Syllabus for Physics 6C, Summer Quarter, 2019

Contact Information

Instructor: Adriane Steinacker  
e-mail: asteinac@ucsc.edu  
Office: ISB 236

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, 10:15-12:15PM, Thimann 391, Adriane  
Wednesdays, 10:15-12:15PM, Thimann 391, Adriane

TA: Nicholas Hamer, nhamer@ucsc.edu  
Shijun Sun, ssun40@ucsc.edu

TA Sections: Wednesdays, 4-5:30PM, ISB 235

Sections and office hours start during the week of July 1! 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 Monica Leys (mleys@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 University Physics” by Hugh Young and Roger Freedman, any edition. For example, the 1999 edition (10th 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: Tuesdays, 9AM-12AM, Nicholas Hamer  
6N-02: Tuesdays, 1PM-4PM, Nicholas Hamer  
6N-03: Thursdays, 9AM-12AM, Shijun Sun

Lab Sections: Note that some labs will take place in Thimann 115. Please refer to the schedule at the end on the syllabus.
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 1!

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 19, and August 2 during class.

3) **Final Exam**, 25%. The final exam is on Friday, August 16, 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) Electric field due to charge distributions – The parallel plate capacitor (first glimpse)  
4) Electric Potential and Electric Potential Energy – Point charges and continuous charge distributions (two classes)  
7) Electric current, resistance, Ohm’s Law, resistivity.  
8) RC circuits. Charging and discharging a capacitor.  
11) Motion of the electric dipole in a uniform electric field. Induced and permanent dipole moment.  
12) Electric Flux and Gauss’ Law. Electric field of charge distributions, revisited  
13) Equipotential surfaces. Determining the electric field from the potential. The Van de Graaff Generator, breakdown electric field and potential.  
14) The Magnetic Field: discovery, sources, permeability constant, the Biot-Savart-Law.  
15) The magnetic field generated by various current distributions. Ampère’s Law.  
16) Motion of a point charge in a magnetic field. Lorentz Force.  
17) The magnetic force between two parallel wires.
18) 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.
20) Torque on a current loop. The magnetic dipole, magnetic moment. The electric motor.
22) A simple generator. Induction and energy transfer. Inductance, Energy stored in a magnetic field
23) LC and LR circuits
24) Alternate Current Circuits

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

<table>
<thead>
<tr>
<th>Week of</th>
<th>Physics 6C/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday, June 24</td>
<td>No lab</td>
</tr>
<tr>
<td>Monday, July 1</td>
<td>Electrostatics</td>
</tr>
<tr>
<td>Monday, July 8</td>
<td>Surface Charge, Potentials, Capacitance</td>
</tr>
<tr>
<td>Monday, July 15</td>
<td>Step Response</td>
</tr>
<tr>
<td>Monday, July 22</td>
<td>DC Circuits</td>
</tr>
<tr>
<td>Monday, July 29</td>
<td>Static Magnetic Fields</td>
</tr>
<tr>
<td>Monday, August 5</td>
<td>e/m</td>
</tr>
<tr>
<td>Monday, August 12</td>
<td>Magnetic Induction</td>
</tr>
</tbody>
</table>