Report for Laboratory XX: TITLE OF THE LABORATORY PROCEDURE

First Author   Second Author   Third Author

Department of Mechanical Engineering, Saint Martin's University

ME 316—Mechatronics & Measurements Laboratory

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Abstract. "The abstract is a very short summary (usually around 150-250 words) of what the question is, what you found, and why it may be important."

See the LaTeX tutorial below in Appendix A. You should delete Appendix A and the following filler text when using the template.

The suggested structure of the document is given. In the following sections, content is suggested by direct quotes from MIT's Guidelines for Writing a Lab Report. This text should obviously be deleted at some point.

1 Introduction

"Introduce what your question is. Explain why someone should find this interesting. Summarize what is currently known about the question. Introduce a little of what you found and how you found it. You should explain any ideas or techniques that are necessary for someone to understand your results section."

2 Materials and Methods

"This is like a cooking recipe. Include enough detail so that someone can repeat the experiment. It is important that the reader be able to interpret the results knowing the context in which they were obtained.

"The Materials and Methods section should be written in the past tense, since your experiments are completed at the time you are writing your paper."

3 Results

"To write the results section, use the figures and tables as a guide. Start by outlining, in point form, what you found, going slowly through each part of the figures. Then take the points and group them into paragraphs, and finally order the points within each paragraph. Present the data as fully as possible, including stuff that at the moment does not quite make sense.

"Verbs in the results section are usually in the past tense. Only established scientific knowledge is written about in the present tense, 'the world is round,' for example. You cannot presume that your own data are part of the body of established scientific knowledge, and so when you describe your own results, use the past tense, 'a band of 1.3 KB was seen,' for example. There are, however, exceptions to this general rule. It is acceptable to say, 'Table 3 shows the sizes of the DNA fragments in our preparation.' It is also acceptable to say, 'In a 1991 paper, Ebright and coworkers used PCR to mutagenize DNA.' ...

"Some readers begin by scanning the figures first. The figures, with the legends, should provide a self-explanatory overview of your data. Decide what the data show, then create figures which highlight the most important points of your paper.

"Tables are used to present repetitive data that is numerical. Graphs or illustrations, collectively called figures, are used to present numerical trends, raw data (like a picture of a gel), or a model that explains your work.

"When you prepare your figures and tables, keep in mind that it is significantly more expensive for journals to publish figures and tables than text, so try to present the data in a way that is worthy of such added expense."

4 Discussion

"This is the section of the paper for you to show off your understanding of the data. You should summarize what you found. Explain how this relates to what others have found. Explain the implications."

References

K. Ciesielski. *Set Theory for the Working Mathematician*. London Mathematical Society Student Texts. Cambridge University Press, 1997. ISBN 9780521594653.

Derek Rowell and David N. Wormley. *System Dynamics: An Introduction*. Prentice Hall, 1997.

A LaTeX Tutorial

A.1 Citing a Source

I'm going to teach you how to use LaTeX a little bit. Like how to cite a source, insert a graphic, and build tables. Follow along in the `report.tex` file.

Let's cite a source. The source must be already saved as a BibTeX file (`.bib`) in the same directory as the `.tex` document. I have already created a sample `report.bib` file. (If you want to add and remove sources to this file, you may use a reference manager like BibDesk on a Mac or JabRef on a PC.)
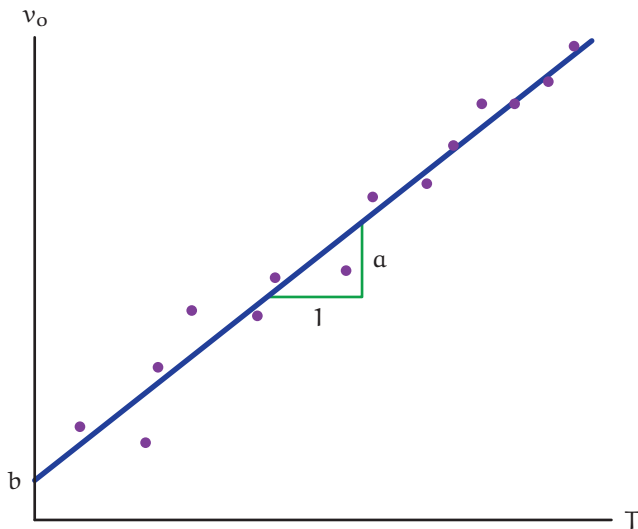
Figure 1: here's a caption.

The next step is to cite the source, inline (Rowell and Wormley, 1997). And I can easily cite another reference (Ciesielski, 1997).

A.2   Equations

$$x = 1 \tag{1}$$

$$\int_0^t x_2 \sin x \, dx = \begin{bmatrix} 1 & 0 & 8 \\ 0 & x^7 & \\ 7 & & \end{bmatrix} \tag{2}$$

$$x = \alpha \left(\left(\frac{2}{3} \right) + \frac{5}{6} \right) \tag{3}$$

And this works too: $\frac{\partial x}{\partial y}$.

$$x = 2y \qquad \text{(where } x > 2\text{)}$$
$$y = 4x + 8$$

Later, you could refer to the equation Equation 2.
Or you could do it multiple times: Equation 2.

	label 1	label 2
Interesting thing	5.1	603
Thing of interest	pigtails	x^3

Table 1: a table caption.

A.3   Figures

It is easy enough to add a figure. In the subdirectory `figures`, I placed a file `data.pdf`. If we want to include it in the document, we use the following commands.

We can easily reference the figure with its label, like Figure 1.

A.4   Tables

Tables can be a pain in LATEX. Here's a simple table.

Notice (as in Table 1) that these things don't go where they're entered. Most of the time it's preferable to have a figure or table "float" such that it is at the top or bottom of a column.