

## Phys 6A, UC Santa Cruz, Fall 2009

### Introduction to Physics I

Physics 6 is taught over three quarters, and Physics 6A is the first installment. In this course, we learn basic concepts of classical mechanics, as established by Newton. Two extremely important overarching principles that will be emphasized throughout this course are Newton's laws and conservation laws. We will learn what these laws are and how to correctly interpret them, as well as how to apply them to various problem solving situations. The list of topics include linear and rotational kinematics and dynamics, energy and momentum and their conservation, angular momentum and its conservation, statics and equilibrium, oscillations, and gravity.

**Instructor** Gey-Hong (Sam) Gweon, ISB 249, gweon at ucsc.edu, (TEL) 9-1806

**Lecture hours** 8-9:10 am (Section 1), 9:30-10:40 am (Section 2), MWF, Thimann Lecture 3 [The two sections should be treated as non-mixable – see **Stick with your section** near the end of this document.]

**Office hours** 11:00 am-12:00 pm, MWF, 2:00-3:00 pm Monday, 10:00-11:00 am Thursday.

**Text** Essential University Physics with MasteringPhysics, Richard Wolfson [Chapters 1-14; Vol. 1 suffices] (Pearson, Addison Wesley)

**Enrollment issues** Please contact the ever helpful physics undergraduate advisor, Teri Pennington, tapennin at ucsc.edu, 383 Thimann Laboratories, for wait-list, permission code, etc.

**6L** The lab course 6L is closely tied to this course. Nonetheless, it is formally separate from 6A. I do not have the authority to answer your questions regarding 6L. The instructor of 6L is George Brown.

**Email address** Your email address as recorded in the registrar will be used for critical communications during this course. If you want to receive my emails at another email address of yours, you can make a request by sending an email message to me.

**Websites** The following web sites are also very important for this course.

- The ILT site is being phased out. Go to the WebCT site <http://ic.ucsc.edu/webct> instead for quizzes and announcements. You can use your current CruzID and password to log into WebCT. Don't have a CruzID? Go to <http://its.ucsc.edu/services/accounts/forms.php> and download the "Sundry Account Form." Fill it out and bring it to me. I will sign it, and you can mail it so that you get an ID for the WebCT site. [The following information is becoming irrelevant, due to our move from ILT to WebCT, as of Oct. 6, 09: I will be using the Harvard ILT web site for administering quizzes and lecture note distribution (and perhaps other purposes as we go along). You are required to enroll yourself at the following website: <http://polaris.deas.harvard.edu/galileo/students/enroll/?courseID=2458>. You need to enter your UCSC

student ID when you enroll, so that I can keep track of you. Once enrolled, you should use <http://polaris.deas.harvard.edu/galileo/students/?courseID=2458> to access our course "UCSC Phys 6A."

- We will be using the Mastering Physics system for homework. You need to enroll yourself at <http://www.masteringphysics.com> with the course ID **SAMPHY6A**. You need to enter your UCSC student ID when you enroll, so that I can keep track of you. Different from the ILT service, you need to pay for a unique serial number before being able to register for the MasteringPhysics website (see **Text** above). [In the past, I had a student who got an unexpired serial number donated by his friend. I do not know the details, but if this is your situation, then let me know, so that we can try to work out a solution.]
- The address <http://samphy6a.blogspot.com> will be used for posting notices and so on.
- The links to the above websites are provided at <http://griffin.ucsc.edu/teaching/current/>.

**Lecture Plan** The rough lecture plan, subject to adjustments as we go along, is as follows.

Week	Lecture	Date	Topics	6L (FYI)
0	1	Sep 25	Units, sig-figs	No labs
1	2	Sep 28	Dimension; Motions in 1D	No labs
	3	Sep 30	Motions in 1D	
	4	Oct 2	Vectors	
2	5	Oct 5	Motions in 2D/3D	Kinematics (1D)
	6	Oct 7	Projectile motion	
	7	Oct 9	Force and motion (tension)	
3	8	Oct 12	Force and motion	Dynamics, Newton's law (FBD; tension ...)
	9	Oct 14	Newton's 3 <sup>rd</sup> law	
	10	Oct 16	Midterm #1	
4	11	Oct 19	Hooke's law, friction	Potential energy and Kinetic energy (mgh; rotational E incl.)
	12	Oct 21	Work, power	
	13	Oct 23	Work-energy theorem	
5	14	Oct 26	Conservation of energy	Conservation of Momentum and energy (elastic, inelastic collisions)
	15	Oct 28	Many particles and collisions	
	16	Oct 30	Momentum and energy conservation	
6	17	Nov 2	Circular motion	Rotating frame (Corioli, centri-fugal incl.)
	18	Nov 4	Rotations	
	19	Nov 6	Angular momentum	
7	20	Nov 9	Angular momentum	No labs
		Nov 11	<i>Holiday (Veteran's day)</i>	
	21	Nov 13	Midterm #2	
8	22	Nov 16	Statics	Rotational dynamics (torque, angular accel., conservation of ang. mom.)
	23	Nov 18	Gravity	
	24	Nov 20	Gravity	
9	25	Nov 23	Harmonic oscillations	No labs
	26	Nov 25	Harmonic oscillations	
		Nov 27	<i>Holiday (Thanksgiving)</i>	
10	27	Nov 30	Waves	Harmonic oscillator (spring, pendulum)
	28	Dec 2	Review	
	29	Dec 4	Review	

**Final exam** According to <http://reg.ucsc.edu/soc/2098/sched.html#Fall2009>, the final exam schedule is Wednesday, December 9, 8-11 AM (Section 1) and 4-7 PM (Section 2).

**Homework (MasteringPhysics)** The MasteringPhysics ("MP") homework system is a very helpful system, but its unique system requires some getting used to. I think you can get frustrated if you do not have a good strategy how to use it. For instance, as of now, each time one tries an incorrect answer, there is a small reduction in score. It seems that this policy is reasonably fair in that it encourages a careful approach, while at the same time the reduction ratio is not really too big to prevent students from trying couple of solutions first without worrying too much. However, one should be careful not to try too many "random guesses." Pretty soon, you get to a crossroads between ~ 80 % and 0 % grades! This can become a quite stressful situation. Here are a few pieces of advice/information, which I hope will relieve your stress.

1. Some MP problems are based on the textbook problems, with a few numbers tweaked by random number generation. For these problems, I will post the answers to the corresponding even-numbered textbook problems. The textbook already gives the answers to odd-numbered problems. The idea here is the following. First, you work out the textbook problem and make sure you get the correct answer. Then, all you need to do to get the correct answer to the MP problem is to apply your formula to randomly tweaked number(s) of the MP problem.
2. If you do not get the correct answer in two or three trials, you should stop and take a break. I recommend that you re-think carefully, after refreshing yourself. Or, get help from me, TAs, and friends.
3. In case you feel strongly that you got "tricked by the MP system" so that your score of a certain problem grossly underestimates your understanding, you can make an appeal to me. Generally, I may require you to submit a fully written solution of that problem to me, or show me how you worked out that problem. You would need to do this before I post my homework solutions on the web (see 5 below).
4. Similarly, if you are sure that the computer made a mistake, you should just let me know with brief information. I will investigate and make sure you receive the credit you deserve.
5. As a general rule, my homework solutions will be posted as soon as the homework due date has passed. The reason for this is to facilitate your immediate review of homework (see the discussion in **Evaluation** below), which is always very important, especially close to an exam. Because of this, I will not accept any late homework. If you have exceptional personal circumstances, you should come and discuss with me (see **Absenteeism** below).
6. I welcome your thoughtful comments about MP homework problems. You can use email or the "leave comments" feature in the MP website. If you want to make sure that I consider your comments that you choose to leave on the MP website, please check "Yes" on the question "Would you like this comment to be e-mailed to your course administrator?" (that administrator is me) in the "Item Survey" section. This way, you are making sure that I will definitely receive your comments.

**Quizzes** In this course, quizzes will be administered through the Harvard ILT website. See **Websites** above. [I-clickers will *not* be used in this course, partly because a significant fraction of students do not have i-clickers, and do not plan to have them any time soon.] Quizzes can be accessed through the **READING** link (or the link(s) under **COMING UP**) of the ILT website. You are required to submit your answers to quizzes before each lecture [except for the initial trial periods, about 2-3 lectures (?)]. You will get the full credit for correctly answered quiz questions, and 90 % credit for incorrectly answered quiz questions. So, the participation is the most important aspect of the quiz. You should read the lecture note and the relevant chapters before doing the quiz. During the lecture, we will discuss these quiz questions in detail. Active student participants in these discussions [and any other academic discussions] during class will be diligently kept track of by me. They may be rewarded in certain ways, e.g. bonus points to quizzes.

**Where you can get help (all of the following is optional, but strongly recommended)**

**From me** To get help from me, visits during office hours will be the best way. Essentially, you can grab me any time in the mornings of MWF to get help. For example, I think the break time, 9:10-9:30 am, might be also very useful for quick helpful information exchange between me and students. Then, after the 2<sup>nd</sup> lecture, 10:40 till noon is available for discussion. I will also try my best to respond to email inquiries. As a general rule, I will try to respond to your email messages in a day, if not sooner. However, by the uncontrolled nature of the email correspondence, I cannot 100 % guarantee my reply. To enhance the chance that you will get a quick and useful reply to your email inquiry, you should make your email as specific, short, and to the point as possible, in other words as easy to reply to as possible.

**TA discussion sessions** Each of your TAs for 6L will hold a 1 ½ hour long 6A discussion session each week at **ISB 165**, starting from the week of Sept. 28. The weekly schedule is as follows. Note that homeworks are due Thursday evening, in accordance with this schedule. You can attend any discussion sessions, to ask questions about homework and any other subject matters of this course.

	12:30 – 2 PM	2 – 3:30 PM	3:30 – 5 PM	5 – 6:30 PM
<b>Monday</b>	<b>Andrew Short</b>	<b>Marty Tysanner</b>		<b>Derek Padilla</b> <b>Lulu Liu</b>
<b>Tuesday</b>			<b>Milton Bose</b>	<b>Laura Daniel</b>
<b>Wednesday</b>	<b>Daniel Rasolt</b>		<b>Jonathan Cornell</b>	
<b>Thursday</b>	<b>Omar Moreno</b>	<b>Gregory Bowers</b>		

**MSI** This course includes [Modified Supplemental Instruction support](#). The MSI learning assistants and their schedules are the following.

Joel Pearman ( jpearman at ucsc.edu; Section 1, 8 AM class)  
 Wednesdays 9:30-10:40am @ ARC 202  
 Wednesdays 7:00-8:15pm @ Arc 202  
 Thursdays 4:00-5:15pm @ Oakes Learning Center

Thomas Atanasov (tatanaso at ucsc.edu; Section 2, 9:30 AM class)

Tues 10:15 - 11:45 AM @ Oakes Learning Center

Wed 11:00 - 12:15 PM @ ARC 202

Wed 5:30 - 6:45 PM @ ARC 203

The schedules are, in principle, also posted at <http://eop-apps.ucsc.edu/msi/msischedule.cfm>. Note that you are required to attend MSI regularly, if you like to get an LSS tutoring service (see next).

**LSS tutoring service** Learning Support Services (LSS) offers many academic programs to UCSC students. One of these programs is course-specific tutoring that is available to all UCSC students. Generally students meet in small group (up to 4 people per group) lead by a tutor. Students are eligible for up to 1 hour of tutoring per week per course, and may sign-up for tutoring at <https://eop-apps.ucsc.edu/OTSS/tutorsignup/> beginning October 6th. Normally, students need to attend MSI first before they are eligible for the LSS tutoring service. However, if special circumstances exist, you should discuss them with me. I am told that the following students have been hired at the LSS to support our course: Kurt Almeida (kalmeida at ucsc.edu), Lorenzo Cabusca (lcabusca at ucsc.edu), Holden Ridge (hridge at ucsc.edu).

**Evaluation (and how to succeed in exams)** The following approximate weighting factors will be used for the evaluation: 10 % for quiz, 25 % for homework, 17 % for midterm #1, 18 % for midterm #2 and 30 % for final. [In the past, after each exam, I notified each student what her/his estimated letter grade at the time was. I think this helped students have good ideas about their progress/standing, and I plan to do the same this year.] The evaluation will be absolute, not relative, so your classmates are your friends, not foes. So, have a lot of helpful discussions! Form study groups! But, please do not just feed the answers to each other. By the nature of the quiz system and the homework system, the variations in quiz and homework scores are likely small. However, it seems that these small variations are greatly amplified in exam scores. Why? My one theory is that, to be successful in exams, it is very important that you review your homework right after you have successfully finished them, especially if you get much help from others (me, TAs, or your friends). Getting help is greatly recommended whenever necessary, but, in the end, it is you who should make sure to internalize and absorb the knowledge before it evaporates into thin air as it tends to do. My theory is that this step of a firm internalization is crucial for your long term success.

**Academic integrity** In the unfortunate case this issue comes up, the following policy is in place. Cheating, if confirmed, will result in a failing grade, regardless of other scores. Suspected cheating activities in exam, homework and quiz will be investigated.

**Absenteeism** You should not miss any exam, by all means, since the negative impact of not taking one exam will be quite huge. Also, you should not miss on-line quizzes and homeworks. If, due to emergency (e.g. family or health), you have to miss any of them, then you should come talk to me, or contact me by phone or email. Under reasonable circumstances, a make-up will be arranged to the extent possible. Per the University-wide policy, I will *not* accept any "medical documentation" related to your absence.

**H1N1 Flu** Per the University-wide policy, you are advised not to come to class if you become ill with flu like illness. Here is what the University policy recommends: "The university has adopted the CDC recommendation that members of the campus community who develop flu like illness should self-isolate until at least 24 hours after they are free of fever or signs of fever. This will likely be a period of 3-5 days." Please notify me before taking the self-isolating action.

**Stick with your section** Keep in mind that the two sections are formally separate, and so be sure to not mix sections. First of all, you should take exams in your section. My current plan is that the two sections will have completely different exams, and will be graded independently. Second, attend lectures in your section. While I anticipate/hope that lectures will be nearly identical between the two sections, I cannot guarantee, at this point, that they will be. For instance, my interaction with students in one section may be somewhat different from my interaction in the other section, and this may cause some differences in lectures. Their paces may become slightly different. So, if you must skip a lecture of your section and then like to make up for it by attending the equivalent lecture of the other section, please keep in mind that the other lecture may not give you a complete make-up. However, the homework will be identical between the two lectures, and so will be the quiz.

**Last note** If you acquire some true understanding enough to enjoy this course with occasional smiles, that is a big mission accomplished for me. And, I wish all of you to succeed to the extent commensurate with your efforts. I will try to be as open as possible to all of you, so feel free to express to me, in a constructive manner, any concerns or comments, positive or negative, you may have regarding any aspect of this course, so that we can meet these goals together. Lastly, I highly recommend forming study groups, a lot of asking questions (in and outside classes), and a lot of peer discussions, on your part.