Course Syllabus

PHYS 101 Essentials of Physics

Fundamental Physical Principles: Mechanics

Fall 2012

Lecture: CRN 15520
Class: 2:00pm – 3:20apm: Tuesday & Thursday; Location: 100 WIL

Prerequisite: High school algebra

Instructor: Bijan Shahir
Office: 198B Anstett Hall and 144 Willamette Hall
Hours: Mon, Wed, Fri: 2pm–2:50pm(198B ANS); Thu: 12:30pm–1:20pm(144 WIL), or by appointment
Phone: 541-346-0538
Email: bijan@uoregon.edu

GTFs: Gesa Welker, gwelker@uoregon.edu, 219 Willamette Hall, Thursday: 9am – 11am
Jingtao Zhang, jingtao@uoregon.edu, 261 Willamette Hall, Wednesday: 3pm – 5pm
Maira Amezcua, mamezcua@uoregon.edu, 217 Willamette Hall, Monday: 10am – 12pm
Sudarshan Karki, skarki@uoregon.edu, 220 Willamette Hall, Friday: 2pm – 4pm

Required Materials:
Conceptual Physics, Paul G. Hewitt, 11th ed. Pearson (Addison Wesley)
MasteringPhysics (MP) (This software comes with the 11th ed. of the above textbook)
i>clicker

Course Content:
This course focuses on mechanics, a subject that is the foundation of all of physics. After a quick introduction to early natural philosophies, most of this course focuses on Newtonian mechanics and its manifestations. Newton's three laws of motion provide an early example of the changes in western thought embodied by The Enlightenment. Newton unified our understanding of 'heavenly' and 'earthly' forces while at the same time providing a framework within which natural phenomena could be understood.

The first third of the course will be spent investigating the kinematic concepts of force, mass, acceleration, velocity and displacement and the relationships among these. The next third will deal with dynamical phenomena described in terms of momentum, work, and energy. The course concludes by discussing Newtonian gravitation and satellite and planetary motion, certainly the crowning achievement of Newton's work in this area.

The course is primarily conceptual in nature, using only simple high school algebra to help illuminate the underlying physical phenomena. Simple numerical and conceptual problems will be assigned in homework sets, and use of a calculator will be helpful but not essential.
Blackboard:
At https://blackboard.uoregon.edu you may login and access course documents such as this syllabus. In addition, you may view announcements, course materials, scores on homework and tests at any time.

Log in:
Use your Username i.e. Duck ID without "@uoregon.edu" and Password to login to Blackboard. Be sure to log out when done - use the "Logout" button at the top of most blackboard pages. If you have problems of logging in please contact: blackboard@ithelp.uoregon.edu.

i>clicker:
There will be several clicker questions in each lecture. You will get credits for being in class and clicking on each question. Additionally, you will get an extra credit for answering each question correctly. 10% of your overall grade will be devoted to the clicker questions. The two lowest score of the clicker questions in two lectures will be dropped and if you missed two lectures you will get zeros – there will be no make up for clicker questions.

Login:
You only have to register once, and if you have already registered your i>clicker this term, ignore this part. To register your i>clicker, please do the following:
1) Log in to Blackboard
2) Click on “PHYS 101 (Fall 2012; 15520), Essentials of Physics” course
3) In the upper left corner (green rectangle) of the “Home Page” click on “Course Information”
4) Fill in all fields of “UO i>clicker Registration”
5) Click on the “Registration” button

Homework:
We will be using a web based homework system called MasteringPhysics. You will submit your homework answers via computer. This is to give quick feedback to homework questions. You will be allowed a stated number of attempts to submit a correct assignment (Saving homework does not count as a submission.) THE DUE DATES ARE SET FOR TUESDAYS, AND NO LATE HOMEWORK WILL BE GRADED. Note: the numbers for the problems in the web question will be different for each student. If you figure out how to solve the problem as a group, you will still have to calculate your values for your own answer. The lowest homework grade will be dropped.

Group Work:
I highly recommend that you work together, and learn from each other, but all assignments must be submitted individually - based on your own merits.

Quizzes:
We’ll have 10 – 15 minute quiz on Thursdays with the exception of mid-term weeks. Your lowest quiz grade will be dropped.

Exams:
1) Midterm Exam 1: Thursday, October 18th (Week 4)
2) Midterm Exam 2: Thursday, November 8th (Week 7)
3) Final Exam (Comprehensive): Monday, 1:00pm, December 3rd (Week 11)
Course grade determined by:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>20%</td>
</tr>
<tr>
<td>i&gt;clicker problems</td>
<td>10%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>2 midterm exams</td>
<td>15% + 15%</td>
</tr>
<tr>
<td>Final exam (comprehensive)</td>
<td>30%</td>
</tr>
</tbody>
</table>

Curving Grades:
There will be a small adjustment at the end of the term if the course grades on the whole don’t meet my expectations. I will not make this decision until after all the work for the term is done (including the final exam) – the individual assignment will not be graded on a curve.

Student Conduct:
Mutually respect in class is paramount. Violations of the student conduct code result in the incident being included on your student conduct record and can result in a failing grade on any course work related to the violation or a failing grade in the course. The University of Oregon requires all instances of cheating be reported, no matter how small. Cheating includes, but is not limited to:

- Looking at another student’s exam during a test
- Copying the work of another person (student or otherwise) and submitting it as your own
- Using any materials except those explicitly approved during a test-taking situation
- Resubmitting graded work that was altered after being returned

**For a list of other descriptions of cheating, see the Student Conduct Code.

Special Accommodations:
If you are currently registered with AEC (Accessible Education Center), for a documented disability, please present your paperwork to me as close to the beginning of the term as possible so that we can design a plan for you. If you have a disability but are not registered with AEC, you should contact them as soon as possible (http://aec.uoregon.edu). It is much more likely that measures can be taken to provide adequate special accommodation if the organization is done through AEC.

Suggestions for Successful Study:
1. Don’t get behind on readings or homework. Physics is like a ladder, one step at a time.
2. Participate in class, ask questions, and make use of my office hours and Graduate Teaching Fellows (GTFs).
3. Read ahead in the book. Even reading the first few pages of each lesson will help the material sink in quicker during lecture and allow you to ask meaningful questions.
4. Keep all your old midterms, and quizzes. You’ll find them useful when you’re studying for future tests.
5. University courses, in general, require at least 2 hours/week of work outside the course for each credit hour.
6. This means you should devote at least 8 hours/week working outside class to do well in this course!
7. By devoting adequate time, managing your time effectively, and practicing good study/problem solving skills you should succeed in this course.
8. BIG HINT FOR DOING PHYSICS PROBLEMS: LEARN THE PHYSICS, UNDERSTAND THE CONCEPTS, PARTICIPATE IN CLASS DISCUSSION, AND READ THE BOOK!!! It will make things so much easier!

Successful Problem solving:
1. Draw a clear diagram(s) indicating the situation – if needed
2. Think about the principles involved. Write them down!
3. Write down the quantities that are known and the quantities you want to know
4. Write down numbered steps indicating the logical progression of your reasoning
5. Clearly mark your answer (underlined or in a box)
6. Don’t forget units! Check your significant figures.
7. Check your answer to see if it is reasonable

Help Sessions:
Drop-in Help Sessions are available at Willamette Room 147. Please make sure pick up a schedule in the Physics Office.

Weekly Schedule:
The given schedule is tentative, changes will be discussed in class and posted online.

<table>
<thead>
<tr>
<th>Date</th>
<th>Chapters</th>
<th>Lecture Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept. 25</td>
<td>1</td>
<td>Scientific Measurements, Introduction to Physics</td>
</tr>
<tr>
<td>Sept. 27</td>
<td>2</td>
<td>Newton’s 1st Law - Inertia, Aristotle, Copernicus</td>
</tr>
<tr>
<td>Oct. 2</td>
<td>2, 3</td>
<td>Galileo, Equilibrium, Linear Motion, Velocity</td>
</tr>
<tr>
<td>Oct. 4</td>
<td>3</td>
<td>Acceleration, Free Fall</td>
</tr>
<tr>
<td>Oct. 9</td>
<td>4</td>
<td>Newton’s 2nd Law, Force, Friction,</td>
</tr>
<tr>
<td>Oct. 11</td>
<td>4</td>
<td>Newton’s 2nd Law, Mass, Weight, Acceleration g</td>
</tr>
<tr>
<td>Oct. 16</td>
<td>5</td>
<td>Newton’s 3rd Law, Action / Reaction</td>
</tr>
<tr>
<td>Oct. 18</td>
<td>5</td>
<td>Tug of War, Vectors + 1st Midterm Exam (Chapters:1-4)</td>
</tr>
<tr>
<td>Oct. 23</td>
<td>6</td>
<td>Momentum, Impulse, Collisions (Elastic + Inelastic)</td>
</tr>
<tr>
<td>Oct. 25</td>
<td>6, 7</td>
<td>Conservation of Momentum, Energy, Work,</td>
</tr>
<tr>
<td>Oct. 30</td>
<td>7</td>
<td>Power, Conservation of Energy, Potential &amp; Kinetic Energy</td>
</tr>
<tr>
<td>Nov. 1</td>
<td>8</td>
<td>Circular Motion, Rotational Inertia, Torque</td>
</tr>
<tr>
<td>Nov. 6</td>
<td>8</td>
<td>Center of Mass, Centripetal Force, Angular Momentum</td>
</tr>
<tr>
<td>Nov. 8</td>
<td>8</td>
<td>Angular Momentum Conserved + 2nd Midterm Exam (Chapters:5-7)</td>
</tr>
<tr>
<td>Nov. 13</td>
<td>9</td>
<td>Newton’s Theory of Gravity, Tidal Forces, Universal Law of Gravity</td>
</tr>
<tr>
<td>Nov. 15</td>
<td>9</td>
<td>Einstein’s Theory of Gravity, Black Holes</td>
</tr>
<tr>
<td>Nov. 20</td>
<td>10</td>
<td>Projectile motion</td>
</tr>
<tr>
<td>Nov. 22</td>
<td>-</td>
<td>Thanksgiving Day (no Classes)</td>
</tr>
<tr>
<td>Nov. 27</td>
<td>10</td>
<td>Satellite Motion, Kepler’s Laws</td>
</tr>
<tr>
<td>Nov. 29</td>
<td>13</td>
<td>Liquids</td>
</tr>
<tr>
<td>Dec 3</td>
<td>1-10 + 13</td>
<td></td>
</tr>
</tbody>
</table>

**FINAL EXAM Comprehensive Monday, 1:00pm**

Important Dates (http://registrar.uoregon.edu/calendars/academic):
- Monday of 2nd week (Oct 1) - Last day to drop without a “W” and only 75% tuition refund
- Wednesday of 2nd week (Oct 3) - Last day to add a class
- Sunday after 7th week (Nov 11) - Last day to withdraw (drop with a “W”) or change to P/NP
- Thurs/Fri of 9th week (Nov 22, 23) - Thanksgiving Holiday (No Classes)
Showing Work:
While doing your MasteringPhysics homework, I highly recommend having scratch paper at hand. Even though MasteringPhysics does not grade you on your process, having a comprehensive thought process is necessary. It will also help you track down mistakes that you made if the first answer you submit is incorrect. Remember: On quizzes and exams showing your work will be extremely important.