Physics 251
Foundations of Physics

Fall 2006

Instructor: Raymond Frey, WU 405, 346-5873, rayfrey@cosmic.uoregon.edu
Lectures: MTuWF 10:00-10:50, Wil 110
Office hours: M,W: 11-12 and 2-5; F: 1:30-2:30 (or other times I'm around)

Please Note: The text is not the same as the Giancoli text used by Phys 201.
The correct text for Phys 251 looks like the picture to the left.
The text is available new or used at the UO Bookstore in a package which includes the text, broken up into 5 volumes ("parts"), plus two free supplements. (Details below.)

Co/Pre-requisite: Math 251 (or equivalent)
Labs: Physics 290, companion lab course available
WWW: http://physics.uoregon.edu/~rayfrey/251/ (this page)
Grading: Midterm Exams I and II (35%), Homework (30%), Final Exam (35%)
Scores and related information will be posted on Blackboard.
TA: Ricky Fok, Wil 220, office hour: Mon 2-3 + tutorial session (see below)
Other Resources: | Drop-in Help | [Framework Solutions] | Exams and Exam Solutions |

News/Announcements:

Date

Text: This is available at the UO Bookstore in a package which includes the text, broken up into 5 volumes ("parts"), plus two free supplements: (1) Student Study Guide and Solutions Manual for the text, and (2) Physics lab notebook. Supplement 2 is intended for visualization, and includes a CD for your computer. Both supplements are optional -- if you don't find them useful, feel free to ignore them.

Labs: Phys 290 is a lab course which is designed to be taken at the same time as 251, 252, 253. It is recommended, especially for science majors. Although it need not be taken concurrently with 251, this is recommended. Some of you may need the lab to meet requirements for your major.

Lecture/Homework/Exam Schedule (to be updated continuously):
Solutions are available here: | homework | exams and practice exams |

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture Topic(s)</th>
<th>Text Chs.</th>
<th>Homework (&quot;Problems&quot; from text)</th>
<th>HW Due (5 PM)</th>
<th>Comment</th>
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</thead>
<tbody>
<tr>
<td>Sep 25</td>
<td>units, dimensions; kinematics in 1-dimension; the fate of the universe</td>
<td>1-2</td>
<td>#1: Ch 1: 3,9,13,23,33,54 (not to be turned in)</td>
<td>n/a</td>
<td>HW #1 not turned in good time to review trig and vectors (see Ch. 3)</td>
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<td>Oct 2</td>
<td>Kinematics in 1 and 2 dimensions, vectors</td>
<td>2-3</td>
<td>#2: Ch 1: 8,20,36,37,41; Ch 2: 12,15,22,27,29; 30,55,58,69</td>
<td>Oct 4</td>
<td>Here is a &quot;model solution&quot; to a homework problem.</td>
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<td>Oct 9</td>
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Course Description:

Fall term will be concerned primarily with the classical basis for modern physics: Newton's Laws of motions and their applications, the principles of conservation of energy and momentum, and rotation. This corresponds roughly to Chapters 1-12 (Part 1) of the text. It is unlikely that we will complete all material in Part 1 in Fall, however. We will discuss the relationships of this classical physics to modern physics. Winter term will include some modern physics: Einstein's relativity, introductory quantum mechanics and atoms, and the structure of matter.

Physics is "simple". There are two important goals for this course:

1. Learning the fundamental concepts underlying physics. There are really only a few concepts which physics, and hence the physical universe, is built upon. We will emphasize learning these well.
2. Physics is inherently quantitative. We can determine exact and precise answers to specific questions, and test these answers. So learning how to arrive at quantitative answers is important. This is where two skills are required: mathematical skills and problem-solving skills. For this, practice makes perfect (or close enough) -- this is the primary role of the homework.

Math requirement. Students need to be co-enrolled in Calculus (Math 251), or to have taken Math 251 or equivalent previously. We will actually need to use some elements from calculus before you see them in the Math series (if you are co-enrolled) Don't worry... we will take time to try to explain it as needed.

Weekly schedule. Lectures will be MWF. Tuesdays will emphasize problem solving, your questions about homework problems, etc. Homework will typically be due on Weds.

Homework:

• Weekly homework will be assigned from the text and will be due as posted above.
• Students are required to show their work and reasoning as appropriate to receive full credit. A model solution will be posted in week one.
• You are welcome to work on the homework with your classmates, and please feel free to seek help from me. (Note that the Physics Reading Room in Willamette Hall is available to use to collaborate on assignments, discuss deep thoughts, etc.) The work you turn in must be entirely your own, of course.
• Complete solutions will be available from this website soon after the due date. Please refer to these.
• Late homework penalties.

Exams:

There will be two midterms and one final exam. Exams will be closed book, but the generally useful equations and information will be provided. Problem solutions need to include all work necessary to demonstrate the result. Practice exams and solutions will be provided approximately one week before an exam. The dates for midterms will be announced at least 8 days before the exam. Solutions will be posted after the exam.

Quizzes:

We may have a few quizzes. These will be announced in class and on the web page. The quizzes will count toward grading in the homework category.