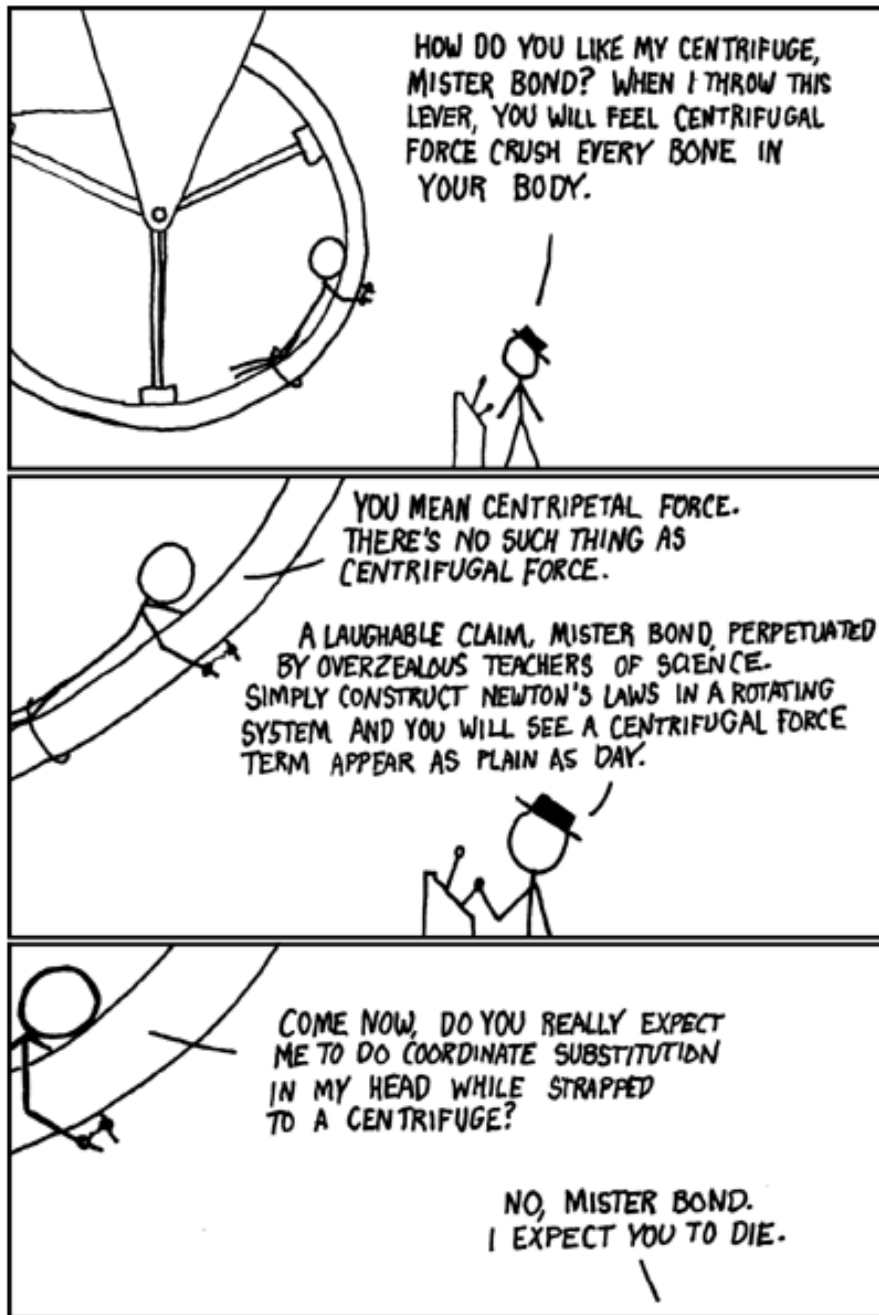


Physics 203: Foundations of Physics
The College of Wooster
Fall 2011
Instructor: Cody Leary



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

**PHYS 203 Foundations of Physics:
MWF 9-9:50 AM (Lab: W/Th 1-3:50 PM)
The College of Wooster
Fall 2011**

Instructor: Cody Leary

Office Hours: Mon 3-4 PM, Tues 9-10 AM, Tues 3-4 PM, and by appointment

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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>

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.

Physics is not a collection of facts but a way of thinking. No one can teach you physics. Only you can teach yourself to think.

Guiding Principles of the Course

- 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 working problems. 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:

- Read the chapter 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 to the 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 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

You will need to log on to the Woodle course website at <http://woodle.wooster.edu> in order to view your written homework assignments. 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 syncing 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>. Help with registering for Mastering Physics and information about how assignments are graded can be found at <http://www.masteringphysics.com/site/support/faq-students.html>.

Homework

The homework for this course will come in three forms:

- A **Mastering Physics** online reading quiz will be due each Wednesday morning by 8 AM
- **Mastering Physics** online homework will be due each Thursday afternoon by 4 PM
- **Written** homework will be due each Monday at the **beginning** of class (9 AM)

The required reading on which you will be quizzed each Wednesday is posted on the schedule at the end of this syllabus. By no later than 12:00 PM each Sunday, I will post the coming week’s online homework on the Mastering Physics website, as well as the written homework due the following Monday.

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.

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. If you already know the solution, it isn’t a problem, but an exercise. 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 wouldn’t 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 corrections and room for your ideas. 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 class and office hours with any questions that arise.

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.

Scheduling Individual Appointments During My Regular Office Hours

The first two fifteen minute slots of each of my regular office hours can be used to schedule an individual (or group) appointment with me, if you would like to ensure individual attention at that time. To sign up for such an appointment, simply log on to Woodle and click on "Schedule an office hours appointment" for the week you are interested in. Once taken, a time slot is displayed to other student as unavailable in Woodle. I will still be in my office during any unfilled time slots and am happy to help any "drop-ins" in such a case.

Spontaneous Drop-ins

The second half of each hour of my regular office hours is dedicated to spontaneous, unscheduled "drop-ins", so no meetings may be pre-scheduled at this time.

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.

Grading

Your grade will be calculated as follows:

Mastering Physics online reading quizzes:	5%
Mastering Physics online homework sets:	5%
Written homework sets:	10%
Exam 1:	20%
Exam 2:	20%
Final Exam	20%
Labs	20%

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%

The above final grade standards may be relaxed, but will not be raised.

How Written Homework is Graded

The grader will look over each written assignment for **neatness** and **completeness**; 50% of the point value of the 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 problems will not be graded but will simply be looked over for neatness and completeness, see above). 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 Moores 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.

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	Reading	Date	Topic
1	1.1-1.6, 2.1-2.3	M 29 Aug	Course Intro
		W 31 Aug	Units, dimensional analysis, sig. figs.
		F 2 Sept	1D motion, average speed, velocity, acceleration
2	2.4-2.5, 1.7-1.9, 3.1-3.3	M 5 Sept	Constant acceleration, Freefall
		W 7 Sept	Vectors
		F 9 Sept	Velocity, Acceleration, Projectile Motion
3	3.4-3.5, 4.1-4.6	M 12 Sept	Circular motion, Relative velocity
		W 14 Sept	Forces: Newton's 1st and 2nd Laws
		F 16 Sept	Mass, Newton's 3rd Law, Free-body diagrams
4	5.1-5.5	M 19 Sept	Particles in equilibrium, Dynamics of particles,
		W 21 Sept	Frictional forces, Dynamics of circular motion
		F 23 Sept	Catch-up and review
5	6.1-6.2, 7.1-7.2	M 26 Sept	Exam 1: Chapters 1 - 4
		W 28 Sept	Work, Kinetic Energy, Work-Energy Theorem
		F 30 Sept	Gravitational potential energy, Elastic potential energy
6	7.3-7.4, 8.1-8.4	M 3 Oct	Conservative forces, Force and Potential Energy
		W 5 Oct	Momentum and impulse
		F 7 Oct	Conservation of momentum and collisions
7	9.1-9.6	M 10 Oct	Angular velocity and acceleration, rotational motion
		W 12 Oct	Energy in rotational motion
		F 14 Oct	Parallel-axis theorem, Moment of inertia
8	10.1-10.6	M 17 Oct	Fall Break
		W 19 Oct	Torque and angular acceleration
		F 21 Oct	Rigid body rotation, Angular momentum
9	...	M 24 Oct	Catch-up and review
		W 26 Oct	Review
		F 28 Oct	Exam 2: Chapters 5-10
10	11.1-11.3	M 31 Oct	Conditions for Equilibrium
		W 2 Nov	Center of gravity
		F 4 Nov	Rigid-bodies in equilibrium
11	14.1-14.6	M 7 Nov	Describing oscillation
		W 9 Nov	Simple harmonic motion and energy
		F 11 Nov	Applications of simple harmonic motion, The pendulum
12	13.1-13.4	M 14 Nov	Newton's Law of gravitation
		W 16 Nov	Weight, Gravitational potential energy
		F 18 Nov	Motion of satellites and planets
13	...	M 21 Nov	TBA (Thermodynamics)
		W 23 Nov	Thanksgiving Recess
		F 25 Nov	Thanksgiving Recess
14	TBA	M 28 Nov	TBA
		W 30 Nov	TBA
		F 2 Dec	TBA
15	TBA	M 5 Dec	TBA
		W 7 Dec	TBA
		F 9 Dec	TBA