tissues, water bottles, and candy are OK, but please don't hide crib notes in them. Laptop computers, PDAs, cell phones, pagers, knives, scissors, scrap paper, note cards, white-out, glue, tape, and staplers are prohibited from use during an exam.

You may not un-staple the exam. You must put your name on every page. If the exam comes apart or you seem to be missing any pages, or you notice anything else that you need to bring to our attention, please raise your hand and summon a proctor

immediately. Students who promptly and honestly notify us of a problem will not be subject to any academic integrity penalty for the situation reported.

Final Exam

The final examination is optional. *However, if you miss one or more unit exams, excused or not, the final is mandatory.* If you are satisfied with your grade after all activities, homework, and unit exams are complete, then you are finished with Physics I. (See the next section for how we determine grades.) However, if you are not satisfied with your grade, particularly if you have one or more low unit exam scores, you can attempt to raise your grade by taking the final. If you do take the final and hand it in for grading, it counts as two unit tests, giving you an effective total of five exam scores. We drop the lowest score of the five scores, computing your exam average from the best four. *Taking the final does not guarantee you a higher grade; it could lower your grade if you do poorly.*

The final exam lasts three hours, but we aim for two hour's worth of questions. The format is similar to the unit exams, but twice as long.

The final exam date will be scheduled by the registrar. We do not know the date of the final until quite late in the semester. We have often been scheduled on the last day of exams. Hence, until we know the date of the final, do not plan to leave campus before the end of the final exam period. *No special arrangements will be made for students who cannot take the final at the scheduled time.* Physics I is an introductory course and so if you have a conflict between our final and another final, you will likely have to reschedule the other final.

Exam Re-Grade

If you think there was an error in grading your exam or adding up the points, it is up to you to bring the error(s) to your instructor's attention within one week of getting the exam back. Use the cover sheet, front and/or back, and write which problem(s) you think should be re-graded and why. The instructor will take your exam, check it out, and give it back in about a week. Please ask only your own instructor for a re-grade. Exams that have been written on after being handed back, except on the cover page, cannot be submitted for a re-grade. *Under no circumstances will a re-grade be considered for an exam after the next exam or final has been given.*

Institutional Policies

Academic Integrity Policy

Academic integrity is one of the cornerstones of the institute. Students taking courses have a right to expect that their work will be evaluated fairly with respect to other students. They have a right to expect that other students will not attempt to enhance their own grades or the grades of their friends by cheating. Professors have a right to expect that their students are honest and submit work reflecting their own efforts. In an atmosphere of academic integrity, students and professors are on the same team trying to achieve the same learning objectives.

If you attempt to cheat, you are placing yourself in a position where you are at odds with your professors and the vast majority of your fellow students. Some students have discovered to their lasting regret that there was no graceful exit strategy when they were caught cheating. Academic dishonesty is a serious offense and we will treat it accordingly.

The first occurrence of academic dishonesty will result in an F for the course.

The development of teamwork skills is a course objective in Physics I and II. Hence, all students are expected to participate actively in a collaborative group when working on the in-class activity. However, each student must turn in her/his own activity write-up containing only work to which she/he contributed. In other words, we expect you to participate on the team and not just copy other people's work. Activity write-ups from groups of students will not be accepted. No student will submit an activity in the name of any other student who was not present. This is considered cheating by both students involved and will be handled according to the policy for academic dishonesty stated above.

When you take an examination, any type of collaboration is considered cheating. Sharing information about the exam with another student who will take it in the future or is currently taking it is considered cheating for both students. Taking an exam in the name of another person is considered cheating for both. Copying answers from another student's exam without his or her knowledge is

considered cheating only for the one who copies. Using prepared crib notes or a book of any type during an exam is cheating. (You will be given the same formula sheets that you will find below when you take the exam.) Altering or adding to answers when you submit an exam for a re-grade (see below) is cheating.

Discussing homework problems and getting help with them before class is permitted and encouraged. Looking at someone else's solution to learn how to do it before class is permitted. Copying from another student during a quiz, discussing a quiz problem with a student who has not yet taken it, or other forms of academic dishonesty during a quiz are considered the same as cheating on an exam. The only difference is that the use of your textbook during a homework quiz is permitted.

If you get creative and think of a new way to cheat that is not specifically mentioned above, it is still cheating. If you are that creative, please put your talents to better use.