Physics 111—General Physics I: Mechanics and Thermodynamics Section 2, TR 11:00 a.m. – 12:15 p.m.
Course Description, Fall 2013

Instructor:	Andrew Dougherty
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Office Hours: I will have regular weekly help sessions. Since our homework will usually be due on Tuesdays, I will normally hold help sessions on Monday afternoons from 1–4 p.m. Beyond that, I will usually be either in my office or lab during the free times indicated on my schedule. Please feel free to call, e-mail, or stop by at any time and ask a question or set up an appointment.

Classes on Snow Days and Other Emergencies: If I am unable to make it to class, I will leave a message on my voice mail (610-330-5212).

Description: This course is a non-calculus-based introduction to the foundations of physics, designed primarily for students in science who do not require a calculus-based physics course. Topics will include kinematics, dynamics, conservation laws for linear momentum, angular momentum, and energy, mechanical oscillations, and thermodynamics. Recognizing and applying physical ideas is stressed; there will also be emphasis on problem solving.

The student work in this course is in full compliance with the federal definition of a four credit hour course.

Student Learning Outcomes: After completing this course, a student should be able to

- understand, identify, and apply the fundamental principles of physics in a variety of physical situations.
- use both qualitative reasoning and quantitative problem-solving skills in applying those principles.
- apply Newton's laws of motion to simple mechanical systems,
- use conservation of energy, when appropriate,
- use conservation of momentum, when appropriate,
- use conservation of angular momentum, when appropriate,
- describe and predict the behavior of oscillating systems, and
- apply the three laws of thermodynamics.

Students *also* should be able to engage in the *process* of doing physics, including such tasks as

- developing and testing models,
- generating and interpreting experimental data,
- understanding the role of uncertainty,
- solving problems, and
- communicating results.

Corequisite: Math 125 (or 141 or 161). In addition, high school algebra and trigonometry are used extensively.

Texts: *College Physics: A Strategic Approach Technology Update*, second edition, by Randall D. Knight, Brian Jones, and Stuart Field, ISBN-13: 9780321815118, along with along with an online homework component *Mastering Physics*. You can purchase this as a single package at the bookstore. If you did not get *MasteringPhysics* with your text, then you may purchase it online at `http://www.masteringphysics.com/`. Our course ID is `LafayettePhys11102Fall2013`. You will also need the *Physics 111 Laboratory Manual*, available in the bookstore.

Your Responsibilities:

Read the text. Your text is a critical resource for this class—it is a source of definitions, facts, ideas, explanations, derivations, and worked examples. I do not intend to spend class time simply repeating the text. Instead, class time will be used to *discuss* those ideas, answer your questions, observe demonstrations, do examples, and practice applying those ideas to various physical situations.

Accordingly, you should read the text ahead of time. I have included a detailed daily syllabus so you know what the assigned readings for each day will be. Occasionally, we may have unannounced quizzes on the assigned reading material.

Ask questions. If you are confused, it is important that you stop me and try to sort it out rather than falling behind. *Please* interrupt and stop the class whenever anything isn't clear. Remember that if you are confused, there are almost certainly many others who are confused as well, and they would welcome your question.

Do all assigned work. A good rule of thumb is that you should anticipate spending approximately two hours outside of class for each hour in class for a college course. This means you should anticipate spending an average of six hours per week outside of class for physics (not including the lab). Plan ahead. I am here to help. If you start on your homework ahead of time, I will be available to help you if you get stuck. Don't wait until the night before an assignment is due before starting it.

Participate in class. Class time will be used to go beyond merely reading the text. Your active engagement during class can play an important part in helping you to master the material. Class time will also be used to announce changes to the syllabus. It is *your* responsibility to keep up.

Tests: There will be three hour-long in-class tests on the dates indicated on the syllabus. There may also be additional quizzes, either announced or unannounced.

Equation Sheet: You will receive an equation sheet with each test. I have included a copy with the course description so that you may use it as you study and do homework problems. The idea is that you will use your study time to focus on the fundamental ideas and practice doing physics rather than to memorize formulae.

Homework Problems: Homework assignments will be due at the beginning of class on the dates indicated on the syllabus. Some assignments will be given and graded on the Web using *MasteringPhysics*, an on-line system with quick feedback, hints, and guided tutorials. Other assignments will be pencil-and-paper problems; these problems will typically focus

as much on the *methods* of solving problems as on getting the right numerical answer. Some of these problems may be graded by student graders; others will be graded by me.

- Problems will be due at the *beginning* of class. **Late homework will normally not be accepted**, since I will hand out solutions in class.
- For written homework, please staple your pages together. This ensures your pages don't get lost.
- **Illegible papers will not be accepted**. If I have difficulty reading or understanding your work, I may return it to you ungraded for re-submission. You may resubmit a legible version (along with the original) by the next class meeting, but that version must not have any new content—it must simply be a legible version of the original.
- Please look at the homework problems ahead of time and ask questions about them either in or out of class. I am happy to give whatever help you need, but it is important that you eventually learn to do these problems on your own—after all, that's what you will have to do on the tests.

Supplemental Instruction: Phys 111 participates in the Supplemental Instruction program (SI) run through Lafayette's Academic Tutoring and Training Information Center (ATTIC). More information will be available on the first day of class.

Academic Honesty: The fabric of science, and indeed any intellectual endeavor, is built on the integrity of all involved. Accordingly, I take academic honesty very seriously. I expect that you will abide by the "Principles of Intellectual Honesty" appearing in the Lafayette College Student Handbook.

Working with others is often a helpful way to learn physics. I encourage you to collaborate with each other on homework, but unless specifically directed otherwise, all work you turn in as your own should be your own.

Academic dishonesty can hurt you in many different ways. First, of course, it is wrong to turn in someone else's work as your own. If you get caught, the penalties can be severe. Second, it hurts your grade. Learning to do problems by yourself is the best preparation for the tests. Students who take the "easy" way out and get excessive or inappropriate help from others tend to get significantly lower grades on the tests.

There are a variety of resources available to help you in your study of physics. These include my office hours, SI, tutoring through ATTIC, and working with classmates. Some students also find it useful to consult other texts, friends, and even a variety of on-line sources. In all cases, though the principles of academic honesty apply: All collaborators must be acknowledged (apart from your instructor), and all work you turn in must be your own.

Please read the department's Academic Honesty policy for the rules regarding collaboration. Feel free to ask if you have any questions about this policy.

Laboratory: The laboratory is an essential part of this class, and successful completion of the laboratory is required in order to pass the course. You are responsible for completing all of the assigned experiments at the scheduled times. If you can not make it to your scheduled lab, please try to come to one of the other sections for this course. You can't count on the equipment being available outside of the scheduled lab times.

Final Exam: There will be a comprehensive final exam at a time to be arranged by the registrar. *Please do not make travel plans that conflict with the scheduled exam time.*

Grades: Your grade will be based on homework (20%), tests and quizzes (40% total), the final exam (20%), and the laboratory (20%). The lowest homework assignment will be dropped. Feel free to ask questions about how your grade is determined.

Andrew Dougherty Fall 2013
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Time	Mon.	Tues.	Wed.	Thurs.	Fri.
8:00 8:30					
9:00 9:30					
10:00 10:30	*prep*	*prep*	*prep*	*prep*	*prep*
11:00 11:30	**FYS 175** HSC 017	**Phys 111** HSC 100 (12:15)	**FYS 175** HSC 017	**Phys 111** HSC 100 (12:15)	**FYS 175** HSC 017
12:00 12:30					**Physics Club**
1:00 1:30	*Office Hours*			*Office Hours*	
2:00 2:30					
3:00 3:30					
4:00 4:30	Department Meeting	Faculty Meetings	**Physics Club**		

Syllabus		**Physics 111**	**Fall 2013**
Aug.	27	Welcome and Introduction	Ch. 1
	29	Motion in One Dimension	Ch. 2:1–5
Sept.	3	Constant acceleration; Free-fall HW #1	Ch. 2:6–7
	5	Motion in Two Dimensions	Ch. 3:1–5
	10	Projectiles; HW #2	Ch. 3:6–8
	12	Forces	Ch. 4:1–5
	17	Newton's Laws; HW #3	Ch. 4:6–8
	19	**Hour Exam I**	
	24	Applying Newton's Laws	Ch. 5:1–4
	26	Friction; Interacting Objects	Ch. 5:5–8
Oct.	1	Circular Motion; HW #4	Ch. 6:1–4
	3	Gravity	Ch. 6:5–7
	8	Rotational Motion; Torque; HW #5	Ch. 7:1–4
	10	Moment of Inertia; Rolling Motion	Ch. 7:5–6
	15	*Fall Break*	
	17	Momentum; HW #6	Ch. 9:1–4
	22	**Hour Exam II**	
	24	Collisions; Angular Momentum	Ch. 9:5–7
	29	Work and Energy; HW #7	Ch. 10:1–4
	31	Conservation of Energy	Ch. 10:5–8
Nov.	5	Energy; First Law; HW #8	Ch. 11:1–5
	7	Second Law	Ch. 11:6–9
	12	Ideal Gas Processes; HW #9	Ch. 12:1–4
	14	Specific Heat; Heat Transfer	Ch. 12:5–8
	19	**Hour Exam III**	
	21	Fluids; Pressure	Ch. 13:1–4
	26	Fluid Dynamics; HW #10	Ch. 13:5–7
	28	*Thanksgiving*	
Dec.	3	Oscillations	Ch. 14:1–4
	5	Damped Oscillations; Resonance; HW #11	Ch. 14:5–7

Final Exam (cumulative)