

Syllabus for Physics 6C, Summer Quarter, 2016

Lectures: MWF, 9:30-10:40 AM, Earth & Marine B206

Instructor: Stephanie Bailey

Office: ISB 328

Phone: ???

Email: stlbaile@ucsc.edu

Office Hours: MWF 10:45 – 11:45 AM

Head TA: Nico Canzano (ncanzano@ucsc.edu) is the head TA and all questions regarding the lecture course should be directed to Nico. If your head TA is not able to handle your request, then she/he will discuss it with me. I am responsible for four different courses and I do not have time to respond to individual emails. I've implemented this policy because I simply do not have the bandwidth. I care about all of my students and I care about doing a good job. But the reality is we are at a big university with big classes and I cannot give everyone the individual attention they want and deserve.

Lab TAs:

- Michael Saccone, Tuesday, 12:00-3:00 pm, msaccone@ucsc.edu
- Dylan Kennedy, Tuesday, 3:30-6:30 pm, dymkenne@ucsc.edu

Email: I do not encourage asking homework questions by email. It is much more effective to discuss in person so please instead attend office hours or discussion sections; you have lots of opportunities to ask questions and get help. In addition, you should not expect that an email sent past 5 pm on a weekday or anytime on the weekend will be answered.

Optional Discussion Sections: Led by TAs. Attendance of one of the discussion sections is strongly recommended but not mandatory. They will concentrate on problem solving, understanding of concepts, and help with homework. Discussion sections will begin the second week of class.

- Tuesday, 12-1:30 pm, ISB-235
- Wednesday, 1:30-3:00 pm, ISB-235
- Thursday, 3-4:30 pm, ISB-235

Learning Support Services (LSS): Learning Support Services provides course-specific academic support for all UCSC undergraduate students. The goal of Learning Support Services is to enable all UCSC students to maximize their intellectual potential and demonstrate academic excellence. Their website is:
<http://lss.ucsc.edu/>

For this course, we are offering 2 hours of tutoring per week. You may sign-up for tutoring at <https://eop.sa.ucsc.edu/OTSS/tutorsignup/> beginning June 21 at

10:00AM. Your LSS tutor is Kevin Rodriguez (kprodrig@ucsc.edu).

LSS times are as follows:

Monday --> 11am

Wednesday --> 12:15pm

Thursday --> 11:00am

Webcast: Lectures will not be recorded or webcasted.

Use of smart phones during lecture: You are not allowed to use your phones or smart phones during my lectures. Absolutely no texting, no talking, no ringing, no recording of my lectures, no face-booking, no tweeting, nothing! This is very distracting to both your peers and myself. If you use your phone, I will ask you to leave the lecture hall.

Textbook: I require “Physics for Scientists and Engineers: A Strategic Approach”, Volume 4, by Randall Knight, the 2013 edition (3rd edition). I recommend purchasing this books from the UCSC bookstore as a bundle, along with access to MasteringPhysics; I worked hard to get a good package deal from the publisher for you.

Course Description: Physics 6C is the third course in the three-quarter physics sequence for life- science and related majors. This class builds on what was learned in Physics 6A and applies it to the study of electricity and magnetism.

Prerequisite(s): courses 5A/L or 6A/L, and Mathematics 11B or 19B or 20B or Applied Mathematics and Statistics 15B. (General Education Code(s): SI, IN.)

Course Goals: My goals for the course are to have you

- Develop a qualitative sense of “how things work” and learn to explain many everyday phenomena
- Learn to think analytically and logically by solving quantitative problems using the physics concepts developed in this course
- Gain an appreciation for the physical world and find the world a more interesting place

Course Website: The main class website is on eCommons (<http://ecommons.ucsc.edu>) under “PHYS 6C 2016 Summer.” Announcements, course schedule, homework assignments, solutions, the syllabus, lecture notes, and grades will be posted here.

Course Schedule: The course schedule is on eCommons and contains important dates such as exams and homework assignments. I will update the schedule after each lecture to include the relevant reading from Knight and homework assignments so please check it daily.

Grading:

Homework: 10%
Class Participation (ConcepTests): 5%
Midterm 1: 25%
Midterm 2: 25%
Final Exam: 35%

I will base your grade on a curve. I DO assign grades of “C-“, “D”, and “F”. I am a conscientious teacher and I care about teaching you. But your grade is your responsibility. Do not hassle me about your grade, do not ask for extra credit, do not ask me for an exception. I expect you to act like adults and to be kind and respectful. If you act otherwise, I will not deal with you. I’m nice and friendly. But I’m not a push-over. I strive for fairness and consistency. I’m strict and I have high expectations of each of you.

Exam re-grades: Sometimes, despite our best efforts, your exams may not be graded with perfect precision and accuracy. This could be due to many factors: multiple graders, graders with little experience, time pressure, and so on. Consequently, you will have an opportunity to review your exams and the solutions and ask for a re-grade if you think your exam was graded unfairly. This is handled entirely by your head TA and not me. You must take this up with your head TA within one week on getting your exam back. Do not approach me about a re-grade. Your head TA handles this entirely to ensure fairness and consistency.

Homework: Homework sets are assigned weekly and are usually due within one week from the posting date unless otherwise noted in the schedule. Homework is due at 9:30 AM on the day it is due. No homework will be accepted after that time because the solutions will be posted on eCommons. There are NO exceptions so please don't ask. The problems are usually selected from the material taught during the previous week of class. Taking the homework seriously is very important as it prepares you for exams. Do not ask me homework questions immediately before or after class. This is difficult as I am in transition from one classroom to another and have to set-up technology and demonstrations.

We will be using MasteringPhysics for the online homework submission and homework problems will come from the required textbook. The homework answers will be entered via the WWW using MasteringPhysics (www.masteringphysics.com). The course ID is MPBAILEY79208. You will need this course ID to register into my MasteringPhysics course. Please be sure to enter your student ID when you register. This is extremely important. For a video link to step-by-step instructions on how to register and enroll into my course, go to:
<http://www.pearsonmylabandmastering.com/northamerica/masteringphysics/students/get-registered/index.html>.

Do not ask questions via MasteringPhysics as your TA will not be checking this website. Questions asked via MasteringPhysics will remain unanswered. Instead, contact your TA directly.

This software will provide instant feedback on which problems were answered correctly and which were not. You will be allowed multiple attempts to upload answers (up to a maximum of 6 attempts per problem), and your grade will be based on the last submission. Homework solutions will be posted on the course website shortly after the deadline. Don't ask for additional attempts or extensions on homework. This isn't possible since solutions are posted online.

You are encouraged to discuss how to do the homework problems with each other, but after discussing them, go back and work them through by yourself. If you copy someone else's solution, this will be considered cheating.

I have posted a "Homework Guidelines" document, which elaborates on good practices. Even though the homework is submitted online, you should always use

these guidelines and write out your homework as if you were going to turn it in to me. I expect you to follow these guidelines and good practices on in-class exams. So practice these on your homework.

Class Participation: Lectures will be interspersed with conceptual questions (called ConcepTests or QuickQuizzes) that assess your comprehension of the material discussed that day. These questions are multiple-choice questions. All students discuss their reasoning with their neighbors and vote on the answer they think is correct.

You will need either an “iclicker” RF electronic student response unit (available at Bay Tree Bookstore) or a smart device. If you don't own a clicker, you can use “Reef Polling” which allows students to use their smart phone or tablet or PC to participate via the web. Registration for “Reef Polling” costs \$10. You can register your iclicker on our eCommons course website. You can register your smart device here: <https://www1.iclicker.com/students-get-started/>. Please register your device before the second class meeting. Do not register or use more than one device in this class. Use either a clicker or Reef Polling. Do not use both as this causes the software to malfunction.

Correct responses get full credit and incorrect responses get 1/3 credit. Don't ask me to change this proportion. I understand that it may be necessary to miss a few lectures due to circumstances beyond your control. I also understand that you may occasionally forget your iClicker or your batteries may fail. So at the end of the quarter, I will automatically give everyone an extra 6 participation points. Do not ask me for exceptions to this rule.

Why do I use ConcepTests?

- This method has the tremendous importance of giving me significant feedback about where the class is and what it knows. It allows me to test my assumptions on the level of comprehension of the material by the students in the class and adjust accordingly in real time, either covering misunderstood material in another way or moving quickly through content that is already clear to the group.
- This teaching style engenders a better understanding of the fundamental concepts and discourages a number of bad study habits such as rote memorization and an exclusive focus on problem solving.
- The method allows each student to test their own comprehension of course content and identify gaps in their knowledge anonymously.

Exams: Exams are closed-book and closed-notes. Seating will be assigned. I will provide you a list of all the equations you need, plus some you don't. The style of exams may be a mix of conceptual questions (multiple choice, short answer) and numerical problems. Exam dates are listed on the course schedule. Don't hassle me about the equation sheet. I'll post the sheet within a few days of the exam.

No makeup exams are scheduled. If you miss an exam due to an unavoidable catastrophe, then please come to see me about what to do, together with appropriate official documentation of your excuse. Do not ask to take any exam on a different day or time. Absolutely, no exceptions.

The midterms are scheduled on Monday, July 18, 2016 and Monday, August 8, 2016 during the regular lecture. The final exam will be cumulative and is scheduled during the last lecture, Friday, August 26, 2016.

Labs: The lab course is graded and passed separately from 6C, although they are designed to work together. Read through the experiment before you arrive and do the pre-lab exercises carefully. This is useful for you, of course, but more importantly it's unfair to your lab partner for you to come in with no preparation. Please be neat, clear, and complete in your lab write-ups. There will be a total of eight labs. Labs must be attended regularly. If you miss one lab, you cannot get higher than a B in 6N. If you miss two, you will fail the lab course (6N, not 6C), and will have to take it again. 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. Lab grades are assigned by your TA and are separate from your grade in the lecture course. Please come to the first lab prepared with the lab manual and a new lab notebook in which to do your work.

Getting Help:

1. Office hours: Please drop by my office hours to discuss course content, get help on assignments, or just to chat. Office hours are a great way for me to get to know students better and provide help one-on-one.
2. Discussion Sections: The TAs will be running discussion sections to provide help with homework. Section attendance is optional. You may attend a discussion section from any lab TA assigned to this course.
3. Other Students: Your fellow classmates are an excellent way to get help with homework or to review material. I encourage each of you to connect with one or two classmates and form a study group. Who knows, you may make some life-long friends in this class!

Disability Accommodations: UC Santa Cruz is committed to creating an academic environment that supports its diverse student body. If you are a student with a disability who requires accommodations to achieve equal access in this course, please submit your Accommodation Authorization Letter from the Disability Resource Center (DRC) to me privately during my office hours or by appointment, preferably within the first two weeks of the quarter. At that time, I would also like us to discuss ways we can ensure your full participation in the course. I encourage all students who may benefit from learning more about DRC services to contact DRC by phone at 831-459-2089 or by email at drc@ucsc.edu.

Needed Equipment:

- A simple scientific calculator for exams. This cannot be a programmable calculator, graphing calculator, smart phone, or any other device that can store information, make graphs, do calculus, or connect online. Appropriate calculators are generally those that cost less than \$15.
- An “iclicker” RF electronic student response unit (available at Bay Tree Bookstore) or a smart device. If you don't own a clicker, you can use “Reef Polling” which allows students to use their smart phone or tablet or PC to participate via the web. Registration for “Reef Polling” costs \$10.
- Physics 6N Lab Manual (available at Bay Tree)
- A hard-bound, quadrille-ruled laboratory notebook, such as the 7-1/2 inch by 9-3/4 inch notebooks available in the bookstore. Spiral bound notebooks or linear ruled notebooks are not acceptable.
- Access to MasteringPhysics.

Class Courtesy: Please make a special effort to arrive at class on time and avoid leaving early. Students going in and out during the lecture are disruptive to the rest of the class and to me. If you unavoidably arrive late or absolutely must leave early, then please use the upper doors and take a seat in the back rows of the lecture hall.

Courtesy to Me: If you choose not to attend lecture, you will miss out on important announcements. Do not send me emails asking for this information. I do not have time to repeat myself.

Learning Physics Takes Work: Reading the textbook, participating in the lectures and labs, and working all of the assigned homework problems is the minimum effort needed to gain a competent understanding of each of the topics covered in this course. You should expect to work no less than about 16 hours per week on this course alone: 4 in lecture, 4 in lab (including preparation before the session), and 8 studying the book and doing homework (perhaps including attendance of the discussion sections). That is reasonable for 6 units of university credit. Depending on your abilities and background, to truly excel in the course may require somewhat more effort. I recommend that you read the Preface to the Student in the textbook.

Start out strong and don't fall behind: In any course, it is advisable to keep up with the work throughout the quarter, but that is especially crucial in physics. The material builds upon itself throughout the quarter. It simply is not possible to understand Chapter 26 if you do not first understand Chapter 25, and so forth. You cannot take a week off from the physics homework under the assumption that you

will miss just 10% of the course. If you do so, you very likely will be in trouble the following weeks, unless you go back and learn the material that you missed. If you keep up with the pace every week, then you will be able to go into the exams with low stress and, hopefully, excel.

Succeeding in 6C: We're here to help you, but you have to take primary responsibility for making sure you learn the material. There are a lot of tools available to you, and homework is probably the most important. We strongly encourage you to discuss the problems with other students, but you must sit down to work out your final answers alone. Violation of this rule, or any other abuse of the online homework system, will be considered academic dishonesty and will result in penalties up to failing the course, at my discretion. 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.

There is no quick and easy way to do well in a physics course. If you're not spending 10 hours a week outside the classroom on homework, reading, and other problem-solving, do not expect to pass. Please take advantage of the TAs' discussion sections and my office hours for help. You may come to any TA's hours for help, not just your own lab TA. Come to us early if you're getting worried. Your grade is determined entirely by your numerical scores, so there's nothing we can do to change it after the fact – we can only work with you so that you'll do better on the final. Feel free to ask me to schedule an extra office hour with you if you can't make the posted ones or feel you are in particular trouble; I may not always be available but I'll do it if I can.

Physics consists of applying basic principles in new and unfamiliar situations. Thus, you will be facing problems on the exams that might look unfamiliar to you. This is the essence of a physics course and why other departments generally want you to take one. It can be unfamiliar when compared to other courses where memorization and drilling simple tasks is enough. Don't get caught off-guard by it, and come to us for help if you find it frustrating.

Academic Integrity:

On exams: use of any aid not specifically allowed, including notes, use of a smart phone or other device to get any outside information, any copying from another student, or any help from another person by any mechanism, will result in a grade of F in the entire course. To repeat: getting caught cheating on an exam results in automatically failing the course. All work presented on exams 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. On homework: If you are caught cheating or plagiarizing on an assignment, you (and anyone else involved) will receive a zero for that assignment.

On class participation: Bringing someone else's clicker or smart device into class to get clicker credit for them as well as yourself will result in the loss of a full letter grade in the course for both parties involved.

All cases of academic dishonesty will be reported to the provost of your college. In addition to the academic penalties above, your provost may order other penalties such as suspension or expulsion from the university.

Please familiarize yourself with the following guide to academic integrity:
https://www.ue.ucsc.edu/ai_student-guide.

List of topics: Please note that the below 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.

- 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 Potential, electrostatic potential energy, equipotential surfaces
- 7) Determining the electric field from the potential. The Van de Graaff Generator, breakdown electric field and potential.
- 8) Capacitors, capacitance. Electrostatic energy stored in a capacitor.
- 9) Cylindrical and spherical capacitors. Capacitors in series and parallel. Dielectrics.
- 10) Electric current, resistance, Ohm's Law, resistivity.
- 11) RC circuits. Charging and discharging a capacitor.
- 12) Direct Current Circuits (series and parallel). Power.
- 13) The electromotive force, emf, terminal voltage. Junction, resistance, and emf rule for DC current circuits. The Ammeter and the voltmeter.
- 14) The Magnetic Field: discovery, sources, permeability constant, the Biot-Savart-Law.
- 15) The magnetic field generated by various current distributions.
- 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.
- 19) Discovery of the electron
- 20) Crossed Fields, The Hall Effect, magnetic levitation.
- 21) Torque on a current loop. The magnetic dipole, magnetic moment. The electric motor.
- 22) Magnetic flux, Faraday's Law, induced current and induced emf. Lenz's Law.
- 23) A simple generator. Induction and energy transfer. Inductance, Energy stored in a magnetic field
- 24) LC and LR circuits
- 25) Alternate Current Circuits
- 26) Maxwell's Equations. The speed of light.