Syllabus for Physics 6C, Summer Quarter, 2018

Contact Information:

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

Office Hours: Please note that in order to serve a larger number of students than is possible by holding conventional office hours, **I hold my office hours as sections**.

Office hours=Section: Mondays, 4:40-6:10PM, Phyiscal Sciences 130, Adriane
Wednesdays, 4:40-6:30PM, Physical Sciences 130, Adriane

TA: Dominic Pasquali, dpasqual@ucsc.edu

TA Sections: Tuesdays, 4:30-5:30PM, Thimann Labs 391, for a review of concepts
Thursdays, 4:30-6:00PM, Thimann Labs 391

Sections and office hours start during the week of July 8! 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 Yanall Boutros (yboutros@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 6N. The lab manual is available at the Bay Tree bookstore. Please also see lab schedule and locations at the end of the syllabus.

Lab TA Contact Information:

6N-01: Maverick McLanahan, mmclanah@ucsc.edu
6N-02: Ryan Van Haren, rvanhare@ucsc.edu

Lab Sections: Note that some labs will take place in Thimann 121. Please refer to the schedule at the end on the syllabus.

6N-01: Thursdays, 9:30AM-12:30PM, Thimann Lab 115
6N-02: Thursdays, 1:30PM-4:30PM, Thimann Lab 115

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 9!

Course Work: Your grade will be made up from the following 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 27, and August 10 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, a compass, graphing paper, a calculator (not your cell phone), a stapler.

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 and Motivation. Charges, conductors, insulators, the Electrostatic Force.
2) The Electric Field, test charge, probing the Electric Dipole Field.
3) Charge distributions
4) The parallel plate capacitor
5) Motion of the electric dipole in a uniform electric field. Induced and permanent dipole moment.
6) Electric Flux and Gauss' Law
7) Electric field of charge distributions, revisited
8) Electric Potential, electrostatic potential energy, equipotential surfaces
9) Determining the electric field from the potential. The Van de Graaff Generator, breakdown electric field and potential.
10) Capacitors, capacitance. Electrostatic energy stored in a capacitor.
11) Cylindrical and spherical capacitors. Capacitors in series and parallel. Dielectrics.
12) Electric current, resistance, Ohm's Law, resistivity.
13) RC circuits. Charging and discharging a capacitor.
14) Direct Current Circuits (series and parallel). Power.
15) The electromotive force, emf, terminal voltage. Junction, resistance, and emf rule for DC current circuits. The Ammeter and the voltmeter.
16) The Magnetic Field: discovery, sources, permeability constant, the Biot-Savart-Law.
17) The magnetic field generated by various current distributions. Ampère's Law.
18) Motion of a point charge in a magnetic field. Lorentz Force.
19) The magnetic force between two parallel wires.

20) The e/m ratio, cyclotron motion, frequency, helical paths, magnetic mirrors. Motion of charges in a uniform electric field. The discovery of the electron and elementary charge.
21) Discovery of the electron
22) Crossed Fields, The Hall Effect, magnetic levitation.
23) Torque on a current loop. The magnetic dipole, magnetic moment. The electric motor.
24) Magnetic flux, Faraday's Law, induced current and induced emf. Lenz's Law.
25) A simple generator. Induction and energy transfer. Inductance, Energy stored in a magnetic field
26) LC and LR circuits
27) Alternate Current Circuits
28) Maxwell's Equations. The speed of light.

The above list is not a list of individual lectures. Some of the topics are covered through more than one class, others are just parts of one lecture.

Lab Schedule

Week of:	Lab	Room
7/2	(no lab)	-
7/9	Electrostatics	Thimann 115
7/16	Potentials; Capacitance	Thimann 121
7/23	Step Response - RC only	Thimann 115
7/30	DC Circuits	Thimann 115
8/6	Magnetism	Thimann 115
8/13	e/m	Thimann 115
8/20	Magnetic Induction	Thimann 115