

# Physics 338K : Fall 2025

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## Lab Report Information

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## Welcome

Welcome to Physics 338K! Over the course of the semester, you will write 5 lab reports. For lab reports 1-4, you do not need an introduction and a conclusion, and you do not need to reproduce the material in the lab manual unless it provides important context for your results. Please number the questions the way they are numbered in your lab manual (e.g. “Chapter 2, 1 (a)” ) and include results and answer the questions posed in the “For Your Report” sections. For lab 5, you will be asked to come up with your own project. The final report will be submitted as a full lab report consisting of an introduction, methods, results and conclusion. This rubric is subject to change. If I do change the rubric, I will make sure to notify the class well ahead of the next lab report.

## General Notes for Labs 1 to 4

- Submit individual typed lab report. You can choose whether you write the lab report using Microsoft Word or a L<sup>A</sup>T<sub>E</sub>X editor (I recommend Overleaf, Texmaker, or TeXstudio).
- Make sure your name as well as the name of your lab partner is clearly present at the top of the lab report.
- Please typeset equations and numbers and always give units! For example:

$$I_{\text{circ}} = \frac{V_{\text{bat}}}{R_{\text{circ}}}$$

is much easier to read than  $I_{\text{circ}} = V_{\text{bat}}/R_{\text{circ}}$ . Similarly,  $3.4 \times 10^{-2}A$  is better than 3.4E-2.

- While we will not be focusing on computing uncertainties in this class, please present data up to a reasonable number of significant figures. Let’s say you are measuring a voltage with a voltmeter and the number is fluctuating somewhere between 3.4978V and 3.5452V . It is reasonable to write 3.5V or 3.52V , but please avoid writing 3.5137V just because that’s the number the volt meter gave at the exact moment you decided to write it down.
- Please generate graphs in a graphing software that gives you control of how you graph your data. Acceptable examples are, MATLAB (free for UT students), python (it’s free,

open source, and you can use an online editor!), Origin (no programming required, but it's not free). Do not use Excel.

- Always graph your data properly. Take screenshots of the oscilloscope and download using a flash drive. Do not submit photos of the oscilloscope screen. When asked to show oscilloscope data, we will make it clear whether we are looking for a qualitative description of the waveform you see, or if you are being asked to quantitatively analyze the data. If you are asked to quantitatively analyze the data, please download it (we will provide flash drives if you don't have your own) and graph it.

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## Lab 5 Lab Report Structure

### 1 Introduction and Theory (10 pts)

Each lab report, even if it consists of multiple parts, is centered around a central topic. In the introduction, you should introduce this topic and place it in context. When giving context, think of answering questions such as, “Why is this technique or tool important?” and “Which instruments might rely on this technique or tool?”. Finally, this section should include the concepts and equations relevant to your stated goals and the results you plan on presenting.

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### 2 Methods (15 pts) and Results (10 pts)

Depending on the scientific article (and the style guide of the journal which publishes the research), these two sections may or may not be separate. Sometimes, the methods are described first and the results come second. Other times the results are shown first and the methods are described in a subsequent section. And finally, it sometimes makes sense to describe a method and then present the relevant results and then move onto the next method. You can choose which of these styles suits each lab report best as long as you include all the necessary information in a logical order.

#### 2.1 Methods

A description of what you did should be presented with enough detail to allow for your experiment to be repeated. Imagine that one of your classmates who hasn't read the lab manual walks into lab and is handed your report. Would they be able to reproduce your results based on the details you provide in the methods section? You can use words, diagrams, pictures (please use figure captions).

## 2.2 Results

Please make sure to include all the measurements you are asked to perform in the lab manual. When presenting the results in a graph, please format the graph with legible axes that are titled and labeled with units as well as a figure caption that give all relevant information.

## 3 Conclusion (5 pts)

Quickly summarize your results and their relevance to electronic methods or techniques. The reader should walk away with a clear “take-home message” after reading your conclusion. If something went wrong with your experiment and you didn’t get conclusive results, or your results disagree with theory, this is your chance to explain what went wrong and propose an improvement to the experiment.

## 4 Style Points (10 pts)

Your lab report should flow like a cohesive story. Each next section should be set up by the previous one and the reader should never have to ask, “why did they do this thing?”. Run on sentences, confusing formatting, badly formatted diagrams and graphs, missing references, and excessively long lab reports will result in points deducted in this category.

## General Notes for Lab 5

- There is not a fixed length for any lab report. A lab report is too short if it doesn’t flow smoothly because key details required for understanding the material are missing. However, please avoid writing a needlessly long lab (the latter is an easier trap to fall into). So, please try to be concise!
- Please cite relevant facts and equations unless you have derived them yourself (and unless they are considered common knowledge like Ohm’s law). Any citation style is okay as long as the source material can be found.