Instructor: Brad Antanaitis (Dr. A)  
Office: HSC 024  610-330-5209  
Biophysics Lab: HSC 021  
NMR Lab: HSC 301 (no phone)  
E-mail: antanaib/@lafayette.edu

Course Website: We will use Moodle – [http://moodle.lafayette.edu](http://moodle.lafayette.edu). “PHYS 111.02 Fall 2015 General Physics” should be in your list of current courses. Handouts, homework assignments/solutions, supplemental articles, etc. can be downloaded from this site. Taking a few moments to explore this site at the beginning of the semester is highly recommended.

Course Locations and Times:

Class: Hugel Science Center – 100  
Monday, Wednesday, Friday: 11:00 – 11:50 AM

Labs: Hugel Science Center 119  
Phys 111L-01 Wednesday (1:10-4:00 PM, Dr. A); Phys 111L-02 Wednesday (7:00-9:50 PM, Wong); Phys 111L-03 Thursday (8:00-10:50 AM, Shelley); Phys 111L-04 Thursday (1:10-4:00 PM, Alexander); Phys 111L-05 Thursday (7:00-9:50 PM, Knight)

Office Hours: The SI for our class is Shannon Hartzell (email - hartzels) who will typically hold a problem help session and schedule drop-in times during the week. You may also drop in any time you see a free period in my schedule. Interacting with students is one of my favorite activities and a source of considerable joy. So, don’t be shy, just call, e-mail or stop by whenever a question arises or you wish to discuss material in greater depth than we have had time for in class. If I’m not in my office, look across the hall in the biophysics lab or upstairs in the NMR lab. If that fails, talk to Debbie, our secretary, upstairs in room 124 – she usually knows where I am.
Classes on Snow Days and Other Emergencies: If I am unable to make it to class (I live in Morrisville, PA, about 55 miles from Easton), I will send an email message via Moodle.

Description: This course is mainly an algebra-based introduction to Newtonian dynamics and classical thermodynamics designed primarily for AB science majors, pre-med students or anyone who is curious about the structure of the universe and how things work. We will study kinematics and dynamics with an emphasis on conservation laws for linear momentum, angular momentum and energy. Simple physical models of wide applicability, such as the harmonic oscillator, will also be examined. We will also study how the four laws of thermodynamics can be applied to systems of practical importance and how these laws, especially the first, is related to mechanics.

Goals: This course will enable you to understand, identify and apply the fundamental principles of classical mechanics and thermodynamics to a wide variety of situations, from solving simple end-of-chapter problems to tackling the knotty, multi-faceted problems that currently plague mankind, global warming, for example. It will emphasize both qualitative reasoning and quantitative problem-solving. A secondary goal is to introduce the student to the process of doing physics, vid., developing and testing models, solving problems and communicating results in a clear and coherent way. Many of the skills developed in this course will be readily transferable to other fields of study, especially biology, chemistry, engineering, geology, medicine, neuroscience and environmental studies.

Student Learning Outcomes:

- Students will be able to apply the laws of mechanics and thermodynamics to a wide variety of situations, including those encountered in everyday life.
- Will develop a Newtonian intuition about motion, describing it mathematically and understanding its causes.
- Will be able to modify a simple physical model, e.g., free fall, to include realistic effects like air drag.
- Will be able to identify and/or formulate a testable scientific hypothesis.
- Will be able to generate and evaluate evidence necessary to test and/or revise a hypothesis.
• Will understand how scientific uncertainty informs the evaluation of scientific hypotheses
• Will acquire the machinery necessary to describe oscillatory motion.
• Will acquire or sharpen the mathematical skills necessary to write and solve equations of motion for a number of simple systems.
• Will sharpen critical thinking skills and continue developing their analytical skills as they analyze ever more complicated physical systems.
• Will acquire an impressive array of problem-solving tools and cultivate a mindset of rational exploration
• Will appreciate the foundational nature of Physics and its relationship to other related disciplines as well as its connection with the solution of real-world problems.

**Co-requisite:** Math 125, 141 or 161.

**Texts:** *Physics 4th ed. Technology Upgrade* by James S. Walker; we will also use Mastering Physics for on-line homework assignments. You can sign up for Mastering Physics at http://www.masteringphysics.com. For this purpose you will need to purchase an access code for this particular textbook. Note: if you bought your textbook from a vendor other than the college bookstore, the access code may not be for Mastering Physics. You will also need the *Physics 111- Laboratory Manual*, available in the bookstore.

**Your Responsibilities:** Your textbook is a critical resource for this class – it is a source of definitions, facts, concepts, explanations, derivations and worked examples. I do not intend to waste your time simply by parroting exactly what is in the text. Instead, I will devote class time to discussing key ideas, answering questions, giving demos and practicing the application of those ideas to richly varied physical situations. Many of these explorations will have a distinct biological, medical or environmental flavor, while others will be practically oriented.

Accordingly, you should read the text prior to coming to class. You can anticipate topics for discussion by appealing to the course syllabus.
**Ask questions.** If you are confused, feel free to interrupt the class and ask a question. Chances are good that your confusion is shared by others and they will welcome your question.

**Do all assigned work.** A useful rule of thumb for any college course is that you should spend approximately two hours out of class for every hour in class. For this course that means devoting an average of six hours per week outside of class (not including lab). Do yourself a favor and plan ahead! Don’t wait until the night before an assignment is due to start it.

**Participate in class.** Class time will be used to go beyond what can be gleaned from reading your text alone. Active engagement during class can and should play an important role in helping you master the material. To encourage your active involvement, I will often initiate discussion of the physics behind a demo or a toy brought to class. Class time will also be used to announce changes to the syllabus. It will be your responsibility to keep up.

**Tests:** There will be three in-class exams on the dates marked on the syllabus. There will also be a cumulative final exam on a date to be determined by the registrar, *vide infra.*

**Equation Sheet:** An equation sheet will accompany each test. A copy has been included with the course description packet so that you can 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 just memorizing formulas.

**Homework Problems:** Homework assignments will be due at the **beginning** of class on the dates indicated in the syllabus. Some assignments will be given and graded on the Web using **Mastering Physics,** an on-line system with quick feedback, hints and guided tutorials. Other assignments will be pencil-and-paper problems and these problems will often focus as much on the methods of solving problems as on getting the right numerical or symbolic answer. These problems will usually be graded by student graders. Your lowest homework grade will be dropped at the end of the semester. All assignments and other relevant course information will be available on Moodle (Physics 111 – Mechanics and Thermodynamics).
• Problems will be due at the beginning of class. **Late homework will normally not be accepted**, since solutions will posted on Moodle after the assignment is due.

• For written homework, please staple your pages together. This assures they won’t get separated or lost.

• **Illegible papers will not be accepted.** If I or the graders can’t read or follow your work, it may be returned to you ungraded for resubmission. 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 will be happy to give you whatever help you need, but eventually you must learn to solve these problems on your own. After all, that is precisely what you will be expected to do on exams and more importantly, later in life.

**Academic Honesty:** Working with others is often a helpful way to learn physics. I encourage you to collaborate with each other on homework, but the work you turn in must be your own. If, in fact, you do collaborate with fellow students, be sure to include their names at the top of your homework paper. You should read the department’s Academic Honesty policy for rules regarding collaboration. If some point is unclear, be sure to ask me for clarification.

**Laboratory:** You are responsible for completing all of the assigned experiments at the scheduled times. If you can’t make it to your scheduled lab, try to come to one of the other lab sections for this course. There are five laboratory sections for this course (see course locations and times). 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 determined by the registrar. Please don’t make travel plans that conflict with the scheduled final exam.

**Grades:** Your course grade will be based on homework (25%), tests (30% total), the final exam (20%) and the laboratory (25%). Feel free to ask me
how your grade is determined and how you are doing at any time during the semester.

**Meeting Federal Credit Hour Standards:** The student work in this course is in full compliance with the federal definition of a four credit hour course.

**Moodle & Privacy:** Moodle contains student information that is protected by the Family Educational Right to Privacy Act (FERPA). Disclosure to unauthorized parties violates federal privacy laws. Courses using Moodle will make student information visible to other students in this class. Please remember that this information is protected by these federal privacy laws and must not be shared with anyone outside the class. Questions can be referred to the Registrar's Office.