Foundations of Physics

PHYS 253 - Spring 2011

http://physics.uoregon.edu/~torrence/253/
Updated Tuesday March 29, 2011

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Help Center Hours
TBA in Willamette 147

Lecture
MWTh 11:00-11:50 Willamette 100

Tutorials
All tutorials are Friday in Willamette 112

Labs
PHYS 290 recommended, but not required

Textbook
Physics for Scientists & Engineers with Modern Physics, 4/E, Giancoli

Pre-req
Math 252 or equivalent

Overview

Spring term will explore various topics in electricity and magnetism. The following topics (Ch. 21-30) will be covered:

- Electrostatics - electric charge, electric field, Coulomb's law, Gauss' law
- Electric Potential
- DC circuits - resistors, capacitors, Ohm's law
- Magnetism - magnetic field, Ampere's law
- Electromagnetic Induction - Faraday's law, transformers
- AC circuits - inductors, circuit theory

Syllabus
<table>
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<tr>
<th>Week</th>
<th>Topics</th>
<th>Assignment</th>
<th>Tutorial</th>
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<tr>
<td>Week 1</td>
<td>Ch. 21: Electric Charge and Field</td>
<td>Ch. 21: 15, 38, 48, 49, 53, 61, 80, 86</td>
<td>Midterm Review (not mandatory)</td>
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<td>3/28-4/1</td>
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<td>Week 2</td>
<td>Ch. 22: Gauss' Law</td>
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<td>4/4-4/8</td>
<td>Ch. 23: Electrostatic Potential</td>
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<td>Week 3</td>
<td>Ch. 24: Capacitance</td>
<td>No homework assigned</td>
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<td>4/11-4/15</td>
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<td>MT review</td>
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<td>Week 4</td>
<td>Ch. 25: Electric Current and Resistance</td>
<td>First Midterm</td>
<td>Monday Apr. 18th</td>
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<td>4/18-4/22</td>
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<td>Week 5</td>
<td>Ch. 26: DC Circuits</td>
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<td>4/25-4/29</td>
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<td>Week 6</td>
<td>Ch. 27: Magnetism</td>
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<td>5/2-5/6</td>
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<tr>
<td>Week 7</td>
<td>Ch. 28: Magnetic Field</td>
<td>No homework assigned</td>
<td>Midterm Review (not mandatory)</td>
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<td>5/9-5/13</td>
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<td>Second MT review</td>
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<td>Week 8</td>
<td>Ch. 29: Induction</td>
<td>Second Midterm</td>
<td>Monday May. 16th</td>
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<td>5/16-5/20</td>
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<td>Week 9</td>
<td>Ch. 30: AC Circuits</td>
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<td>5/23-5/27</td>
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<td>Week 10</td>
<td>Ch. 30: AC Circuits</td>
<td>Homework due Thursday!</td>
<td>Final Review (not mandatory)</td>
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<td>5/30-6/3</td>
<td>No Class Monday!</td>
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<td>Finals</td>
<td>Final Exam Tuesday June 7th, 10:15-12:15</td>
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<td>6/6-6/10</td>
<td>Final Exam Review</td>
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This syllabus is tentative, and is subject to change as the quarter progresses.

**Grading**

Course grades will be based on weekly homework assignments (30%), tutorial participation (10%), two midterm exams (15% each), and a final exam (30%).

**Homework**

Remember to do the *Problems* not the Questions. Solutions will be posted to Blackboard the evening after the assignment is due.

- Homework #1 (Due Apr. 6th) - Chapter 21: 15, 38, 48, 49, 53, 61, 80, 86
- Homework #2 (Due Apr. 13th) -
One of the key goals of this course is to become proficient in solving physics problems. Homework problems are your primary tool for practicing this skill. Homework will be assigned from the text and will be due as posted above. Typically, assignments will be posted on Wednesday and due on the following Wednesday at the start of class (11 AM). To receive full credit you must show your work! Please make sure to do the problems, not the questions, in the back of each chapter.

Homework should be turned in before class starts in Willamette 100, although you may turn it in early if you wish. Graded assignments will be returned in the homework box in the Willamette basement just as you come down the stairs.

I will post homework solutions Wednesday evening after the assignments are due. Late homework will be accepted up until 5PM on Wednesday with a 25% penalty. Turning in your homework more than one day late is possible, but 50% of the assignment value will be deducted right off the top. If your answers are clearly copied from the solutions, no credit will be given. Turning in late homework is better than nothing, and practicing the problems will undoubtedly help you on the exams, but staying on top of the assignments and getting your work done on time is a key to achieving a good grade in this course.

Due to the size of this class, we may not grade every single homework problem in detail, and the graders will likely not make extensive corrections to your work on your homework assignment. It is your responsibility to go over your graded homework assignment and compare your answers with the posted solutions. Grades will be posted to Blackboard as soon as they are ready. Please check your Blackboard account regularly and report any discrepancies or possible errors as soon as you notice them.

You are encouraged to find help in doing your homework, including from other students, your TAs, the physics department drop-in help center, and the instructor during office hours. Discussing homework with other students is a very good way to discover conceptual difficulties and can be a powerful tool for improving your understanding of the subject. To facilitate students who wish to work together, we will have scheduled times in the physics drop-in center (Willamette 147) when your TAs and instructor will be present to help people with homework issues. This will likely be Tuesday afternoon, and possibly Monday afternoon and Tuesday morning depending upon demand. The physics reading room in the atrium of Willamette hall is also available for students wishing to work together.

The practice in earlier quarters of having multiple students turn in one homework assignment has lead to more problems than it has solved. For Spring, I am going to ask everyone to turn in their own homework assignment.
Exams

There will be two in-class midterm exams and one final exam. These are the primary tools for assessing whether you have achieved the course goals. Exam problems will be similar to homework problems, in that you must solve quantitative problems on the physics topics addressed. All exams will be closed book, although you may bring one handwritten, single-sided, notebook-sized sheet of notes if you wish. Scientific calculators are needed, and will be provided on request.

The exams will very likely be held on the dates indicated on the syllabus above, but I reserve the right to move these in case some real tragedy strikes. The exact exam dates will be announced at least a week before the exam. Review material will be provided in the week before each midterm. If a higher percentage score is achieved on the final than one of your midterms, the lowest midterm score will be dropped (and replaced with the score on the final). This gives you a chance to redeem yourself if you really screw up a midterm.

Tutorials

On Friday each of you should be enrolled in one of the five tutorial sessions. Attendance at these sessions is mandatory, aside from the exam review weeks which are optional. The tutorial sessions are designed to give students a chance to discuss and assess their understanding of the topics covered in class in a more interactive, group setting with direct feedback from the teaching staff. Students will work in groups on worksheets targeted towards the subject of the week, and must justify their answers at regular intervals to the TAs in the room. These sessions have been shown to be a particularly effective way for students to improve their understanding of the subject, and should be viewed as an integral part of the course instruction.

The tutorials will be graded for attendance and reasonable participation only. Your worksheet answers will not be graded for correctness. If you are really struggling with a particular topic, you should try to use your tutorial time working with the TAs to improve your understanding. Attendance at the tutorials is mandatory. Each tutorial missed will cost you 2% of your total grade, up to 10% in total.