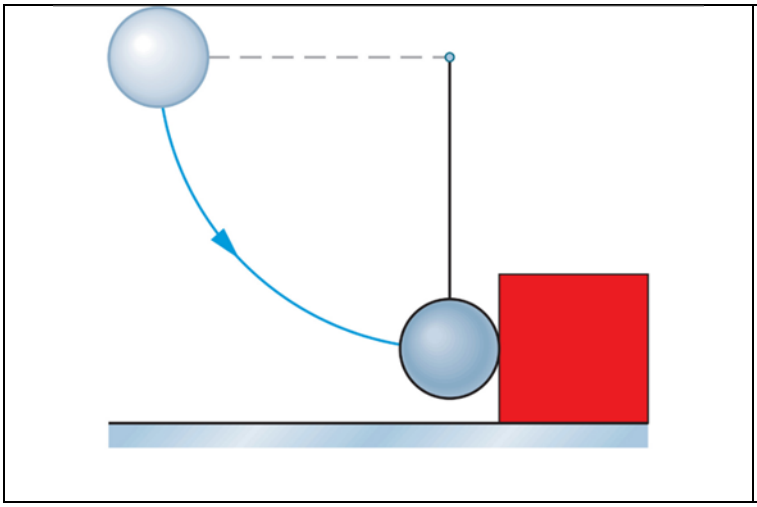
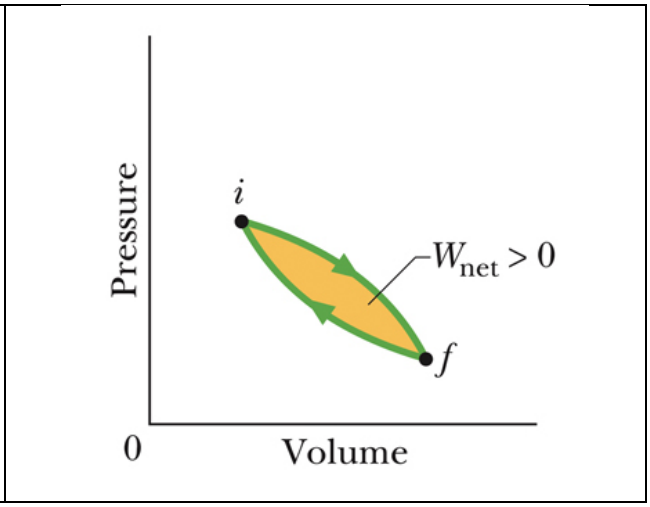
Physics 2921

Honors General Physics I

Fall 2014

Lectures-(Gladfelter Hall L013) **M W F 1:00-1:50 PM**
Laboratory (Barton BA200) Sec 41@ R 9:00 10:50AM Sec 42@ W 2:00 3:50PM Sec 43@ R 2:00 3:50PM **Recitation-Sec 1** M 2-2:50 **(BE 413)** and **Sec 2** M 3-3:50**-(BE 415)**





Lecture Instructor: Professor *Zbig Dziembowski*

Physics Faculty Advisor

E-mail: dziembow@temple.edu

Office: Barton Hall BA225/ SERC 412

Office hours: Monday 4:00-5:00PM and TWR 3:30-4:30PM
or by appointment

Laboratory Instructor: TBA

Course Description: This course is the first of a two-part calculus-based general physics sequence intended for engineers and science majors. The course is designed to train you in a wide variety of problem-solving skills that you will be able to transfer far beyond this physics course. Doing well in this course does not require you to be brilliant but will have to use your critical thinking, analytical reasoning skills toward new concepts in physics and you will have to apply these ideas in order to solve computational problems. To accomplish the latter, you will need mathematical skills acquired upon completion of two semesters of calculus.
Prerequisite: Mathematics 1042 or equivalent background in calculus.

Course Learning Outcomes: If you complete this course and do well, you will be able to

1. understand the fundamental principles of classical mechanics and thermodynamics
2. develop solid and systematic problem solving skills by use of qualitative and quantitative reasoning, and by experimental investigation.
3. understand connections of physics to other science disciplines.

Course Calendar: weekly course content topics are listed below, along with exam dates.

Required materials:

- **Text and WebAssign access code**: "Fundamentals of Physics," 10th Edition by David Halliday, Robert Resnick, Jearl Walker VOLUME 1 packaged with the Web Assign code (ISBN 9781118731239). Students must create a WebAssign account. Class Key for our course is *temple 1569 7489*. There is a Student Quick Start Guide with instructions to follow posted on Blackboard. These two items (the text and access code) can be also purchased separately at a discount from Amazon (book) and Wiley (access code).
- **TurningPoint response pad (clicker)** - recommended model *RF LCD*. You can purchase a clicker from our Bookstore or from the Turning Technologies online store. (http://store.turningtechnologies.com/) When accessing the Turning Technologies online store, you will be prompted for a school code. The code for Temple University is 6mS4. Newly acquired clickers have to be registered at Temple web site. Follow the instruction posted at https://computerservices.temple.edu/clickers-students.

Website: The course's website is available on Blackboard Course Management System and it can be accessed from the TUportal using your Temple e-mail username and password. Here you will find important announcements, updates to this syllabus, laboratory scripts, assignments and other material. You will also be able to view your current grades.
Lecture participation: You are strongly advised to read the textbook before each lecture: You will benefit much more from the lectures if you have already tried to absorb some of the material beforehand. Lectures will be conducted in a very interactive fashion. The lecture room is equipped with radio receiver and you will use a response pad (clicker) to answer brief multiple choice questions. When the instructor poses a multiple choice question, you will be given one or two minutes to think about the question and consult your neighbor before answering with your pad. The purpose of these questions is twofold: to stimulate in-class discussions and to provide feedback to the instructor about how well you understood the material. Full credit (100%) will be given for each correct answer and 80% for each incorrect answer. No credit (0%) will be given to a missed answer. Therefore it pays off to answer the question even if you get it wrong. About 5% of your final grade will be earned answering the questions posed in lectures.
In-class exams: There will be one midterm exams (see the course calendar), worth about 15% of the final course grade, and a cumulative final exam worth about 30% of the final course grade (see Grading policy). The average difficulty of questions given at the exams should be similar to that of the more difficult problems from your WebAssign homework and recitation examples. Note that a missed exam will result in no credit. A makeup exam will be given only to those students who were medically incapacitated on the day of the exam and bring an official doctor's note to document that.
Recitations: Recitations will be given once a week on Monday. You are expected to attend and participate actively in all recitations. At recitation your instructor will illustrate a systematic framework- ***the 5-step***

strategy! (see below) by solving problems based on the conceptual material covered in the most recent course unit.

Homework (PSW=The Problem Set of the Week): Homework means applying the concepts you have learned in class and recitation, so it is a key part of your learning process. Problems will be assigned online every week through WebAssign (http://www.webassign.net/), unless announced otherwise by the instructor. To use the homework system you have to purchase a WebAssign access code. Each problem in WebAssign is generated uniquely for each student, so the problems assigned to you will be similar but not identical to those assigned to another student in your class. Collaboration with classmates is encouraged, but eventually you are expected to set up and solve every assignment individually. So make sure to get a good grasp of problem solving strategies as early as possible. About 30% of your final grade will be earned completing the PSW assignments.

Grading policy: Grades will not be curved. This means that you personally have a great deal of control over your own grade. The maximum score for the various components of your performance in the course will be 1500 points. These will be broken down according to the table below.

Midterm exam	200 points
Final exam	500 points
Written PSW	150 points
On-line PSW	300 points
Lab work	200 points
Lecture participation	75 points
Recitation participation	75 points
TOTAL	**1500** points

The following scale will be used for letter grades: A: 90-100, B: 80-90, C: 60-80, D: 50-60, F less then 50. A sheet with detailed grading ranges is posted on Blackboard.

Academic integrity: Students are expected to work together but submit **their own work** on all assignments in this course. Dishonesty on an exam, PSW, or lab report will result in a grade of zero for that assignment. Severe cases will result in a failing grade for the course.

The Disability Disclosure Statement: Any student who has a need for accommodation based on the impact of a disability should contact me privately to discuss the specific situation as soon as possible. Contact Disability Resources and Services at 215- 204-1280 in 100 Ritter Annex to coordinate reasonable accommodations for students with documented disabilities.

Important dates:

- **Last day to drop the course** (tuition refund available**): Monday, September 8.**
- **Withdrawal from classes:** Last day to withdraw: **Tuesday, October 21.**
- **Final Exam: Friday 12/12 10:30-12:30**

FIVE GOOD REASONS for a PRE-MED to MAJOR in PHYSICS:

1) An understanding of fundamental physical principles gives insight into all basic sciences, including those in medicine.
2) The techniques of physics include intellectual approaches to problem solving, with methods universal to all sciences.
3) Knowing how the instruments of medicine work means being familiar with their underlying principles, capabilities, limitations, and risks.
4) Physics training develops the skills necessary for the proper analysis and handling of observations and data, skills also needed by physicians.
5) A degree in physics demonstrates, perhaps better than any other major, the capabilities necessary for doing well in medical school. Medical schools love physics majors!

Course Calendar - Honors General Physics I (**FALL 2014**)

Wks	Topics	Halliday, Resnick (10th ed) Reading Assignments
#1 Aug. 25	Unit 1 -Motion along a straight line	1 2
#2 Sep. 1	Unit 2 – Vectors	3
#3 Sep. 8	Unit 3 – Motion in 2-dim and 3-dim	4
#4 Sep. 15	Unit 4 – Particle Dynamics –I	5 and 6
#5 Sep. 22	Unit 5 – Particle Dynamics –II	5 and 6
#6 Sep 29	Unit 6 –Conservation Laws-Energy	7 and 8
#7 Oct. 6	Unit 7 – Conservation Laws-Momentum	9
#8 Oct. 13	**Mid-term (Monday)** Units 1-5 Unit 8 – Rotational Motion	10 and 11.1-11.6
#9 Oct. 20	Unit 9 – Equilibrium and Oscillations	12 and 15
#10 Oct. 27	Unit 10 – Fluids	14
#11 Nov. 3	Unit 11 – Mechanical Waves-	16
#12 Nov. 10	Unit 12 – Sound	17
#13 Nov. 17	Unit 13 –Temperature & Heat	18
#14 Nov. 24	Fall Break (no classes held)	
#15 Dec. 1	Unit 14 – Kinetic Theory Unit 15 – Thermodynamics	19 20
#16 Dec. 8	Unit 15 – Thermodynamics	20
Final Exam (Units 1-16) Friday, Dec 12, 10:30-12:30PM		

The 5-Step Problem Solving Strategy

1) Understand the problem

Read the problem carefully and ask yourself "What is going on here?" Explain out to yourself (or to your roommate) what is actually happening in the problem, and what you are asked to determine. Be sure that you really grasp what is occurring in the situation being described. Do not ask, "What formula will solve the problem!" You are likely to need several formulas and so it is crucial that you identify the physics principles (or as we will call them "models") needed to solve the problem under consideration including the models' conditions of applicability.

2) Represent the problem in terms of symbols and figures

• Write down the given data, with units, using the symbols of the relevant model(s). Ask yourself, what is the unknown (or as we will call it "the target quantity"), what is its symbol?

• Draw a rough sketch of the actual real-world situation. Mark on your diagram the coordinate system you are planning to use. Choose your axes wisely that they are aligned with some important aspects of the physics of a given problem.

3) Plan

The signature of a good plan is that you could give your plan to someone else who could then solve the problem, following the steps outlined in your plan. Thus a good plan answers the following questions:

• What is the connection between the target quantity and the data? Identify a relevant physics model or fact of mathematics that provides a promising connection? Write down the connection that you are going to use in equation form. Solve algebraically for the target quantity.

• After solving the equation, you may find out that additional data are required in the connection. Consider this as a sub-problem with auxiliary target quantity and regress to the above.

• How do I know that ultimately I do have a valid plan? Your plan is sound if as a result of the plan, the target quantity and the all auxiliaries can be computed from the data given in the wording of the problem.

At the end of the planning stage reflect on the key insight and/or simplifying assumption that is needed to solve the problem or a part of the problem? How do the parts tie together to give you the solution of the whole problem?

4) Solve

Once you have devised a valid plan, list all sub-problems in reverse order. Calculate numerical values of all auxiliaries and then the target quantity. Round them off to the appropriate number of significant figures. Finally, present your answer with the appropriate units.

5) Evaluate your answer

• Is the answer properly stated? Double check that your answer has the appropriate units, sign, and number of significant figures.

• Is the answer reasonable? Check that the magnitude of your answer is not unexpectedly large or small.

• Is the answer complete? Check that you have answered the original question