Course Overview: This five-unit course is the first in a three-part sequence of introductory, physics classes designed for pre-professional majors. In this course we will study the general areas of physics known as mechanics. The level of mathematics that will be used assumes proficiency in algebra, trigonometry, and basic calculus. We will cover material from Volume 1 in the textbook according to the following syllabus:

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<tbody>
<tr>
<td>6-15-15</td>
<td>Chapter 2</td>
<td>Chapter 2</td>
<td>Chapter 3</td>
<td>No class-</td>
</tr>
<tr>
<td>Introduction</td>
<td>No labs meet!</td>
<td>First lab meets, 1 PM</td>
<td>Quiz 1</td>
<td>No lab</td>
</tr>
<tr>
<td>6-16-15</td>
<td>Chapter 2</td>
<td>Chapter 2</td>
<td>Lab#2 meets, 1 PM</td>
<td>No class-</td>
</tr>
<tr>
<td>Chapter 1</td>
<td>No labs meet!</td>
<td>First lab meets, 1 PM</td>
<td></td>
<td>No lab</td>
</tr>
<tr>
<td>6-22-15</td>
<td>Chapter 4</td>
<td>MTEXAM (1-5)</td>
<td>Chapter 6</td>
<td>No class-</td>
</tr>
<tr>
<td>Chapter 4</td>
<td>Chapter 5</td>
<td>Chapter 6</td>
<td></td>
<td>No lab</td>
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<tr>
<td></td>
<td>No labs meet!</td>
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<tr>
<td>6-29-15</td>
<td>Quiz 2</td>
<td>Chapter 11</td>
<td>FINAL EXAM</td>
<td>No class-</td>
</tr>
<tr>
<td>Chapter 8</td>
<td>Chapter 10</td>
<td>NO LAB!</td>
<td>Chapters 1-11</td>
<td>No lab</td>
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<td></td>
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<td></td>
<td>9 AM – Noon</td>
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<td></td>
<td></td>
<td>No Lab!</td>
<td>HAPPY July 4\textsuperscript{th}!</td>
</tr>
</tbody>
</table>

Grading:
Your grade for this course will be based on the final “curve” of the class according to the following factors:

(a) Homework \hspace{1cm} 15\%
(b) Quizzes \hspace{1cm} 15\%
(c) Lab Projects \hspace{1cm} 20\%
(d) Midterm Exam \hspace{1cm} 20\%
(e) Final Exam \hspace{1cm} 30\%
(a) Homework (15%):  
You will be required to complete at least five (5) problems from each chapter in your textbook. In addition, you will be assigned Extra Problems. Solutions for the textbook problems will be made available prior to the test dates in the Dropbox folder that is assigned on the first day of class. These homeworks are due no later than the midterm exam and the final exam, respectively. No homework will be accepted for credit after the solutions are handed out. It is very important that you stay up with the class—the homework is the best measure of this endeavor. Make every effort to stay caught up!! More information about HW is listed at the end of the syllabus.

(b) Quizzes (15%):  
There will be two (2) quizzes that will be given on Thursday of the first week and Tuesday of the last week. These will be short (about 25 minutes), closed-book, and involve two or three of the problems from the material we have been working on prior to the day of the quiz. If you are caught up with the syllabus and attending class, you will have no trouble with the quizzes. Complicated formulae will be provided on the quiz.

(c) Lab Projects (20%)  
There will be eight lab projects completed in two separate lab sections (either a M-W afternoon section or a T-R afternoon section). These will last for four hours and will meet in DSC 303, starting at 1:00 PM on Mondays-Wednesdays and Tuesday-Thursdays. Each student is required to complete the lab projects and submit a lab report. You will be given more information regarding this component of the grade on your first day of lab (either Wednesday, 6.17.15 or Thursday, 6.18.15). The schedule of lab projects is listed below. Briefly, the lab grade component will be based on two factors: completion of the lab projects and submission of the lab reports describing the results. Any scheduling problems must be addressed in the first two days of class. If you plan to study for all three sessions, please plan ahead for a special lab day (the LAST lab is on Monday, August 10, 2015 for all students—you may need to make special arrangements with study, research, work commitments).

(d) Midterm Exam (20%):  
On Wednesday, June 24, 2015, we will have a midterm exam on Chapters 1 – 5. This exam is closed-book, however, all the equations will be provided to preclude the memorization of formulae. There will be no makeup exams given, so attendance on this day is mandatory. The exam will take place from 9:00 – 10:30 AM, and class will resume at 10:45 – noon.

(e) Final Exam (30%):  
On Thursday, July 2, 2015, we will have a cumulative final exam. You will receive more information about this exam as the time draws near. It will begin at 9:00 AM and last until noon.
This course is very challenging for several reasons. First, we will be studying a large variety of topics. Second, we will be investigating nature from both a qualitative and a quantitative point of view, with an emphasis on problem-solving. Third, we will incorporate some basic calculus techniques into our descriptions and problem-solving skills. Finally, the pace of this class is about three times faster than a normal quarter taught at Santa Clara University!

Of all the information that you will need to get started in this class, there is one concept that is of paramount importance: DO NOT FALL BEHIND IN THIS CLASS!!! With this in mind, please seek help as soon as you feel that you are not understanding the material in lecture. I am always open to questions during class and your success depends on your initiative in asking. Remember, there are no dumb questions except those that you fail to ask! If you are confused by something that is being said, it is your right and responsibility to seek clarification. If your question is not satisfactorily addressed in class, please talk to the instructor after class or in office hours or at the start of the next class. There are several other options for getting help (either from the instructor or your colleagues--all you have to do is ask).

Any questions concerning the assessment of your work (such as the assignment of partial credit on either homework or tests) should be taken up with the instructor as soon as possible. I look forward to working with you in this class as we study the mechanics of the world in which we live.
Physics 11--Homework Assignments  
Summer Session IIIA-2015

You must complete no less than five (5) problems in any given chapter. You should be sure to spread out your five choices in order to cover the many different types of problems from each section in the chapters. Please use a “homework journal” that has pages that cannot be removed (any lab notebook will suffice). In addition, you must turn in the Extra Problems that are assigned each week. Each problem will be scored as follows:

“3” = Correct method, correct answer, all parts completed  
“2” = Correct method, wrong answer, good effort, partially complete  
“1” = Incorrect method, wrong answer, some effort, incomplete  
“0” = Incorrect method, wrong answer, no effort

CHOOSE AT LEAST 5 PROBLEMS FROM EACH CHAPTER...  
PLUS, THE EXTRA PROBLEMS THAT ARE ASSIGNED!!

<Your homework solutions are due at any time, as soon as possible, but no later than the midterm exam and the final exam>.


CHAPTER 2:  43, 44, 45, 47, 51, 52, 54, 62, 68, 69, 76, 81, 84, 95, 99

CHAPTER 3:  31, 32, 36, 46, 48, 49, 51, 55, 62, 69, 79, 88

CHAPTER 4:  47, 48, 51, 61, 65, 78, 79, 80, 85, 88, 92, 100, 102

CHAPTER 5:  43, 47, 51, 54, 55, 56, 63, 64, 68, 73, 78, 82, 84, 88, 92

CHAPTER 6:  38, 43, 47, 49, 51, 54, 55, 56, 63, 71, 75, 79, 80, 88, 90, 94, 104

CHAPTER 7:  38, 39, 44, 46, 47, 56, 57, 65, 67, 78, 82, 85, 88, 90, 93

CHAPTER 8:  48, 51, 54, 55, 58, 73, 75, 78, 94

CHAPTER 10:  35, 41, 46, 50, 61, 73, 74

CHAPTER 11:  37, 43, 50, 53, 61, 73, 74, 75, 76, 97

Solutions are available on the Internet:  
(dropbox folder)

PHYS011  
Letteer
E1. A car passes by a stationary police officer at a speed of 200 km/h. The officer immediately accelerates from rest at a constant acceleration of 6.0 m/s$^2$ (with a maximum speed of 250 km/h) in an effort to catch up. The driver of the car sees the policeman in her rearview mirror and begins slowing down at a rate of -1.75 m/s$^2$, hoping to reach the legally posted value of 120 km/h by the time the policeman catches her. If the policeman does not have radar to remotely detect the speed of her car, will the speeding woman receive a ticket or not? Explain any assumptions and be sure to show all of your steps in justification of your conclusion.

E2. You throw a rock straight up at a speed of 12 m/s. With what speed must a friend on the roof of a building that is 39 m above your release point throw a second rock so that the two rocks collide 1/6 of the way up (i.e., 6.5 m above your release point)?

E3. A projectile is launched from ground level to the top of a cliff that is 225 m away and 188 m high. If the projectile takes 7.32 s to reach the top of the cliff, find the initial velocity vector (magnitude and direction) of the projectile. How would you answer change if air resistance were present?

E4. A crate is loaded onto a flatbed truck and the coefficient of static friction between the crate and the truck is 0.45. If the driver of the truck is moving at 25 m/s and sees the car ahead of him stop, 147 m away, will the crate slide relative to the truck as the driver avoids a collision? If so, what is the acceleration (magnitude and direction) of the crate?

E5. Two boxes are pushed with a horizontal 50 N force, along an inclined plane, as shown. The angle that the plane makes with the horizontal is 30° and there is no friction between the boxes and the plane. Calculate the acceleration of the boxes and the force that the 8 kg box exerts on the 5 kg box.
E6. The force that acts on a mass is given by the following. Calculate the work done from \( x = 0 \) to \( x = 2 \) m by the following force (SI units are used throughout).

\[
F(x) = 2x^2 + 3x
\]

E7. A 63 kg person expends 400 W when walking on a level treadmill at a speed of 10.8 km/h. When the treadmill is inclined without changing the speed, the person’s expended power increases to 600 W. Estimate the angle of incline by assuming that all of the increased power output goes into overcoming the force of gravity.

E8. A 7.2 kg bowling ball moving at 2.74 m/s strikes an identical ball that is originally at rest. After the collision the path of the initially moving ball makes an angle of 27° with respect to its original path. The path of the second ball makes an angle of -53° with respect to the same direction. What is the speed of each ball immediately after the collision?

E9. A ball of mass 100 g is projected straight up with a speed of 5 m/s from the floor as shown. Another ball of mass 50 g is hung from the ceiling by a light string at a height of 1.00 m directly above the first ball, so that the projected ball collides elastically with it. Calculate the height above the floor to which the smaller ball will rise. **Show all your steps!**

E10. A 1 kg mass is moving at an original speed 5 m/s toward the right. It collides elastically with a 2 kg mass that is initially at rest. The small mass moves off after the collision at a speed \( v_1 \), at an angle of 30°. The big mass moves off after the collision at a speed of \( v_2 \), at an angle of \( \theta_2 \). Calculate the values of \( v_1 \), \( v_2 \), and \( \theta_2 \).
Physics 11 — Tentative Lab Schedule  
Summer Session IIIA-2015

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Labs Today</td>
<td>No Labs Today</td>
<td>First Lab Meets!</td>
<td>Sec. #2–1:00 PM</td>
<td>NO LABS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sec. #1–1:00 PM</td>
<td>Lab1: Measurement</td>
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<td>Lab2: Falling Body</td>
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<tr>
<td>6-22-15</td>
<td>6-23-15</td>
<td>6-24-15</td>
<td>6-25-15</td>
<td>NO LABS</td>
</tr>
<tr>
<td>Sec. #1–1:00 PM</td>
<td>Lab3: Projectiles</td>
<td>Sec. #1–1:00 PM</td>
<td>Lab5: Ballistic Pend</td>
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<td></td>
<td>Lab4: Inclined Plane</td>
<td>Sec. #2–1:00 PM</td>
<td>Lab6: Cons of Energy</td>
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<tr>
<td></td>
<td></td>
<td>Lab3: Projectiles</td>
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<tr>
<td></td>
<td></td>
<td>Lab4: Inclined Plane</td>
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<tr>
<td>6-29-15</td>
<td>6-30-15</td>
<td>7-1-15</td>
<td>7-2-15</td>
<td>NO LABS</td>
</tr>
<tr>
<td>Sec. #1–1:00 PM</td>
<td>Lab7: Collisions 2D*</td>
<td>NO LABS</td>
<td>FINAL EXAM 9 AM - Noon</td>
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<td>Lab8: Buoyancy</td>
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*Please wear comfortable clothing…you will be working on the floor of the lab room.*

Lab sections all meet in DSC 303:

Section #1: Monday & Wednesday, 1:00 – 5:00 PM
Lab instructor: Guy Letteer

Section #2: Tuesday & Thursday, 1:00 – 5:00 PM
Lab instructor: Guy Letteer