

New Guidelines for Physics 183 Formal Lab Reports

The ability to write a scientific paper is an important skill to have. Without adequate communication, the scientific community would grind to a halt – every scientist would need to conduct his or her own original research from first principles onward, rather than learning from the work of others and advancing the field. Writing a formal lab report based upon a prescribed lab provides a structured environment in which to learn this skill. However, the purpose of a formal report is not to simply copy the lab manual. Instead, you are to state, in your own words, the concept or problem at hand, the theory behind the concept, the equipment and procedure you used for investigation, and your results. Remember that although this report is in your own words, you are still required to answer the questions asked of you in the lab manual.

Each student must write his or her own report. Formal reports are not a group effort, and any form of plagiarism or “borrowing” without citation is considered academic dishonesty. Questions concerning the format or content of the formal report are to be addressed during office hours.

The formal lab reports should have the following sections, weighted as indicated.

Title page (5%). The title page should have the title of your experiment; your name in bold, followed by the names of your group members in the standard typeface; your section (e.g., Physics 183W); the date you performed the experiment; and the abstract.

Abstract (5%). At the bottom of your title page, write a one paragraph, 75 - 100 word abstract, briefly summarizing your paper. Write a concise description of your goals for experimentation, the primary concepts explored in the lab, and your important results, making sure to include the uncertainty values. [Hint: it is often easiest to write this section of your paper last.]

Introduction (15%). The introduction is literally that – an introduction of the concepts and theories to the reader. Restate the purpose of this lab with a full explanation. This section is likely to contain equations, which should be typed, not handwritten. When discussing equations, treat them as nouns and use proper punctuation. To be complete, your introduction should

- Have a clearly stated hypothesis.
- Contain a review of relevant knowledge and make a connection to the current experiment.
- Explain the purpose of the experiment.

Apparatus and Procedure (15%). This section of the paper should have a list of all physical and electronic equipment used in the experiment, including important pieces of computer hardware and software. Insert a sketch of the physical setup for your lab. You are not required to do this with graphical software, but if you choose to draw by hand, take full advantage of rulers, protractors and ink pens, then scan your drawing and insert it as a graphic. The procedure section provides the reader with a detailed account of how you conducted the experiment. Include the important settings of your equipment, your reasons for altering certain conditions, and other information of this nature. The reader should be able to completely replicate your experiment. Be careful not to quote the lab manual here, but use your own words! To be complete, this section should

- Be clear enough so that a reader could duplicate the experiment from procedure as written.
- Explain the relationship between experiment and theory

Results (20%) and Discussion (25%). This is perhaps the most important part of your lab report. Present all of your results (often in graphical or tabular form) in a clear and concise format with uncertainty values, and explain to the reader the significance of these results. Do your results confirm the theory discussed earlier in your paper? What corrections can be made to the experiment so that your results are more precise and accurate? What did you learn from this lab? Answer all questions posed in the lab manual. To be complete, this section should

- Contain sufficient quantity of data to obtain accuracy and precision.
- Analyze data via graphs, statistics, and curve fitting as appropriate.
- Identify assumptions you made in interpreting the data, critique the process of data gathering and analysis, and consider sources of error that would affect the data and explain how errors affect the results.
- Draw sound conclusions from the data and communicate a logical path from the data to the conclusion.

Conclusion (5%). The conclusion of a formal report is often quite similar to the abstract, and only one or two paragraphs long. Begin by restating the purpose of the experiment, then briefly touch upon your results and discuss their meaning. Finish your paper with a strong sentence stating whether or not your objective was achieved.

Formatting and Style (10%)

Presentation and organization are key elements in a good formal report.

- These lab reports should be 4-7 pages long, double-spaced, in 12-point font.
- Sections of the lab report should be clearly labeled with headings.
- You have done the experiment in the past, so please write in the past tense.
- You are welcome to write from either the first person singular, first person plural, or third person point of view. Choose one and stick to it.
- Graphs and illustrations should be included in the body of your text. Tables, unless they are excessively large, also belong in the body of your text. It is appropriate to either title or caption your graphs and tables, and to have them centered in the page.
- Equations, like graphics and tables, are to be on their own line and centered in the page. They do not need to be numbered.
- Variables are to be defined in the text. Convention dictates that vectors are bold, scalars are italicized, and units are in the standard typeface.
- Answers to questions posed in the lab manual are to be italicized.
- Cite your sources! You do not need to use any specific format (APA, MLA, Chicago, Physical Review, etc.) but you must cite your sources somehow.