

## Syllabus for Physics 6C, Summer Quarter, 2015

### Contact Information:

**Instructor:** Adriane Steinacker  
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Office: ISB157

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, 3:30-5:15PM, Thimann 3, Adriane  
Wednesdays, 3:30-5:15PM, Thimann 3, Adriane

TA Sections: Tuesdays, 4:00-5:30PM, ISB231, Tia  
Wednesdays, 10-11:30AM, NatSci2 324, Tia

**Sections and office hours start during the week of June 29! The first homework will be posted this coming Friday.**

**LSS/MSI:** This course is supported by **Learning Support Services**. The LSS tutor will schedule meeting hours according to the demand. Our LSS tutor this quarter is Michael Stirchak ([mstircha@ucsc.edu](mailto:mstircha@ucsc.edu)). Please do sign up and attend these sessions regularly.

Michael's sections are:

Mondays, 12:00-1:10PM, ARC 203  
Thursdays, 12:00-1:10PM, ARC 202  
Fridays, 12:00-1:10PM, ARC 202

**Textbook:** I do not require a textbook, because I provide typed-up lecture notes that have in the past replaced the need for a textbook for 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. So, please visit the library's reserves desk and ask for Physics Textbooks. 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 (10<sup>th</sup> edition) of this book is very affordable. The newest edition of this book is now in use by the physics department for the Physics 6 series.

**Lab Manual:** Phys 6N. The lab manual is available at the Bay Tree bookstore.

## **TA Contact Information:**

Noah Kent: [nakent@ucsc.edu](mailto:nakent@ucsc.edu)

Gregory Kaminsky: [gkaminsk@ucsc.edu](mailto:gkaminsk@ucsc.edu)

Tia Plautz: [tiaplautz@gmail.com](mailto:tiaplautz@gmail.com)

## **Lab Sections:**

Tuesdays, 9AM-12PM, 6N-01, Tia

Tuesdays, 1PM-4PM, 6N-02, Noah

Wednesdays, 9AM-12PM, 6N-03, Gregory

**Labs:** There will be a total of 8 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 6!

**Course Work:** Your grade will be made up from the following three 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) Midterm Exam, 35%.** This exam is scheduled for Friday, July 24, during class.

**3) Final Exam, 45%.** The final exam is on Friday, August 28, during our last class period.

**Lecture Notes:** will be available on our course website on eCommons. 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!

**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. **Please make sure to bring your student ID to the exams!** Without identification, your exam will be discarded.

### **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, and I provide webcasts, 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.

