

Physics 8b — General Information — 2010

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Overview:

The course emphasizes understanding the basics of electricity and magnetism and their practical applications through laboratory investigations performed on apparatus of your own construction.

There are three main purposes for this hands-on activity:

1. Abstract electrical concepts will become more real and a part of the intuitive scientific knowledge you will use for creative research or engineering.
2. You will meet and become familiar with basic electronic technology, which is a mainstay of all research labs and much of the everyday world.
3. You will get experience in solving real-world experimental problems, which, unlike textbook problems, are multifaceted and open-ended. As predicted in *ZAP!*, “you will find yourselves becoming designers, inventors, and doers.”

The experiments may sometimes seem fairly demanding. Unlike homework problems, they are typically open-ended. They are also designed to provide a challenge to all of you, even those with quite a bit of previous experience. You need to manage your time and get from them what they can best offer you personally. The grading will allow for this.

On Monday, January 4, at 4:00 pm there is an Organizational Meeting in 201 E. Bridge to determine the times for the one classroom meeting per week.

On the afternoon of Wednesday, January 6, from 3:30 to 5:30 pm, you will need to pick up a carton in 74 SAC, under/between Dabney and Blacker (two doors to the west of the laundry room). The carton contains a tool kit, the parts to be used for experiments during the next two quarters, and *ZAP!* You will be asked to sign a quad form to buy your tools for about what a textbook costs. **Be sure to have your student ID number with you.** (This is roughly half the wholesale price of the materials; the cost of the remaining parts is contributed by the physics department.) There are about 100 items — perhaps a bewildering array. By June, you will be familiar with all of them. In addition to electrical gadgets, you will also notice a few low-tech items like Styrofoam, razor blades, and Scotch tape for creative mechanical engineering.

Each week, there will be an assigned experiment in *ZAP!*, your lab manual, to be written up in a standard spiral notebook (included with your parts and tools) and handed in at the weekly class meeting. There will be class discussion of the work just completed, and your TA will discuss aspects of the tasks of the coming week. Your notebooks will be read by the TAs and returned to you promptly. Notebooks that are turned in on time and that indicate sufficient effort was expended will be given a grade of 3, 2, 1, or I. A “3” will be assigned to write-ups that are complete and well-documented and indicate an understanding of the material. Note that to receive a “3” you need not necessarily get all parts of the experiment to work; however, you must document well what you have done and interpret your results (even if they do not match expectation). A “1” is still a “passing” grade for the particular experiment but clearly below the level of work overall needed to pass the course. An “I” means your work on the particular lab is incomplete: the lab must be redone or continued to correct errors or address issues as specified by your TA. Upon completion of the lab, you will be given a numerical grade. There is no penalty for an “I” that was subsequently satisfactorily addressed. If your notebook is turned in late or if the write-up indicates that little effort was expended, you will receive a 0, i.e., no points will be awarded. Note that **in order to pass the course, EVERY lab must be satisfactorily completed before the end of the term.** This requirement to complete all the labs *satisfactorily* is separate from the earning of points toward your final grade. In particular, while late work or initially half-hearted efforts to complete an “I” will earn zero points, all labs must nevertheless (eventually) be completed satisfactorily to pass the course.

To help with difficulties you may encounter, we have a weekly evening Help Lab in room 74 SAC. At least one member of the teaching staff will be there from 8:00 to 11:00 pm. We will determine the day of the Help Lab once the section meeting times are settled. They will also provide spare parts and informal physics talk when the number of people who need help is not too great. The spare parts cabinet can be accessed at any time; the room opens with a South Campus Master.

The last lab experiment of the term will be a lab quiz. It is a separate experiment and not a comprehensive “Final Exam.” But it is to be done by yourself, and it will be graded. Since it is difficult to make up good new labs, we always use the same Experiment 8. **Please do not look at or discuss past work on this experiment by other students.**

Grading:

Lab notebooks : 70% (but all experiments must be completed satisfactorily to pass the course)
Lab quiz: 25%
Class participation: 5%

Lab notebooks will earn 1 to 3 points each week for a passing write-up handed in on time or an incomplete lab made up the following week. 0 points will be awarded for a passing lab handed in late or a failed lab made passing at a later date. **The lab work is an essential part of the course and cannot be substituted by good scores on the other parts. All lab experiments, including the Lab quiz, must eventually be completed with a Pass.** Those who don’t complete them during the term will receive an E for the course and be required to complete them later.

It does in rare instances occur that a student’s nascent trouble-shooting skills are not quite up to the manifold possibilities of the real-world projects, e.g., burned fuses, bad connections, reversed parts. While we do encourage you to seek help in such instances and hope that you will be motivated to get things right, three hours of well-documented effort shall generally be deemed adequate for a minimal pass on a particular week’s lab work. “Well-documented” is a key phrase here: your lab notebook must contain an adequate description of what you did, what happened, and what you tried to remedy the problem. On the other hand, some of what you are asked to build will be needed in future weeks’ experiments. So you must eventually get those parts of the projects to work satisfactorily to earn a Pass.

Your section TA will award 0 – 5 points for class *participation* (as distinct from “attendance,” which is a necessary but not sufficient condition for participation).

Assignment Calendar: (corrected)

ZAP! experiments 0 through 8 are due in class each successive week. Nothing is turned in for experiment 0, but you should complete the task before your second section meeting (Thursday, January 14). Experiment 1 is due the following week, etc.