Washington State University
Physics Lab Report Details

(updated 10/18/07)

GENERAL REQUIREMENTS:

Have the teaching assistant sign and date your unfinished report BEFORE you leave the lab each week, and make sure that the signed sheets are submitted as part of your final report. Failure to do so may result in no grade for that particular lab experiment.

Write the lab so that it is self-contained. In other words anyone with a minimal background in physics should be able to read it by itself and understand what you did for that lab. The teaching assistant knows what you should have done, but practicing writing and communication skills is part of what this course is about.

Although neatness and style are important, the content of the lab report is the main criterion for grading. Spend more time on content than looks. However, making it easy for the teaching assistant to read your report and to understand exactly what you did is a good idea. You must be able to communicate the procedures used and the results of your experiment in a coherent, organized way to receive a good grade

Engineering paper that provides grids for tables and graphs is to be used exclusively for the lab reports; however, computer printouts of graphs, data, etc. may be on plain white paper. A limited supply of engineering paper is provided at the beginning of the semester from your lab fee money. When that supply is exhausted, you are responsible for obtaining additional paper as needed. The laboratory reports are not formal documents so typed submissions are discouraged. Since the many equations and symbols used in a typical report are time-consuming to generate on a computer, we have found that typed reports generally are of a lower overall quality than handwritten submissions. Pens or dark pencils should be used for writing. You should strive to "write" the report with the diagrams, procedural descriptions, data, data analysis, graphs, and possibly the uncertainty analysis before leaving the lab room. If you wish to finish the summary and conclusions outside of lab, you are welcome to type any parts of that for which typing will save you time. A plain white sheet or two at the end of the report with the summary and conclusions will be acceptable. While the summary and conclusions should be in complete sentences using the rules of good English grammar; laboratory procedures, data analysis notes, etc. lend themselves to the use of short notes and numerical designation of steps rather than prose. Cite actual results, being quantitative as necessary, to support your conclusions.

Record all data in an organized fashion. Include relevant symbols and appropriate units when recording data. Do not erase any recorded data. If you decide that your original data is incorrect, put a large "X" through it and simply note why it was in error. Then record the new data. Include both sets of data in your lab report. We do learn from our mistakes so leaving them in the report can be helpful at a later time. Your report grade is not lowered by including these "false starts."

SPECIAL REQUIREMENTS:

Required Cover Page for Every Lab Report

The cover page of the lab report is a title page consisting of:

- The title of the experiment
- Your name and ID number
- The names of your lab partners
- The date that the lab was performed
- The name of your teaching assistant
- The course and lab section numbers (for example, PHYS 101, Lab Section 5)

Nothing else should appear on this page. Tutorial work may not require a cover page. Please check with the teaching assistant in your lab if you are unsure.

Graphs

Generally each graph should fill a full sheet of paper. In some cases it is advantageous to display computer-generated graphs, for example position, velocity, and acceleration as functions of time, on the same page to facilitate comparison between the graphs. Computer-generated graphs should be made as large as possible by printing them in "landscape" (rather than "portrait") mode. Landscape mode will print the "x" axis along the longer dimension of the paper and thus makes the graphs about 50% larger. All graphs must have a descriptive title of what is being graphed with labels and units shown for both the "x" and "y" axes. If you're asked to draw a "curve" through your data points, this should always be a best-fit curve (for example, a straight line, if warranted, that best represents your data, not a dot-to-dot connection of data points). Best-fit lines can be drawn by eyeball and a ruler or with the help of the computer as stipulated by the lab manual and your TA for a given experiment. If you're asked to calculate the slope (or perform other analysis) of the graph by hand, show such analysis directly on the graph, indicating clearly which graphical points were used to calculate the desired quantities. [Refer to the Uncertainty/Graphical Analysis Supplement near the back of your lab manual for more information about using graphs to find mathematical relationships between graphed quantities.]

Uncertainty Analysis

Most experiments require some uncertainty (error) analysis to make them complete. Methods of uncertainty analysis will be introduced as appropriate throughout the semester for PHYS 101 and 201 students. Your TA will guide you in this process. Strive to understand the appropriate use of each technique. As the semester progresses, you will need to make decisions by yourself on appropriate methods for calculating the uncertainties in your various measured and calculated quantities. PHYS 102 and 202 students are expected to be aware of all the uncertainty methods learned in PHYS 101 and 201, respectively, and to use them appropriately. [Refer to the Uncertainty/Graphical

Analysis Supplement near the back of your lab manual for some important definitions, such as standard deviation, and for detailed information about determining uncertainties.]

TEN ITEMS FOUND IN THE MAJORITY OF PHYSICS LAB REPORTS:

1) Introduction to the lab (diagram(s) of the apparatus, if applicable, and/or some words of description explaining what you are doing and what you are trying to find out).

2) Experimental procedure or data taking methodology; how you obtain the necessary information to complete the required assignment; include enough detail so another person with some background in physics could read the report and duplicate the result with the same or similar equipment.

3) List all measured quantities and methods of measurement, such as "mass of block = 243.2 g (measured on electronic balance with 0.1 g smallest division).

4) Adequate amount and quality of data; tabular form often is helpful here; make it clear and simple.

5) Derivation of necessary equations (relationships) to get desired results from the data; with some accompanying words of explanation.

6) Complete set of sample calculations for each step of the analysis using your data.

7) Clear presentation of final results of the analysis in tabular form, graphical form, or other appropriate format.

8) Quantitative comparison of your calculated value with an accepted value, or comparing values of the same quantity determined by multiple runs or two or more distinct methods. If you are comparing two values, do they agree within the limits of the uncertainties that are expected? Uncertainties are determined by using one or more of the methods outlined in the "Uncertainty/Graphical Analysis Supplement" in the lab manual as appropriate.

9) Summary of the experimental results and a clear statement of conclusions based on the values of various quantities calculated from your data, or based on your observations if the experiment is more qualitative.

10) General organization of the report. Are things presented in a logical, coherent manner so a reader can understand the scope and meaning of the investigation by reading the report from beginning to end? After arranging the pages including graphs, etc. in the most logical order of progression, the entire report should be stapled in the upper left-hand corner.

Note: This list is not meant to be inclusive of all possibilities. There may be other items pertinent to some lab reports which have not been included here.