Lab Reports

This guide contains some information to give you an idea of what our expectations are going to be for your lab reports. For the most part, you will be doing the labs in this course in groups of two. Although you are not required to keep a lab notebook for the class, you and your lab partner should each maintain some kind of record of what you did in lab to help you in writing your lab report. You and your lab partner will turn in a single joint lab report that contains a summary of your experimental results and analysis. The lab report for any given lab will generally be due during the week after that lab is done.

0.1 Lab Reports

You and your lab partner will be expected to submit a brief written report, summarizing your experimental results, any relevant analysis, and a discussion of your results. Your lab report should also be well written. Even though this is not a writing course, we still have to read your reports. A poorly written report is very usually very difficult to read and will generally receive a lower grade than a well written report containing the same information. For each experiment that you do in a given lab, you should include an experimental section comprising a summary of what you did, what results you obtained, and any material specifically requested by the lab handout, such as graphs, calculations, responses to specific questions, etc. You should also include a discussion section for each experiment, which should include possible explanations for discrepancies between your experimental results and your expectations and answers to any questions asked in the lab handout. The best lab reports are brief and demonstrate your understanding of the course material. In writing your lab reports, you should adhere to the following guidelines:

- *Make the report neat.* You should generally type your lab reports using a word processor or typeset them using LaTeX. However, you may draw your circuit diagrams by hand. Also, you do not have to incorporate your graphs into the document. You can append them to the end and annotate them by hand. Additionally, you will not be required to typeset your equations; instead, you can leave enough space in your report and write them in by hand as well. Please make the items that you choose to write in by hand neat. It is very difficult to grade an illegible lab report.

- *Make your plots show your data.* You should expand the scale of your graphs so that the experimental data fills the whole plot. Also, in making your plots, you should think carefully about whether a linear scale or a logarithmic scale makes sense for the data that you are plotting. For example, if you are plotting a current–voltage characteristic that is exponential, the current will be changing over orders of magnitude and you should plot it on a log scale to show clearly the form of the relationship. If you were to plot it on a linear scale, almost all of the data points would be stuck on the x-axis, completely indistinguishable from 0.

- *Label your graphs.* Write important information, such as axis labels (with appropriate units) and a brief title telling what the graph is showing, directly on the graph. Also, you should label important features of the graph, such as axis intercepts and slopes.

- *Avoid plotting experimental data as a continuous line.* Except for scope traces, you should reserve continuous lines for theoretical fits to your data. Individual data points should be distinguishable on your graphs, so please plot your experimental data using individual point markers or using dots. This practice makes it clear exactly where you took data, how much data you took, and how constrained your theoretical fits are.

- *Avoid including too many graphs.* Combine graphs where possible, while ensuring that the important features of the graphs are clearly visible.

- *Include units on all values.* If you don't include units and you make a mistake, it will be much more difficult for your lab instructor to figure out what you meant to say.