PHYS 252H: Foundations of Physics I, Winter 04

Syllabus

Instructor
Heiner Linke (lectures, extra assignments, office hours)
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Office 373A Willamette
Office hours M 1-2, F 11-12 (or call, email, stop by)

with the help of:

Brian Stubbs (homework help and homework grading)
Phone (541) 346 4722
Email bstubbxs@darkwing.uoregon.edu
Office 414A Willamette
Office hours TBA (see Staff Information on Blackboard)

Pre-requisites
Math 251, 252 or equivalent (calculus).

Required textbook
You will need Volume II in Spring.

Additional reading
Giancoli's "Physics for Scientists and Engineers" (Prentice Hall) covers roughly the same material as Resnick. It treats some of the material in less depth, but has more emphasis on concepts, examples and problem solving techniques.
"The Feynman Lectures on Physics" (Addison Wesley) are a classic that looks at much of the material from an entirely different point of view. It makes for great additional reading for the seriously intrigued. Its possible to read individual chapters.

Special Relativity.
"Einstein for Beginners" by Joseph Schwartz and Michael McGuinness is of the cartoon type, takes only a couple of hours to read, and is a great introduction to the key concepts of relativity. Its fun and recommended. About 10$ at amazon.com.
"Introduction to Relativity" by John Kogut (Harcourt Academic Press) is accessible and is one of the few books that includes an introduction to General Relativity.
There will be a hand-out based on "Spacetime Physics" by Taylor and Wheeler (Freeman)
This excellent book is more fun to read than your average textbook. It's contents go beyond what we are going to cover in the course, but it is fully understandable and if you get interested in relativity you might consider buying it. I have a copy for you to look at.
Course format
Mondays, Wednesdays and Fridays (10 - 10:50, WIL 318) will be used for lectures on key sections of the textbook. You are expected to read the textbook before coming to class, and to complete online, pre-class quizzes (for details, see "Reading Quizzes" below). All material assigned in the textbook is required for the final exam, regardless of whether we discuss it in class or not.

Tuesday sessions (10 - 10:50, ONXY 171) will sometimes be used for a variety of activities, some of which go beyond the textbook. Examples are the discussion of assignments, guest lectures, lectures on special topics, and problem solving sessions.

Grading
Reading quizzes, Homework, Midterm, and Extra Assignments together 60% or more
Final exam 40% or less
Reading quizzes, Homework, Midterm and other assignments together are worth nominally 60%. Points earned in any one of these activities count towards the total. You need 600 points to achieve the full 60% in this category, but through extra credit you can earn substantially more than that.

If you earn less than 600 points, say 480, then the best possible final grade you can achieve (assuming a perfect score in the final exam) will be 48% + 40% = 88%.

However, if you earn more than 600 points, say 680, then you have a perfect score on 68% of the course, and the value of the final exam will be reduced from 40% to [40 - (68-60)]% = 32%. If you get 80% on the final exam, your grade will be (0.68*100% + 0.32*80%) = 94%.

Available points (approximate numbers, subject to small changes)
Reading quizzes (ca. 22 quizzes, 4 - 6 points per quiz) more than 100
Core homework (9 weekly assignments for 30 - 40 points each) ca. 340
Midterm 160
Extra homework problems (ca. 10 - 20 points per assignment) 100 - 150
Research paper (see instructions handout in week 2) 50 - 80
Extra Assignments, Bonus Points, etc. up to ca. 100
TOTAL POSSIBLE a lot more than 600

Grading scheme (I will possibly be more generous, but will not grade harder than shown.)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A+</td>
<td>97% or more</td>
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<tr>
<td>A</td>
<td>93 - 96%</td>
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<tr>
<td>A-</td>
<td>90 - 92%</td>
</tr>
<tr>
<td>B+</td>
<td>87 - 89%</td>
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<tr>
<td>B</td>
<td>83 - 86%</td>
</tr>
<tr>
<td>B-</td>
<td>80 - 82%</td>
</tr>
<tr>
<td>C+</td>
<td>75 - 79%</td>
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<tr>
<td>C</td>
<td>65 - 74%</td>
</tr>
<tr>
<td>C-</td>
<td>60 - 64%</td>
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<tr>
<td>D</td>
<td>50 - 59%</td>
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<tr>
<td>Fail</td>
<td>&lt; 50%</td>
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How do I decide which assignments to complete?
The grading scheme is designed to give you freedom in managing your time, and to allow you to engage in the learning activities you find most effective.

In the beginning of term you may feel uncertain what activities to prioritize. In this case I recommend to focus on the "core assignments": reading quizzes, core homework and the midterm. Together, these activities allow you to achieve a perfect grade.

When you feel confident, you should make up your own, customized plan, emphasizing activities that you find more useful than others. For instance, if you find reading quizzes useless (actually most people find them quite useful) you may start working on a good research paper early on, and regularly do some extra homework, and you will be fine anyway.

Reading assignments and reading quizzes
Reading assignments will be announced on Blackboard in the Assignment Folder. You are expected to work through the reading before coming to class. For each assignment, a short on-line quiz will be available on Blackboard for at least two days until it is due at 9.00 am on the day of class. In the time between submission and class, the instructor can evaluate what needs to be clarified.

NOTE: In rare cases a browser problem may prevent you from submitting your quiz. To be sure that your score was counted, please wait for the confirmation after submission. You can also confirm your grade online using Blackboard. If there is any problem, please immediately send me an email (linke@uoregon.edu) and check your email before coming to class. Usually I can clear your attempt on-line, and you can retake the quiz without problems, before class.

Homework
Homework problems will be assigned weekly on the Blackboard web page. Each homework will contain a number of "core problems" which will add up to approximately 340 points over the course of the term, plus "extra problems" for additional points. The only reason for distinguishing "core" and "extra" points is to give you a guideline for how much homework you should do if you prefer to follow a more traditional grading scheme (see "How do I decide which assignments to complete?").

- Homework is due in the week after it was assigned, on Thursdays at 5 pm.
- Submit your homework in class or into the box outside WIL 373.
- You are strongly encouraged to collaborate on homework, and to seek help from the instructor or TA (every day of the week, one of us has office hours). However, each student must submit her own work.
- Outside office hours you can post questions on the Discussion Board on Blackboard. Please feel free to answer your peers' questions (the instructor will also do so).
- Solutions will be posted on Blackboard a few days after the due date. Graded homework will be returned in class, usually on Tuesdays.
- Late homework must be submitted in person to the TA (Brian Stubbs), or in his mailbox inside the "Binney Lounge", WIL 215. Late homework will automatically lose 20% of the points unless compelling reasons are stated to the instructor (Heiner Linke) BEFORE the deadline. Extra homework problems cannot be submitted late. Problems submitted after solutions are posted will not be graded.
Extra Assignments and Research Paper
You can earn extra points through activities that engage you in thinking about the course material. During the course of the quarter I will suggest a few such assignments. You may also propose assignments yourself, such as:

- a written report on a topic of your choice (an experiment you carry out, a computer simulation, a special topic report, a reading report,...). (See handout in Week 2).
- an oral presentation of a special topic of your choice in one of the Tuesday sessions.
- a very well-worked out extra problem.

Be sure to stay in close contact with me about your plans for obtaining extra credit, and discuss the topic with me. I require the assignment to stand in direct relation to course material. You must work with me to set your own, firm deadlines, and submit early versions of your work for feedback. The point score will take into account improvement of early versions, and the quality of the presentation (clarity, form, grammatical correctness, etc.).

NOTE: For a specific Extra Assignment to count, you must earn at least 60% of the possible points for that assignment.

Bonus points
Small amounts of bonus points may be made available at the discretion of the instructor.

Tests and exams
Midterm and Final will include both conceptual "short answer" questions and problems similar to homework problems. Tentative dates:

Midterm: Tuesday, February 10, 10:00 - 10:50 (Onyx 171) (Relativity and Fluids)
Final: Day to be announced (check Duckhunt).

No make-up exams will be given. In case of an unavoidable absence from the midterm, contact the instructor prior to the exam.

Web resource
I will use Blackboard as the web resource. You should have received an email with information on how to log onto Blackboard (using your Gladstone username and password). For access and information, please go to: http://blackboard.uoregon.edu
If you experience any problems, please visit the Knight or Science Library ITC for assistance.

Attendance policy
Attendance will not be checked or graded. If you miss class it is your responsibility to obtain all information provided in class from another student.

Late submission policy
Deadlines for Reading Quizzes, Extra Assignments, Bonus Points, and Extra Homework Problems are strict. For late homework, see Homework.
**Tentative course outline (see Blackboard for updates).**

<table>
<thead>
<tr>
<th>Week</th>
<th>Material</th>
<th>Reading assignment</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Jan 5 – Jan 9</td>
<td>Gravity</td>
<td>M &amp; U: Ch. 14 (no quiz)</td>
<td>The first quiz (due Wednesday) is for practice (extra credit).</td>
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<td>Special Relativity</td>
<td>W Ch 20:1-2 and Handout “Motion...” pp 1-14</td>
<td>Friday: quiz for credit.</td>
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<td>F Ch 20:3-4 and Handout “Motion...” pp14-21</td>
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<td>Jan 12 – Jan 16</td>
<td>Special Relativity</td>
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<td>Jan 19 – Jan 23</td>
<td>Special and General</td>
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<td>Jan 26 – Jan 30</td>
<td>Fluids (Chs. 15-16)</td>
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<td>Feb 2 – Feb 6</td>
<td>Oscillations and Waves, Sound (Chs. 17-19)</td>
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<td>Feb 9 – 13</td>
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<td>Feb 16 – 20</td>
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<td>Feb 23 – 27</td>
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<td>Mar 1 – 5</td>
<td>Particle nature and wave nature of light and matter (Chs. 45-47)</td>
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<td>Mar 8 – 12</td>
<td>Electrons in Atoms and in Nanostructures</td>
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**Midterm Tue, Feb 10**
10.00 – 10:50 Onyx 171
(Chapters 15, 16, 20)

Last day to withdraw from classes: February 20.

**Final TBA**
(check Duckhunt)

**Preview**

PHYS 253: Electricity and electromagnetism (Halliday & Resnick, Chapters 25 – 38).

PHYS 351, 352, 353: Waves and optics, interference, thermodynamics and heat engines.