Physics 22 - Introduction

1. Preparation

You should read the experiment write up in this manual BEFORE you come to your lab section. Please keep in mind that you will not be doing the labs in exact numerical order. (Schedule will be handed out at the beginning of the term.)

2. Grading

Your lab notebook and your work in the lab will be graded each week, for 13 weeks. The maximum grade each week is ten. In week 14, you will repeat one of the thirteen experiments without the use of this lab manual. This special project will be graded with a maximum of 20 points.

Your grade for each of the first 13 weeks depends on the quality of your lab work and on how completely you describe what you did. Do not write a formal report with phrases such as “the purpose of this experiment is ....”. Instead, write your notebook as a complete diary of what you did. Include many figures, especially drawings of circuits.

We expect that everyone can do the experiments correctly. A complete, well-done experiment and write up will usually earn a grade of 8.8, corresponding to letter grade of B+. You will need a very high grade on the special projects in order to receive an “A” for the course.

Attendance is REQUIRED by University rules and procedures. If you are absent due to medical reasons, you should obtain an excuse from the Dean of Students. If you are absent due to other conflicts, you must contact your lab section instructor in advance. As soon as possible, you must arrange with your instructor a time to make up the laboratory, since otherwise, you may receive a zero for the missed lab.

3. Relation of this lab to Physics 13 and 21:

It is impractical and unnecessary to arrange that each experiment be done in the same week as the related material is studied in Physics 13 or 21. In most cases you will encounter each new physics principle in the lab first. If your lab notebook is clearly written, you will be able to draw connections between lab and class work as you cover the material in your textbook.

Most of the experiments are designed to introduce you to the equipment that is used to measure electromagnetic and optical phenomena.
4. **Topics of the Special Projects**

In week 14, you will be randomly assigned to perform an experiment that is a subset of one of the experiments from the first thirteen weeks of the course. This will be an individual exercise, not with a partner. You will NOT be able to use this laboratory manual or any other reference books. You may use ONLY your laboratory notebook, a calculator and drawing equipment. Therefore, we re-emphasize that your notebook must have complete enough information to recreate the experiment without this lab manual. For your planning purposes, here is a list of typical projects. (You may want to refer to this list as a guide during the semester.)

1. Measure the period of a standing wave with an oscilloscope.
2. Measure the charge to mass ratio of an electron.
3. Measure the focal length of a diverging lens.
4. Measure the focal length of a converging lens.
5. Measure a spectrum using a grating.
6. Use a computer to measure capacitance.
7. Measure Planck’s constant.
8. Transistor amplifier.
10. Measure a magnetic field using a computer.
11. Electric fields and electric potential.
12. Measure voltages and frequencies with an oscilloscope.