

Physics 4700 Outline

The purpose of this course is to acquaint the student with the fundamentals of electronics and instrumentation. This is primarily a lab course and as such the emphasis is on analyzing, designing, building and testing circuits. By the end of the course you should be skilled at using a multimeter and an oscilloscope to measure voltages, currents, and waveforms as well as have practical knowledge about the workings of diodes, transistors, amplifiers, logic gates and flip-flops.

It is assumed that the student is already familiar with resistors, capacitors, and inductors at the level of Physics 1251. Many of the labs require the design of circuits. The philosophy of this course is to avoid "cookbook" labs where one only assembles a circuit with a prescribed set of components. Thus for many of the laboratory projects in this class only specifications of the circuits and not component values will be given. Details of the circuits can be obtained using information from the lectures, homework and/or reference books.

The course work will consist of seven lab reports and seven homework assignments. There will be no midterms, finals, or quizzes. The homework will count as much as two labs. A lab report or homework submitted past its due date will have its grade deducted by 5% per day past due.

Unless limited by a lack of equipment, each student will work alone and have his/her own laboratory setup.

Each student is expected to keep a logbook that contains notes of all the lab work performed. These notes should form the basis of the lab reports. Each lab will be graded on the basis of 100 points. Each lab report should be self-contained with a section on:

- objectives
- raw data
- analysis (e.g. graphs)
- conclusion(s)

Depending on the lab, you might wish to divide a lab report into multiple self-contained sub-sections with its own objectives, data, analysis, and conclusions. All circuits should be fully documented with measured component values (not the values written on the boxes that you picked the components from). There is no need to list the equipment used since all students use similar equipment. The lab reports should be written using a word processor. A well-written report and logbook will be a valuable reference for future work in electronics and instrumentation. You should feel free to consult with your classmates while doing the lab. However, I expect each student to build his/her own circuits and prepare his/her own lab report.

In addition to the about six hours per week of lecture and lab work, students should expect to spend perhaps an equal amount of time on study, homework, and lab report. You can access the lab through using your ID card.