Physics 499/599
Electronic Instrumentation and Measurement
Spring 2009

LAB NOTEBOOKS AND LAB REPORTS

The two most important items of your weekly output in this course are the notebook and lab reports.

Notebook

In general, you should try to keep your lab book neat and organized. On the other hand, science rarely proceeds this way, and your lab book should record everything you have done including your false starts as well as your spectacular screw-ups. (*E.g.* "I fried another transistor," or, "I electrocuted myself and it was kind of fun.") The lab book should be viewed as a workbook, and thus errors should be simply X'ed out. In no case should data be written on other pieces of paper and later transferred to the notebook. Instead, all observations and notes are to be recorded into the notebook directly.

Taking data with the intention of figuring it out later is a recipe for disaster. It is very important that you understand the experiment as you go, and your notebook should reflect this. Whenever possible, you should graph relevant data and perform relevant calculations in the lab to ensure that things make sense and that questions can be addressed in real time as opposed to after the fact.

Report

In contrast to your lab notebook, your report should be a polished, coherent summary of the experiment. It should be written using standard English, diagrams, and equations where appropriate. It need not be a long, drawn out affair, but it must be complete. Your grade on the report will reflect your understanding of the experiment *and* your ability to communicate this. Your report should contain the following components:

OBJECTIVES

Before you come to the lab you should have a firm knowledge of what you intend to do and why. This information should be summarized in a paragraph or two at the head of your report, and can be written before you enter the lab.

TECHNIQUES

You should describe with sketches and words exactly what is measured and how it is measured. A circuit diagram is essential, and measurement tools such as voltmeters and oscilloscopes probes should be indicated. It should be easy for the reader to understand what you have done and why. The information which is recorded in your report should be complete enough to enable someone to reproduce your measurements.

OBSERVATIONS/RESULTS

In this section of your report you will record your measurements along with any significant findings. You should tabulate your measurements to the greatest extent possible. For example, a measurement of I as a function of V will result in a table of ordered pairs (V,I), with a label at the top of each column which clearly indicates which V and which I are being observed. Frequently it will be useful to plot a graph of your measurements, and the axes should be clearly labeled. Finally, you should develop an appreciation for determining an estimate of the precision of your measurements. This is often best represented in the number of significant figures you use to record a number. Answers to questions posed in the lab should be answered here.

CONCLUSIONS

What did your data tell you about the circuit or device which you were observing? How could your measurements be improved? Have the objectives of the experiment been met, and with what result? Did you observe significant problems or difficulties completing the exercise? What have you learned? What do you wish you learned?