

UG Lab Report and Presentation Guide

2013 JB, 2011 CV

A laboratory report or presentation should communicate, as clearly and concisely as possible, the rationale for the experiment, what was done, what the results were, and what the results mean.

Report preparation guidelines:

All writing must be in good English, in your own words. Please note that nothing should be copied directly from the lab manual and everything must be written briefly in your own words. Reports containing material (sentences or paragraphs) identical to the lab manual or to each other's reports will not be considered for credit and considered as plagiarized. Plagiarism will receive zero credit per the course policy, and may attract other penalties. Reports not meeting standards may be rejected leading to a loss of credit.

All reports must be in hand-written format on A4 size paper with one-inch margins on all sides. Attach a copy of your observations as signed by you all and by the TA. Use graph paper to prepare graphs and draw axes, etc., by hand using ruler and simple drafting equipment. Staple your finished report in top left corner and number all pages and attachments sequentially in lower right corner of the page.

Style and format:

Use a pen, blue or black, and white A4 paper. Write on one side of the paper only. Use good handwriting of size equivalent to 12pt Times New Roman double spaced for text. Please number all pages and equations. All graphs must have axes labels (with units), legends (as needed), theoretical estimates represented as lines and experimental data as points (shown by symbols). All Graphs must be hand drawn and have a Figure number and caption. All Tables must have a Table number and title. Your text in the Results and Discussion sections must refer to necessary tables and figures.

1. Title page

Identify the experiment by name and number and give the date performed and date of presentation, group number and names and roll numbers of all students in the lab group. State who wrote the report, made the .ppt and gave the presentation.

2. Introduction (one paragraph, 100-150 words)

Start with the motivation (or reason) and background for the experiment. What is the basic question you tried to answer or relationship you tried to investigate? Write in your own words the essential ideas behind the experiment. Include only the most important formulae (explaining the meaning, with units, of all symbols used).

3. Experimental procedure [Figure of flow-sheet of experimental procedure, Labeled Figure of schematic of the apparatus, text of one paragraph, 100-150 words]

Clearly describe in your own words, the apparatus used and the procedures followed to get your results. The schematic drawing should show all units and measurement instruments.

4. Sample calculations and uncertainty in estimated parameters [Figure of flow-chart of calculation procedure, discussion of measurement uncertainty, one paragraph, ~100 words]

Estimate measurement uncertainty. Is the least count of the instrument sufficient? What fluctuations in readings did you notice? What is the relative standard deviation in each measurement? How does this propagate into uncertainty in calculated variables?

5. Results and Discussion (2-3 paragraphs, ~100 words each, plus relevant Figures and Tables)

Describe and explain the results you obtain. Each paragraph must describe one key result, clearly stating what was found and what conclusion you draw from it. The paragraph must refer to the figure or table which contains the result, placed below it.

6. Conclusions (one paragraph, ~100 words)

Summarize what you conclude from the results of your experiment and whether they are what you expected them to be. Compare the results with theoretical expectations and include percent error when appropriate. Don't use terms such as "fairly close" and "pretty good;" give explicit quantitative deviations (e.g. ~10% higher, ~50% lower) from the expected result. Evaluate whether these deviations fall within your expected errors (giving estimated magnitude of each source of error) and state possible explanations for unusual deviations.

7. Remarks (one paragraph, ~50 words)

Please critique the experiment as presented in the lab manual. Could the experiment be done in a better way? Do you have some other or original method for investigating the same relation? Your suggestions will be used to improve the Lab course.

8. Appendix

- Observations

Attach your original observation sheet signed by the TA. Make an observation table labeling each column with the parameter name and units. Cutting and pasting Excel worksheet columns is not adequate.

- Calculations

Give one example of each calculation made; it should be clear that you understand what you are doing. You may do the other calculations separately and include only the final results. BE NEAT! When you present data ALWAYS include an estimate of the error. In tables, only

retain appropriate numbers of significant figures (e.g. if a variable of magnitude ~ 100 has a $\sim 10\%$ error in it your tables must contain numbers like 110, 120, 130 (not 114.2578).

Presentation guidelines

Prepare a 10 minute slide-based presentation and bring it in pdf and ppt formats on a USB pen drive stick. The presentation should contain a brief description of the experiment, diagrams, detailed results (in the form of graphs, tables etc) and discussion. Please also discuss the sources of error and present an error estimate by the method of propagation of errors.

Slide 1: Motivation and objectives

What is the basic question you tried to answer or relationship you tried to investigate?

Slide 2: Theory

Write in your own words the essential ideas behind the experiment.

Slide 3: Experimental procedure (Figure of flow sheet of experimental procedure, Figure of schematic of the apparatus)

Slide 4: Calculation procedure (Figure of flow-chart of calculation procedure)

Slide 5: Uncertainty in measured and estimated parameters

Slides 6 onwards (3-4 slides): Results and Discussion

Last slide: Conclusions

Language guidelines

- Wherever scientific terms are not necessary, preferably use commonly known words. However, avoid colloquial and idiomatic expressions, as well as phrasal verbs, which are often difficult to understand by non-native speakers of English. For example, use "Do not" instead of "Don't"; use "and" not "&".
- Define abbreviations when they first appear in the main body of the article (if they may be unclear to readers). Do not use too many different abbreviations, as the text would be hard to understand. Do not abbreviate terms that are used only rarely in your manuscript. Avoid abbreviations in the abstract.
- A table title is placed ABOVE the table, but Figure caption BELOW the figure.
- In general, use the past tense when describing how you performed your study and what you found or what other researchers did. Preferably use the present tense in general statements

and interpretations (e.g. statistical significance, conclusions) or when writing about the content of your article, especially tables and figures (Day & Gastel 2006).

- Do not write about yourself “the author(s)”, as this is ambiguous. Instead, write “we” or “I” if necessary, or use expressions like “in this study”, “our results” or “in our opinion”. Note that you should write “this study” only if you mean your new results. If you mean a publication mentioned in a previous sentence, write “that study”. If you mean authors of a cited publication, write “those authors”.
- Remember that in scientific texts the word “which” should be used in non-defining clauses, while “that” in defining clauses (i.e. meaning “only those that”).
- When using equivocal words, make sure that their meaning is obvious from the text context. Check if all verbs agree in number with their subjects and if the references for all pronouns are clear (this is crucial in translated texts). Note that some nouns have irregular plurals.
- Read the text aloud to check punctuation. All intonation breaks necessary for proper understanding should be denoted with commas or other punctuation marks (e.g. note the difference between “no more data are needed” and “no, more data are needed”).
- Be consistent in spelling. Follow either British or American rules for spelling and date notation (e.g. “21 Sep 2009” in British, or “Sep 21, 2009” in American English; see Appendix: Spelling). Check whether the target journal uses American or British spelling, and then use that setting on your word and grammar check.

References:

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http://teacher.nsrj.rochester.edu/PhyInq/Lectures/Write_Report.html

European Association of Science Editors, www.ease.org.uk