

Caltech

Physics 5/105 — Fall, 2018-2019

http://www.sophphx.caltech.edu/Physics_5/

Contacts

Course instructor

Frank Rice

Lecturer in Physics Office Hours: anytime lab is not in session M–F, 9AM–5PM
 (626)395-3660 rice@caltech.edu 202 E. Bridge; M/C 103-33

Course TAs

Claire Saunders	csaunder@caltech.edu	Hamza Raniwala	hraniwal@caltech.edu
Amyas Chew	awchew@caltech.edu	Maggie Anderson	maanders@caltech.edu
Mykyta Hulko	mhulko@caltech.edu	Valencic, Tine	tvalenci@caltech.edu

Sections

Recitation:	Lab:	TAs:	TA Office Hrs:
Mon 1PM-2PM	Mon 2PM-4:30PM	Claire, Hamza	
Tue 1PM-2PM	Tue 2PM-4:30PM	Amyas, Maggie	
Wed 1PM-2PM	Wed 2PM-4:30PM	Mykyta, Tine	
Thur 5PM-6PM	Fri 8AM-10:30AM	Amyas, TBD	

Schedule

Experiment 1 8–12 October
 Experiment 2 15–19 October
 Experiment 3 22–26 October
 Experiment 4 29 October – 2 November
 Experiment 5 5–9 November
 Experiment 6 12–16 November
 Experiment 7 26–30 November
 Experiment 8 (Final project):
 Design, assembly, testing 3–11 December
Presentations 12 December

Course Text

http://www.sophphx.caltech.edu/Physics_5/Physics_5_105_Intro.pdf

Recommended (not required): [Horowitz and Hill, *The Art of Electronics*](#)

Course Structure and Conduct

Students will be assigned to lab sections of no more than 10 students each at the course organizational meeting. Each lab section will meet once a week for 3½ hours on a day and time to be determined at the organizational meeting (we will try to set up sections so that each meets in the afternoon, 1:00 – 4:30PM or thereabouts, but we may need a morning section).

Each week's experiment will require **at least two hours of student preparation** prior to coming to lab. Make sure you budget your time each week wisely so that you are prepared for lab! Make sure that you have **studied the lab procedure section** of the experiment notes before coming to lab!

The first hour of the lab section will be a discussion (“recitation”) session led by the course instructor. During this time everyone will go over the course material for that week's lab work and review the prelab exercises found in the course notes. Students will hand in their solutions to these exercises at the beginning of the discussion session.

Following a short break, each student will then perform the in-lab portion of the section which will involve the construction and testing of various circuits, including some circuits of the student's own design. Each student will work independently with occasional help from the course instructor and the section TA and assistant TA. Each student will be required to keep brief notes of the circuits constructed and the tests conducted on them, including oscilloscope screen captures, frequency response measurements, and possibly photos of the setup. Each student will turn in the lab notes to the section TA for grading a couple of days following the section. Most of the lab results should be recorded during lab, so you should not need much time to finish them before handing in your work for grading. Your TA will provide specific instructions regarding when lab results write-ups will be due and where they should be turned in.

Ask questions during the lab! Don't just sit and stare helplessly at a circuit or piece of test equipment which stubbornly refuses to cooperate! The experiments cover much new material each week, and, probably, not all of it will soak in sufficiently on a first reading without some help from the lab staff.

Experiments 1 through 7 will each require one lab session (week) of work. The lab sessions begin the second week of the term (see the schedule on the first page of this handout). Experiment 8, work on which begins the last week of November, is a final project of the student's own choosing and design. All student projects will be presented during a “marathon” final lab session (combining all sections) at the beginning of finals.

Grading

Graduate students are encouraged to take the course (Ph-105) Pass-Fail!

The course grade will be based on the number of points a student achieves out of a maximum total of 100 for the entire suite of 8 experiments. The final course letter grade assignment will be on a curve, but will roughly follow the traditional scheme that 93 or above is an A, 90-92 A-, 87-89 B+, etc. The curves for the various sections will differ so that all letter grades are assigned equitably. An A+ may be awarded to one or two students whose performance is truly exceptional.

Each of the Experiments 1 through 7 is worth 10 points: 4 for the student's preparation before lab, including the solutions to the prelab exercises, performance during the recitation portion of the lab, and preparedness to conduct the in-lab experiments; the other 6 points are awarded based on the student's progress during the experiment portion of the lab, effectiveness at completing the lab tasks and measurements, and understanding of the circuits as indicated by their performance in lab and their recorded results.

Experiment 8 (the final project) will be worth a maximum of 30 points. The more that the circuit's design includes original work done by you, the more points you may expect; the greater the variety of concepts adapted from the previous weeks of experiments, the more points you may expect. More details concerning project grading will be provided as the time for it approaches.

Because each student starts the course with a different background and preparation in electronics and circuit design, ***the assignment of numerical grades for each experiment (including the project) will be tailored to each individual.*** Hard work and notable improvement in your skills with circuit design and lab work will ensure that you get a good grade regardless of how advanced other students may appear to be.

Following the project presentations (Experiment 8), the course instructor and TAs will meet to discuss each student's final grade; at this meeting ***letter grades will be balanced and normalized among the various sections*** so that everyone is evaluated fairly and assigned the appropriate letter grade.

Late Policy

Students are required to successfully complete all 8 experiments to complete the course. If a lab session must be missed, then the student should inform his or her TA beforehand and work out a schedule for completing the missed experiment. If at all possible, the student should arrange to attend a different lab session the same week, or, as a last resort, the recitation portion of such a lab session.

You must show up to lab session on time — failure to do so will result in a loss of some credit for that experiment. Repeated late arrivals will result in an ever-increasing penalty. If you cannot turn in your lab write-up for an experiment on time, you must arrange this beforehand with your TA (an email to your TA in the wee morning hours doesn't count!). Unexcused failure to turn in your lab write-up will result in a loss of some credit. Repeated failures to submit work on time will result in an ever-increasing penalty.

Collaboration Policy

Students are encouraged to study the experiment materials together in preparation for lab. Help each other to understand the concepts and circuits being presented, and discuss how to approach the prelab exercises. Each student must write up solutions to the prelab exercises independently, however, and may not consult another student's solutions when attempting to solve them. You may not refer to solutions from a previous year or solutions posted online.

During lab you are encouraged to occasionally assist your fellow students with use of the lab equipment (such as the oscilloscopes) or software. Give them a chance to use the equipment themselves, however, and to learn from their mistakes. Do not fail to complete your own work because you are “babysitting” a fellow student's efforts!

Students must complete their lab write-ups independently, except for brief discussions of general topics to be included or general interpretation of lab data. Any questions concerning this policy should be directed to your TA or the course instructor.

The policy for collaboration with other students during the final project phase will be discussed with the lab instructor when the projects begin.