Lab reports in PHY385 should follow the same format you practiced in PHY224/324. The following are basic guidelines you should follow when writing your reports. They are not fixed rules, so please make sure you understand the reasoning behind each one. Ask your lab TA if you have any questions about report content, style or structure.

Content

1. Your reports will be read by the instructor and TAs. Do not repeat information that is in the lab writeup.
2. Your report should include an **abstract** to give the reader a complete yet concise understanding of your goals and findings. This should be a qualitative (and quantitative, if appropriate) summary.
3. Physical concepts explored in the experiment should be **introduced**, especially equations that will be referenced later in the paper.
4. Provide *necessary* detail in your reports, particularly when describing the the **procedure** you followed for your experiment. Don't forget point #1.
5. Your measurement **results** should be presented with *realistic* error bars, which come from an average of repeated measurements or some other kind of statistical analysis of **measurement uncertainty**. Do not forget that you should also consider and discuss **systematic errors**. Do not forget to use common sense.
6. If it is necessary to fit a curve to your data, that curve should also be displayed on the plot as a smooth curve labeled as a fit. You should include theory and/or calculations in your report to justify why you chose the fit function that you did. There should also be a **residual plot** and an appropriate measure of **goodness of fit**, e.g., a χ^2_{red} value, and you should be able to discuss its magnitude and what it tells you about the fit. Any fit parameters which are relevant to your discussion should be included (with uncertainties and units) in your figure or in the main body of the report.
7. Provide *sufficient* **discussion**, so that the reader can understand what you learned or discovered from your measurements. Make sure to discussion sources of error or corrections made to your model to account for known measurement errors.
8. The key findings from your experiment should be summarized in a brief **conclusion**.
9. Any information from other sources should be cited in text and referenced in a corresponding **References** section. Any use of **AI** should be acknowledged and clearly described.

Style

- Make your writing **legible**. Write in simple English. Use short sentences. Use active voice and past tense.

Here is a bad example: "The knobs on the instrument were set to position A, after which data was collected by the experimenters on the voltage, after I first connect it to a voltmeter, and then will be analyzed using Python code which had been given to us from a quercus link."

Here is a better version: "I set the instrument to position A. Then I measured the voltage 10 times and averaged the values. The averaged voltage versus time is shown in Figure X."

- Make your plots clean and informative. Label axes properly and with the appropriate units, e.g., "Distance, d (mm)". Include detailed captions.
- Data should be plotted as a scatter plot, without lines connecting the data points together, so you can clearly see the data. The error bars representing your uncertainties should be depicted on the plot. If they are too small to see, that should be mentioned.
- Don't forget basic physics skills: physical quantities should have units. Numerical values should only have as many significant figures as make sense.[1]
- Proof-read your report. Spell-check your report. Check for common grammatical errors: `https://advice.writing.utoronto.ca/revising/hit-parade-of-errors/`

[1] If you ever are in doubt about stylistic conventions in physics, check the *Physical Review Style Guide*.