Syllabus for Physics 6A, Summer Session 2018

Contact Information:

Instructor: Adriane Steinacker
e-mail: asteinac@ucsc.edu
Office: Tbi

Office hours: Please note that in order to serve a larger number of students than is possible by holding conventional office hours, I turned my office hours into sections. Please see the schedule below.

Office hours=Section: Mondays and Wednesdays: 3:00-4:30 PM, Physical Sciences 130

TA: Hanwen Qin, hqin1@ucsc.edu

TA Sections: Tuesdays, 9:00AM-10:30AM, EMS 214
Thursdays, 8:30AM-10:00AM, EMS 214

Sections and office hours start during the week of July 9. The first homework will be posted this coming Friday.

LSS/MSI: This course is supported by **Learning Support Services**. Our LSS tutor this quarter is Joanne Dong (jtdong@ucsc.edu). Please sign up via slug-success (https://sserc.ucsc.edu/slug-success) and attend regularly!

Textbook: I do not require a textbook, because I provide typed-up lecture notes that have in the past optimally served a vast majority of the students. If, however, you should feel the need for a textbook in addition to my lecture notes, choose one that you like. Do not buy a book, unless you are convinced it will be helpful. Here is a reference I recommend:

"Sears and Zemansky's Universiy Physics" by Hugh Young and Roger Freedman, any edition. For example, the 1999 edition (10^{th} edition) of this book is very affordable. The textbook in use by the department is "Physics for Scientists and Engineers" by Knight.

Lab Manual: Phys 6 L may be purchased at the Bay Tree Bookstore. Please also see lab schedule and locations at the end of the syllabus.

Lab TA Contact Information:

Daniel Davies, dadavies@ucsc.edu, 6L-01
David Reiman, dreiman@ucsc.edu, 6L-02
Carey Williams, carwilli@ucsc.edu, 6L-03

Lab Sections: Note that some labs will take place in Thimann 127. Please refer to the schedule at the end on the syllabus.

6L-01: Thursdays, 9:30AM-12:30PM, Thimann Lab 133
6L-02: Thursdays, 1:30PM-4:30PM, Thimann Lab 133
6L-03: Wednesdays, 1:30PM-4:30PM, Thimann Lab 133

There will be a total of 7 labs. Labs must be attended regularly. A student who misses two or more labs cannot pass the lab section of the class. If for a plausible excuse you must miss one of the labs, make sure to inform your TA well in advance, and to discuss with her/him whether or how a make-up might be possible. It is completely up to the TA to approve or reject this possibility. Missing one lab will clearly affect the grade. Please read the Introduction section of your lab manual and Appendix C (Guidelines for Laboratory Notebooks) at the end of the Lab Manual carefully prior to attending your first lab.

Labs start during the week of July 8!

Course Work: Your grade will be made up of four contributions:

1) Homework, 20%. Homework sets are assigned weekly. Homework is usually due within one week from the posting date unless otherwise announced. It is very important to note that due to the workload of grading the homework by our TAs, I cannot accept late homework. The problems are usually selected from the material taught during the previous week of class. Taking the homework seriously is very important, because it helps you review the material, and prepares you for the exams. You might find attending the sections helpful. I will soon post a "***Homework Guidelines***" document, which elaborates on the various rules and regulations as well as details about the grading procedure.

2) Two Midterm Exams, 25% each. These exams are scheduled for Friday, July 20, and August 3 during class.

3) Final Exam, 25%. The final exam is on Friday, August 24, during our last class period.

4) In Class Participation, 5%.

Lecture Notes: will be available on our course website on *Canvas*. The syllabus, the lab schedule, solutions to the homework problems, and other material will also be available on this site. Be sure to familiarize yourselves with the site in order to not miss important information!

Announcements: Please be good about following my announcements on Canvas, which you receive as e-mails. Ignoring these messages may result in missing important information pertaining to the course and could jeopardize your standing in the class.

Needed Equipment: Rulers and triangles, graphing paper, a regular scientific calculator (not your cell phone and not a graphing calculator), a stapler. Some of you may profit from a set of colored pencils.

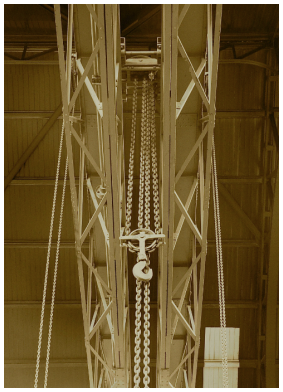
Academic Integrity: While I encourage students to work together in groups, be it in preparation for the weekly homework, or for the exams, each student must ensure a thorough understanding of the material and of the problems solved. Following your group study session or section, you should always write up your work individually. Being able to rework your group's effort will show you whether you really understood everything.

During exams, all work presented must be your own. Any cases of cheating will be dealt with in accordance with the corresponding University regulations against academic dishonesty.

List of Topics: Please note that I am not a "by-the-book" instructor, which is why you won't find page numbers and dates next to each topic. Since I post my lecture notes, you will know where in the following line-up of topics we are. I expect that as skilled college students, you have developed the ability to find the appropriate reading in the textbook of your choice. I also reserve the right to change the order of the topics if needed (e.g. in order to keep pace with the labs), to skip a topic or add a new one.

1) Introduction. Kinematics: Motion in one dimension: velocity, speed, average and instantaneous velocity and speed. Uniform motion in one dimension, distance-time dependence, reading x-t graphs. Motion with constant acceleration, average and instantaneous acceleration, velocity-time and acceleration-time dependence. Reading v-t and a-t graphs. Position-time dependence for constant acceleration, reading x-t graphs, free-fall.
2) Motion in two and three dimensions. Addition and subtraction of vectors. Vector components and unit vector notation, examples. Interpreting y-x graphs, analyzing motion in two dimensions, graphing trajectories, projectile motion.
3) Uniform circular motion, centripetal acceleration, small-angle-approximation.
4) Dynamics: Forces, Newton's Laws. Projecting forces, free-body-diagrams. The spring force (Hooke's Law), the tension force, the normal force. Apparent weight, centripetal force, combined centripetal force and normal force examples. Friction.
5) Energy, Power, Work. Kinetic and gravitational potential energy, conservation of mechanical energy. Work, the scalar product, energy graphs. Work done by the elastic force. Elastic potential energy, conservative and non-conservative forces, potential energy curves.
6) Collisions, energy and momentum conservation during collisions.
7) Rotating frames of reference and fictitious forces (centrifugal force and Coriolis force). Applications.
8) Center of Mass and applications.
9) Rotational Motion: Angular velocity and acceleration, kinematics of motion with constant angular acceleration, relationship between the linear and angular velocity and acceleration, torque. Moment of inertia, angular momentum, conservation of angular momentum.

10) The harmonic oscillator: Analyzing the motion of an object tied to a horizontal spring, equivalence between uniform circular motion and harmonic motion. Analyzing the motion of an object tied to a vertical spring, the simple pendulum, damped and forced oscillations, resonance.
11) The Universal Gravity. Orbits, orbital motion and many fascinating applications.



Lab Sections:

Week of:	Lab	Room
7/2	(no lab)	-
7/9	Measurement & Uncertainty	Thimann 133
7/16	Kinematics	Thimann 127
7/23	Dynamics	Thimann 127
7/30	Forms of Energy	Thimann 133
8/6	Momentum and Energy Cons.	Thimann 127
8/13	Rotating Reference Frames	Thimann 133
8/20	Harmonic Oscillator	Thimann 133