

PHYS 203 Foundations of Physics:
MWF 9–9:50 AM (Lab: W/Th/Fr 1–3:50 PM)
The College of Wooster
Fall 2012

Instructor: Cody Leary

Office Hours: Wed 4–5 PM, Thurs 10:00–11:00 AM, and by appointment

Office: Taylor 108

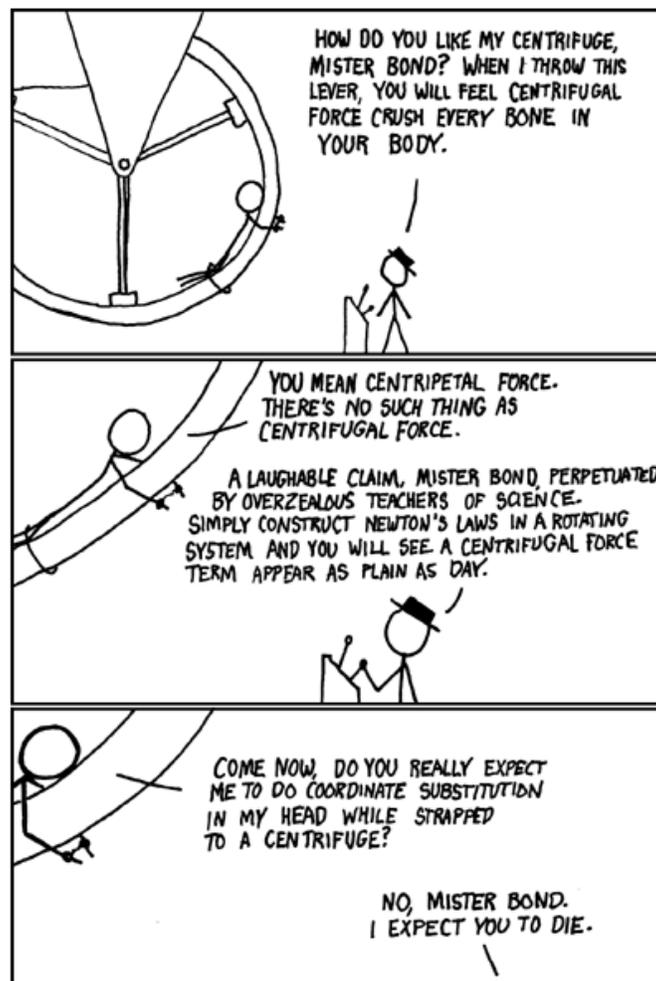
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Text: Sears & Zemansky's University Physics by Young and Freedman, 13th edition

Course Website: <http://woodle.wooster.edu>

Mastering Physics Website: <http://masteringphysics.com> (Course ID: PHYS203LearyFall2012)



<http://xkcd.com/123/>

About This Course

Physics 203 is the first course of our three-semester introduction to physics. In Physics 203, we will learn what is now known as classical physics, from the development of mechanics in the 1600s by Isaac Newton to the thermodynamics fully developed in the 1800s by Ludwig Boltzmann. (In 204, we will learn from Faraday and Maxwell about electromagnetism and light, while in Physics 205, we move from classical physics into modern physics and explore special relativity and quantum mechanics.) The major goals for the course are for students to:

- Develop an understanding of velocity, acceleration, and force from a physicist's perspective
- Understand experimentally how Newtonian physics is a better description of reality, even in this world full of friction and non-perfect objects
- Begin developing the capacity to break down a problem into solvable pieces
- Learn to acquire, analyze and draw conclusions from quantitative data, and
- Learn to explain scientific results effectively and concisely in writing.

Guiding Principles of the Course

- **Physics is not a collection of facts but a way of thinking.** People understand concepts better by seeing them in action and **thinking** about them than by hearing them explained.
- We learn physics by working problems, not by reading about them. Understanding physics is a learned skill, like cooking or playing basketball. It takes time, effort, and practice.
- People tend to learn best by thinking about topics and discussing them with others.
- Students learn most when they take the responsibility for what is learned.

In this course, many topics are counter-intuitive and contradict our existing ideas about how the Universe works. To overcome our misconceptions, we must confront them, figure out why our initial idea is wrong, and build a new understanding of the situation. This takes a lot of practice. Research has shown that students learn and retain the most when they make a sustained consistent effort each week, rather than cramming before exams. To make your time and effort the most efficient, I suggest the following study procedure:

- Complete the assigned reading prior to class. I recommend skimming the chapter and writing down an outline of the headings to form a context for the in-class discussions.
- Listen carefully in lecture and take notes. Really think about the material while in class.
- Start working problems, going back through the chapter to clarify points as they come up. Instead of glancing over the example problems, work them without looking at the answers until you're really stuck. I also suggest you try to answer some of the "Discussion Questions" at the end of the chapter. If you understand these, you probably understand the significant points of the chapter.
- **Think!** Don't just try to fit the problems into an equation or sample problem, think through the question and the physics first.

Woodle

I will regularly update the Woodle course website (available through <http://woodle.wooster.edu>) with homework assignments, exam review problems, and general course information, so you should be checking it regularly. You should be automatically enrolled in this Woodle course within 24 hours of the time when Wooster's Registrar officially adds you to this course, as this synching occurs around midnight each day. Once enrolled in the Woodle course, your login username and password for Woodle should match that of your Wooster email account.

Mastering Physics

You will complete a portion of your homework assignments online through the Mastering Physics website. Mastering Physics is an online product that can give you realtime feedback and hints and you work your way through an assignment online. You must register for Mastering Physics at <http://www.masteringphysics.com> by clicking the "students" tab and typing in your access code, which came wrapped with your textbook if you bought it at the Wooster bookstore. If you obtained your textbook elsewhere, and it does not have a valid access code, then you will have to purchase access directly through <http://www.masteringphysics.com>. You may also be asked for the course ID, which is PHYS203LearyFall2012. Help with registering for Mastering Physics <http://www.masteringphysics.com/site/support/faq-students.html>.

Homework

The homework for this course will come in two forms:

- A **Mastering Physics** online homework set will generally be due on **Tuesday** evenings at 11:59 PM. This assignment will generally include two parts:
 - 1.) Simple questions on the current week's reading assignment. If you've done the reading, you should be able to readily answer these.
 - 2.) Problems related to material covered in class during the previous week.

The purpose of the online homework is to encourage you to keep up with the reading, and to give you immediate feedback on your mastery of the previous week's concepts so that you can rectify any problems before tackling the written homework later in the week. Since Mastering Physics will be used in this course mainly as a self-guided learning tool, you will generally have six tries to answer each Mastering Physics problem assigned for full credit, and there are no penalties for taking advantage of online hints. However, you will have only one try for the simpler reading questions.

- **Written** homework covering the previous week's material will be due each **Friday** at the **beginning** of class (9 AM)

The homework schedule is intended to coincide with the weekly homework help sessions which occur each Tuesday and Thursday in Taylor 101 from 8:00–10:00 PM (see the "Getting Help" section below for further details). I will endeavor to post homework assignments on Woodle for the upcoming week by Saturday evening.

Late Homework

Mastering Physics Homework

There is a late homework penalty of 10% **per hour** of the assignment's point value for all Mastering Physics online homework. However, credit for an assignment will never be reduced more than 50% for a Mastering Physics assignment because of lateness, so you may receive up to 50% of an assignment's point value by completing it, even if it is more than five hours late.

Written Homework

No credit will be given for late written homework.

How Written Homework is Graded

The grader will look over each written assignment for **neatness** and **completeness**; 50% of the point value of the assignment will be awarded as a result of these factors. For each written assignment, several problems will be chosen and graded carefully. The remaining 50% of the point value of the assignment will be awarded from your performance on the selected problems.

Each selected problem will be graded according to the following scale (patterned off Thomas Moore's approach at Pomona):

- 5 pts: good effort with no errors (correct results and reasoning and well-explained)
- 4 pts: good effort but with minor errors OR fair effort (not well-explained) with no errors
- 3 pts: good effort with modest conceptual or math errors OR fair effort with minor errors
- 2 pts: good effort with serious errors OR fair effort with modest conceptual or math errors
- 1 pt: very poor effort
- 0 pts: no effort

The two lowest **written** homework grades will be dropped.

About Homework

The goal of the homework is for you to practice. In some ways, physics is like a sport or like playing a musical instrument. It is not enough to know intellectually how to throw a football pass or how to play arpeggios on the piano. To actually hit the receiver or make it to Carnegie Hall, you have to practice. For physics, that practice is homework. Like sports or music, it is more important to try than to worry about getting it right the first time. To encourage you to work on the challenging homework problems, they are graded partially on effort. The important part of your homework is how you solve the problem, not the number that you get as a result. If the number were really important, it would not already be in the back of the book. Consultation and collaboration with your fellow students is recommended, but the homework solutions you hand in must be your own work.

To make the homework process more effective, please follow these guidelines:

- **No more than two homework problems per page.** This is to allow you plenty of room for your ideas, and for legibility for the grader. You don't have to use new paper; the clean side of scrap paper from the recycling bin is fine.
- Use algebra when working the problem. Although it seems to make the problem easier, substituting numbers in makes it harder to understand the physics.
- Check your answer at the end to see if it makes sense. Are the units right? Is the order of magnitude of your number plausible?
- For full credit, your solution must be clear enough to be easily understood by the grader. Your work should be organized and in a logical order. Neatness counts.

The secret to success in this course is taking the homework seriously! Work the problems and come to office hours with any questions that arise.

How the course will be graded

Your grade will be calculated as follows:

Mastering Physics online homework sets:	10%
Written homework sets:	15%
Labs:	20%
In-class Exams:	30%
Final Exam:	25%

Final Grade:

A 92.5-100%, A- 90.0-92.4%, B+ 87.5-89.9% . . . , C- 70.0-72.4%, D 60.0-69.9%, F 0-59.9%

This course is designed so that the average student will do well, corresponding to a B. You are not competing against each other; it is possible for everyone to earn an A in this course. If I find that I have made the exams more difficult than I intended, I may relax the above final grade standards slightly, but they will not be raised.

Getting Help

Office Hours

I really enjoy teaching physics and am happy to help you outside of class, with either individual attention or in groups. If you would like help, please feel free to drop by my office during my regular office hours, or any other time you see my door open. If your schedule conflicts with my office hours, you can contact me about making an appointment outside of these times.

Homework help and peer tutoring

Homework help sessions occur each Tuesday and Thursday in Taylor 101 from 8:00–10:00 PM. There are also student tutors paid by the physics department that would be happy to meet with you one-on-one (see <http://www3.wooster.edu/physics/> for further details).

Academic Support from the Learning Center

The Learning Center (ext. 2595) offers services designed to help students improve their overall academic performance. Sessions are structured to promote principles of effective learning and academic management. Any student on campus may schedule sessions at the Learning Center. The Learning Center also offers a variety of services and accommodations to students with disabilities based on appropriate documentation, nature of disability, and academic need. Any student with a documented learning disability needing academic accommodations is requested to speak with me and with Pam Rose, Director of the Learning Center (ext. 2595), as early in the semester as possible. All discussions will remain confidential.

Campus-Wide Policies

Academic Honesty and the Code of Academic Integrity

The academic program at the College seeks to promote the intellectual development of each student and the realization of that individual's potential for creative thinking, learning, and understanding. In achieving this, each student must learn to use his/her mind rigorously, independently, and imaginatively.

The College's understanding and expectations in regard to issues of academic honesty are fully articulated in the Code of Academic Integrity as published in The Scot's Key and form an essential part of the implicit contract between the student and the College. The Code provides a framework at Wooster to help students develop and exhibit honesty in their academic work. You are expected to know and abide by the rules of the institution as described in The Scot's Key and the Handbook of Selected College Policies at www.wooster.edu.

Dishonesty in any of your academic work is a serious breach of the Code of Academic Integrity and is grounds for an F for the entire course. Such violations include turning in another person's work as your own, copying from any source without proper citation, crossing the boundary of what is allowed in a group project, submitting an assignment produced for a course to a second course without the authorization of all the instructors, and lying in connection with your academic work. You will be held responsible for your actions. Particular attention should be directed to the appropriate use of materials available through the Internet. Whether intentional or not, improper use of materials is a violation of academic honesty. If you are unsure as to what is permissible, please contact your course instructor.

Policy Regarding Conflicts with Academic Responsibilities

The College of Wooster is an academic institution and its fundamental purpose is to stimulate its students to reach the highest standard of intellectual achievement. As an academic institution with this purpose, the College expects students to give the highest priority to their academic responsibilities. When conflicts arise between academic commitments and complementary programs (including athletic, cultural, educational, and volunteer activities), students, faculty, staff, and administrators all share the responsibility of minimizing and resolving them.

As a student you have the responsibility to inform the faculty member of potential conflicts as soon as you are aware of them, and to discuss and work with the faculty member to identify alternative ways to fulfill your academic commitments without sacrificing the academic integrity and rigor of the course.

Policy Regarding Final Examinations

The College sets the final exam date, and professors are not authorized to grant exceptions. Students who wish to reschedule a final exam must petition the Dean for Curriculum and Academic Engagement in writing in advance of the examination. The student must confer with the instructor before submitting a petition, and the instructor should indicate to the Dean if he or she supports the petition. Normally, such petitions are granted only for health reasons. If other reasons necessitate a request for a change in a final exam, the request must be submitted three weeks in advance of the examination.

Table 1: **Preliminary Class Schedule**

Week	Week Starting	Reading	Topic
1	8/27	Ch 1, 2	Units, Sig Figs, Vectors, 1-D Motion
2	9/3	Ch 2, 3	Velocity, Acceleration, Projectile Motion
3	9/10	Ch 4	Force, Mass, Newton, Free-Body Diagrams
4	9/17	Ch 5	Dynamics, Friction, Circular Motion
5	9/24	Ch 6, 7	Work, Energy, Conservative Forces
6	10/1 (Exam Mon: Ch 1–5)	Ch 8	Momentum Conservation, Collisions
7	10/8	Ch 8, 9	Collisions, Rotational Motion and Energy
8	10/15	Ch 9, 10	Fall Break , Moment of Inertia, Torque
9	10/22	Ch 10	Rigid Body Rotation, Angular Momentum
10	10/29	Ch 13	Gravitation, Weight, Orbital Dynamics
11	11/5 (Exam Mon: Ch 6–10)	Ch 14	Simple Harmonic Motion
12	11/12	Ch 14, 17	The Pendulum, Temperature and Heat
13	11/19	Ch 17	Calorimetry, Phases, Thanksgiving Recess
14	11/26	Ch 18, 19	Ideal Gas, Laws of Thermodynamics
15	12/3	19, 20	Thermodynamic Processes, Heat Engines, Entropy
			Final Exam: Mon 12/10 at 7:00 PM