Outline of a short Lab Report

A. Title page

- course name
- name and number of the experiment
- author of report
- lab partner
- date
- abstract

Write a two-sentence abstract as a single paragraph, which summarizes the experiment and your results in a highly concise form. Address the following main points:

- What is the main physics aspect of the experiment?
- What was measured with which apparatus?
- What is/are the main result(s)? Be quantitative.

B. Main text

You do **not** need to provide the objective, theory, equipment description, or procedures.

Data, Analysis, and Results

(a) Follow the guidance of the lab manual. Answer all questions posed in the manual.

(b) Produce all calculations, graphs, plots, figures, tables, etc. suggested in the manual. Follow the numbering of the lab manual in your report. Reproduce the tables suggested in the lab manual for your report and complete them. Do not fill the results into the lab manual itself and then hand in the manual. Instead produce a self-contained document.

Produce graphs and figures with well-labeled axes of appropriate ranges, self-contained legends, smooth curves, error bars, etc. All graphs, figures, and tables should be numbered and have appropriate captions. Strive for clarity in the design; make it as easy as possible for the reader to understand what you measured. This is the real heart of the report, so work to make it clear and informative.

(c) Give errors for all quantitative results so the reader knows what precision to attach to them. Do an error analysis even if the lab manual does not specifically say so.

(d) Include your raw data at the end of the report, so your results and analysis methods can be checked by the reader.

(e) Compare your results with theory, handbook value, literature values, etc., whenever possible. If the difference falls outside the predicted uncertainty, a search for

systematic error is in order. When a source of such error is suggested, it should be bolstered by at least rough quantitative as well as qualitative arguments to convince the reader that it is indeed a reasonable source of error of the magnitude observed.

(f) If there are approximations to theory involved in your experimental method, discuss these quantitatively to give the reader an idea how valid they are and what error they may give.

VI. Conclusion

Provide a short conclusion (one paragraph) based on your results.

C. Some general comments

- Overall, the report should be concise and clear. Even though it does not have to be journal quality prose, it should be well written in standard English. Its purpose is to convey information to the reader. Make this transfer of information as effective and painless for the reader as possible. Proofread your report before turning it in !!

- All equations should be fully formatted for easy readability. You may use the equation editor in MS Word (Insert -> Object -> MS Equation) to produce script like this: $v = \sqrt{\frac{2K}{m}}$ or use another equation editor such as LaTeX.

- Measured quantities with errors should be quoted in the form: $x = ... \pm ...$ units, for example, $v = 5.32 \pm 0.05$ m/s or $e/m = (2.17 \pm 0.17) \times 10^{11} C/kg$.
  If you distinguish between statistical and systematic errors, it should look like this: $v = 5.32 \pm 0.05(stat) \pm 0.03(syst)$ m/s.

- Never quote more than the significant figures in anything that you include in the report including in any spreadsheets that you use for data analysis.