

Introduction to Lab Report Writing University Level

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Physics Club
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Dear first year student who's reading this, welcome to UTM and welcome to the wonderful world of physics!

Being curious about the natural world is the reason we are all here studying physics!

You are about to begin your mysterious journey. You will learn that you know very little and there are skills and concepts that are yet to be discovered by you. One of the most crucial skills for scientists is writing. Scientists are constantly writing research and funding proposals and publishing papers. **So...you need to learn how to write like a scientist.**

- **Abstract:**

Abstract is probably the most important part of any writing piece. The reader will decide whether your work is worth reading or not based on the abstract. It should be short but must contain all the important information that the reader needs to know about your project.

Things that you must include are:

1. A general statement about what the topic of research is (give a short background on what you are doing)
2. The objectives of your research (*why* you did what you did)
3. A *brief* mentioning of your methodology
4. Your important results (DON'T forget significant digits and units)
5. Final statement about if you achieved your primary objectives.

- **Introduction:**

Technically, this section is the summary of the introduction part of the lab manual. You should give a broader explanation of the topic of the experiment. You can connect it to what you are being taught in lectures as well. Have your equations numbered here. Make sure you explain every parameter of the equation and their units.

- **Methodology:**

Ask your TA if you need to include this section in your report. Most probably you just need to write “refer to lab manual” in your report but if you are asked to write a methodology section, this is how you should do it:

- 1- Depending on the experiment but a half a page to one page methodology section is enough.
- 2- Go through your lab manual and summarize important parts in a way that someone who has never done the experiment can understand the general set up of the experiment.
- 3- You can include important figures for the set up from the manual as well.

- **Data Analysis:**

This is the most important part of your report (in terms of grading). In this section you need to show your figures, graphs and tables. You need to label everything like shown below. You should **not** put your raw data here. Your raw data as a table or all the figures you have belongs into the Appendix section.

If your TA says you don't need to include a methodology section, it is better to include a brief explanation of each part of the experiment and then show the results and figures for it.

*It's worth mentioning that this section is just you presenting your data and results, and NOT explaining them. You will dig more into the explanation and reasons behind each part of the experiment in Discussion.

- 1- Brief explanation of the part of each part of the experiment with their results and how you extracted the data.
- 2- Finalized and important graphs and figures with labels and description
- 3- If you used an equation to calculate something, mention the number of the equation.

- **Discussion & Conclusion**

Congratulations on making it this far! You are almost there.

In this section, you should kind of repeat everything you have said so far in a more contrast way. You can write the conclusion in a separate section as well.

- 1- All the results and everything you calculated with their uncertainty.
- 2- You should discuss all the possible sources of the uncertainty.
- 3- There are always questions in the manual and you should answer them here.
- 4- What you can conclude from the experiment you did (you should again mention the primary objectives of the experiment and whether you achieved them).

- **Appendix**

No explanation is needed here.

- 1- Include your graphs and figure with labels and description.
- 2- Include your raw table of data with label and description.
- 3- A sample of calculation you did
- 4- Standard Deviation calculation and equation

General Tips:

- Have page number.
- Your measurement values should have the same number of significant digits as their errors!!!!!! VERY IMPORTANT
- No matter where you present your values, they MUST have an error ALWAYS.
- Use Text Box to make your report prettier.
- Use font 14 and Times New Roman preferably.
- Don't trust your brain remembering everything! Start writing as early as possible.
- Take quick notes in the lab or take pictures from each section you do so you remember what you did (I always forget what I did lol).
- Read the lab manual before you do the lab and prepare an Excel file for it so you input values as you are doing the lab (this will save your life).
- Do NOT plagiarize (TAs are smart people, they will catch you! So, DON'T)
- Remember you are here to write as a scientist! Scientists don't copy.
- I use this website for sig figs <https://www.omnicalculator.com/math/sig-fig>