Lab Reports in MicroSoft Word

R. L. Forrest

University of Houston

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The purpose of this document is to serve as an example of the proper style for lab reports. This document uses the AIP template in Microsoft Word. Remember to summarize your numerical results here in the abstract, with numerical error and units. The abstract should not exceed 100 words. Notice that there are no references in the abstract.

# Introduction

The purpose of this document is to give an example of the style for your lab reports. All lab reports should be in the style of a Journal of Applied Physics paper. You can browse their papers at the website <https://aip.scitation.org/journal/jap>. You can achieve this using the AIP style Template download, for TEX or Microsoft Word. The TEX template and this Microsoft Word template can be found at the website http://nsmn1.uh.edu/rforrest/lab%20report%20resources.html. The line spacing was changed to single, and the column format set to two-columns from the Introduction forward.

In your introduction, give the background of your experiment, and state the purpose of your experiment. The background should give some context to your experiment. The purpose may include a general purpose, such as becoming familiar with a topic, but must also include specifics of what you intend to measure or determine.

An important part of the Introduction is the Theory for your experiment. Include all equations you will use, defining all variables. For example, Newton’s second law states that force, **F**, is given by

**F** = m**a,** (1)

where m is the mass of an object and **a** is its acceleration. Equations only need to be numbered if you’ll be referring back to them later in the report. For equations more involved than, say, Eq. 1, you should show some key steps in their derivation.

Be sure to include references. You might refer to a book,[[1]](#endnote-1) a web site,[[2]](#endnote-2) a paper,[[3]](#endnote-3) or your lab manual.4

# Experimental Procedure

Here you give the details of what you did. If you deviated from what was expected, explain why. Include diagrams of the apparatus. Do not give a numbered list of steps, explain using sentences, in your own words.

# Results, Analysis, and Discussion

Give the results of your measurements, i.e., your data. Include units. A paragraph always comes before a table or figure in a section. It’s best to put all data in a table or in a plot, whichever is most practical and best conveys the information. Remember that the whole report should be four pages or less. All tables must have titles above them, as in Table 1. All figures must have captions below them, as in Figure 1. No title is needed on the figure because a caption is given. Also notice that Table 1 starts on the next page so that all of it fits on one page, in one column. All tables and figures must be mentioned in the text by number, as in the previous sentence. They are numbered in the order they are mentioned in the text. The same numbering system is used for references.

Table 1. An example table of fictitious data. V is the voltage measured across an imaginary resistor, I is the measured current.

|  |  |  |
| --- | --- | --- |
| Run # | V (mV) | I (A) |
| 1 | 25 | 0.10 |
| 2 | 59 | 0.22 |
| 3 | 100 | 0.40 |



Figure 1. Current versus voltage for an imaginary resistor. The error in the current measurements is 0.05 A.

Next describe your calculations and analysis, in the same section as Results. Discuss the analysis, i.e. calculations, right after presenting the measured data. Give as many details as are practical (within 4 page limit). Typically, one example calculation is acceptable. You should refer back to the equations from the Theory section, no need to repeat them again. Include error analysis.

Finally, in this section, discuss your calculated results. Are they as you expected? Do they match the accepted values? Are discrepancies within the calculated errors? Discuss the source of errors, difficulties you had with the lab, and suggested improvements.

# Conclusions

This is a summary of your report. Repeat your final calculated results again, with error. Did you satisfy the purpose of the experiment, as stated in the Introduction? Summarize your comments from the Discussion.

1. D. Halliday, R. Resnick, J. Walker, *Fundamentals of Physics*, (Wiley, Jefferson City, 2011), p. 100. [↑](#endnote-ref-1)
2. Journal of Applied Physics, accessed 8/18/2020, https://aip.scitation.org/journal/jap. [↑](#endnote-ref-2)
3. R. Verre, K Fleischer, O. Ualikbe, I. V. Shvets, Appl. Phys Lett., **100**, 31102, (2012).

   1. R. L. Forrest, “Measurement and Error Analysis”, p. 2, in Advanced Laboratory I Manual, University of Houston, 8/11/2022.

   [↑](#endnote-ref-3)