Lab Assignment X

Lab Report Template and Guide

Your name(s)

Email Address

**Abstract**

*Summarize the main points of the lab in 2-3 sentences. This should give the reader an overall impression of the purpose of the lab, the progress made, and the outcome.*

This is a lab report template and guide for EECE 2160, Enabling Robotics: Embedded Design. The following sections outline and describe the contents of a proper lab report.

# Overview of the Lab Report

*(your reports do not need to contain this section)*

The purpose of the laboratory exercises is to reinforce your understanding of the material presented in class and discussed in the textbook. Our integrated classroom laboratory environment is designed to give you the ability to test out new material presented in class in an immersive hands-on environment. The laboratory report serves as your way to capture your experience in the lab, as well as to document the various elements of the lab that you have mastered. The report format is designed to practice technical writing and strengthen your ability to convey technical concepts and experimental results in concise English.

Each report should:

* Present a clear and concise description of the work your group completed.
* Use the format described in this document; specifically containing all required sections.
* Be typeset, including equations, and contain figures generated using an appropriate computer graphing or drawing tool. *(A typesetting system like Latex or word-processing software such as MS Office are recommended)*
* Appear professional and clear; it is most important that the document reads logically and contains only the necessary information demanded by this guide.

In addition, each report must contain each of the following elements:

* A cover page with the following information:
  + Course Number and Title
  + Section Number
  + Instructor’s Name
  + Lab Title
  + Names of Students in group
  + Due Date
  + Date Submitted
* Numbered Pages
* Sufficient detail to present all the requested information; **there are no minimum or maximum page requirements.** *(Try to be as concise as possible without omitting crucial information; avoid repetitive sentences and unnecessary adjectives.)*
* The following sections:
  + Abstract
  + Introduction
  + Lab Setup
  + Results and Analysis
  + Conclusion
  + References *(if necessary)*
  + Appendix *(if necessary)*

Lab reports should present and preserve your knowledge. By following the format described here-in, you should be able to return to this document in a few years and understand what you did, how you did it, what worked and what failed, and what work you thought might be interesting in the future. If you develop your report carefully, it could be shared with others in the future, including a prospective employer or a capstone team.

***A note on Technical Writing Style*:**

* *Using the first person (“I,” “me,” “we,” “our,” etc.) is informal and should typically be avoided. One alternative is to use the third person (e.g., “one might” or “the user could”). Nevertheless, the first person can sometimes be the most convenient way to convey your report; in this instance always use the plural (“we”, “our”, etc.) even if you worked alone. When reporting in the first person, always use the past tense (e.g., “we ran a simulation”, “we concluded”).*

The following sections outline and describe the format and content of a proper lab report.

# Introduction

In the introduction section you should explain the lab such that you could return to this report in a few years and understand immediately what you did and why. What is the goal? What are the constraints? What knowledge does this lab assume you have? If relevant, make predictions about the results before you begin your work and document those predictions here. Try to keep this section short and concise (**no more than 1 to 2 short paragraphs**).

# Lab Setup

This section should contain two sub-sections.

## Pre-Lab

This sub-section should contain your responses to all of the prelab questions.

## Equipment

This sub-section should describe the equipment used to complete the lab. This will often be the same between labs; nevertheless, it is important information to include for anyone wishing to repeat your work or identify features of the equipment that may have influenced your results.

# Results and Analysis

This section may be divided into “Results” and “Analysis” sections if there are many results to discuss. For multi-part labs, you should include subsections to discuss each part.

**Results**

This section should contextualize and present your results by explaining:

* Which results you are presenting (e.g., “the effects of hardware acceleration on latency”), referencing the appropriate part of the lab itself.
* The quantitative results themselves in graphical or table form. Use Excel, MATLAB or similar graphing programs to produce these visuals.
* Qualitative results (e.g., code) via listings with line numbers, whenever you need to reference specific code for your results.

All your figures should:

* Have an appropriate title
* Use font that is large enough to read easily (at least 10 pt font)
* Each axis must be appropriately labeled to describe the quantity depicted, the symbol that represents the quantity (when relevant) and the units of measurement.
* The graph or table should have a caption with a figure number  
  (e.g., “Figure 3: A graph of program runtimes”) for easy reference.

Highlight the most important results in the text and use your figures only as a reference to help communicate the detailed results. **Always include text to explain the context and takeaways of each of your figures.** If the report fails to comment on a figure/graph/table, the assumption is that the authors do not understand what the results mean or why they were presented. A good rule of thumb is to use the minimum amount of data, output, or other supporting material to adequately document your work. If a figure exists without comment, leave it out.

**Analysis**

This section should critically describe your results: Did they meet your expectations? Do they make sense according to your theoretical knowledge? If not, what are some possible sources of error? The lab itself may ask for specific questions to be answered in this section. If none of the above questions are relevant to the given lab and there is nothing else to report here, you can state that there is no analysis necessary.

# Conclusion

Explain what the results indicate from a larger or system-level perspective. Reconcile experimental results and account for any differences you observed. This section should expand upon the implications of your **Analysis Section**, it should not repeat the analysis itself.

If appropriate, explain what work might be done in the future.

# References

If you use any additional texts, papers, websites, etc. and refer to them in the report, then you must include a reference. Note that copying text from other sources is typically considered plagiarism. If you copy text verbatim, you will need to put “the copied text” in double quotes and cite the source. Even if you do not exactly copy some text, but only reference an idea from another source you still need to include a citation. For example, most of this lab report guide is based on work by Michael Benjamin [1]. If you find any useful external sources, please tell me about them so I can provide them to future students.

1. Michael Benjamin, “*Lab Report Guide*”, Northeastern University, January 18 2006.

# Appendix

Use an appendix to present additional information such source code snippets, code organization or test run outputs that are large and would disrupt the readability of the rest of the report.