
Lab Report Assignment for Materials Science: 57:015

This and other course materials available at the CTC website

<http://www.engineering.uiowa.edu/~ctc/index.html>

The Materials Science course demands writing in two different formats: the lab report and an independent project.

Important: Although you may do the work of the labs with others, you must write a report on your own. The report measures your individual understanding of the lab. The report also measures your individual ability to communicate your understanding of the lab to others. Copying of the written work of others or any collaboration with others on writing the report may mean that you receive no credit for the lab. In addition, you may be charged with plagiarism and your teacher or the University may take further action. If you have questions about understanding and avoiding plagiarism, go to the CTC home page (<http://www.engineering.uiowa.edu/~ctc/>) for further information or consult the Student Academic Handbook, (http://www.clas.uiowa.edu/students/academic_handbook/ix.shtml). You may also set up an appointment to speak with someone at the CTC, which is located in 2224 SC, (in the Student Commons). Drop-in hours are from Monday to Friday, 1:30 - 4:30 p.m., starting September 8, 2008.

The Lab Report

- Materials Science requires five traditional experiments. (See the Materials Science web page for descriptions of each experiment. <http://css.engineering.uiowa.edu/~matsci/>.)
- Turn in lab reports at the **beginning** of the lab period on the due date listed in the Laboratory Schedule.
- Only use Materials Science laboratory equipment with a TA present (for your safety and that of the equipment) and only **during scheduled laboratory hours**. TAs will not be available at other hours for these studies.

General Formatting Instructions

- Double-space the body of the paper, with 1" margins all around. Times-Roman font, 12-point only.
- Label each section with the titles listed here: **Abstract, Introduction and Background, Experimental Methods, Results and Discussion (one section), Conclusion, References, and Appendices**. Section titles should begin at the left-hand margin. Double space after the title.

- Laser print and staple the entire report. Do not use plastic covers or other binders. **Important:** Be sure to put your lab section on all reports.

The Writing Process — How to write each section of the lab report

Write lab reports that colleagues and supervisors can easily understand. Clear writing is an essential engineering skill. You must present the material in a coherent manner so that any engineering colleague can easily duplicate the experiment. To that end, organize your lab report by sections in the following manner: **Abstract, Introduction and Background, Experimental Methods, Results and Discussion, Conclusion, References, Appendices.**

Abstract: A good abstract summarizes the report in a paragraph and generally answers the following questions:

- What purpose did the lab have?
- For whom did researchers conduct the lab?
- What materials did researchers use?
- What tests did the researchers perform?
- What result(s) did they find?

Write the abstract on a separate page.

Note: The **Abstract** is your report in miniature. Although it appears *first*, common sense dictates that you must write it *last*. Read our CTC handout "Writing an Abstract," which appears on our website: http://www.engineering.uiowa.edu/~ctc/course_support.html#materials_science

Introduction and Background:

An introduction gives the reader a "first impression" and should generate interest in the reader. In this section introduce the subject of the lab and describe the problem the experiment wishes to solve. The introduction should also include definitions of technical terminology. It may also include who conducted the experiment, where they conducted it, and the date when they conducted it.

The background section should include theoretical values for material properties such as tensile strength, hardness, coefficient of expansion, etc. You also need to specify the materials tested, including specific alloy composition and/or polymer type. Relevant equations also go in this section. Use a format similar to that in the textbook - briefly describe the equation before showing it and use the equation editor in Word (Go to the "Insert" menu, choose "Object..." and scroll down to select Microsoft Equation 3.0").

Experimental Methods

This section describes in detail the test(s) you conducted and the methods you used to set up, calibrate, and run the equipment. Include any pertinent illustrations of the equipment used, and make sure you caption them correctly.

Results and Discussion

The section summarizes the major findings of your analysis. Include values you calculate and/or measure. When needed, represent your data in a table or a graph. Always introduce your graphs or tables in the text prior to their appearance.

- Label all graphs and figures as Fig. #. Label all tables as “Table #.” Note that graphs are not labeled “Graph.”
- Include important tables and figures in the text of the report and not in the appendix. Raw data and less important figures and tables can go in the appendix.
- If you include a table or figure in the body of the report, you must refer to it.
- Figure numbers and captions go under the figures. Example:

Fig. 1: A graph of hardness versus tensile strength of 6061 aluminum

- Table numbers and titles go above the tables. See example below.
- Keep all parts of a table together on the same page. See example below.

If your results involve “before and after” experiments (e.g., before and after heat treatment), or if you are looking at changes in measured properties, express them as a percentage change as well as listing the magnitude of change. For example:

Table II: Hardness test results of 1018 steel before and after water quench

Hardness before Treatment (HB)	Hardness after Treatment (HB)	% change
45	60	+33.3%
45	42	-6.7%

Important: Include additional analyses or experiments needed to improve upon your results. Describe any assumptions you made and indicate how these assumptions affected your results.

Conclusion

The conclusion offers you an opportunity to provide new perspectives on your experiment. Do not simply repeat information in your introduction. Include a brief (two to three sentences) summary of the report.

References

Use the APA Documentation Guide, which you can retrieve online by clicking the “APA” link on the College’s Hanson Center (CTC) home page:

<http://www.engineering.uiowa.edu/~ctc/index.html>

Appendices

Material that is somewhat bulky and does not necessarily contribute to the overall presentation of the report is placed in this section. Give the appendices titles; for example, “Appendix A: Tables” or “Appendix C: Example Calculations.” Several items that may be included are:

1. List of Nomenclature and Symbols Used: See example below
2. Tabulated Data: Give the raw data in a neatly tabulated format. Also include any summarized results.
3. Figures: if you choose not to place the figures in the text, you can place them in an appendix, but still have them in the proper order as they are referred to in your text.
4. List of Equipment.
5. Methods: Discuss in greater detail how the experiment was performed, but do not give a minute by minute presentation.
6. Error Analysis: Estimate the accuracy of all measurements. Give statistically meaningful results.
7. Sample Calculation: Give a sample calculation including a unit analysis. Insert typical data into calculations.
8. Theory: If possible, attempt to correlate measurements with a theoretical model.
9. Computer Program: When a computer program is utilized, a listing with a representative case should be given.

Style Suggestions

- Use complete sentences.
- Do not use “bullets.”
- When typing in numbers that are less than zero, precede them with a 0 (e.g. 0.1234, **not** .1234).
- Write in the third person (that means to keep your focus on the subject—don’t use “I” or “we”).
Example: “The glass shattered when the pressure reached 75 psi.”
- Use strong verbs such as “collected,” “reported,” “observed,” “calculated,” and “determined”.
- Substitute “observed”, “measured”, “obtained,” “determined,” or “calculated” results for “results were found”.
- Substitute “conduct” or “perform” a study or experiment, for “a study or experiment was done”.
- Substitute “weight measured” or use the verb “weigh” for “weight taken”.
- Substitute “feasible” for “possible.”
- Use “investigate” for “experiment.”
Example: “The team investigated the tensile strength of aluminum.”

Schedule and Deadline Dates for Materials Science Lab Reports (Fall 2008)

Due Dates for Lab Reports
Lab report for experiment #2 due in lab week of September 15 - 19.
Lab report for experiment #4 due in lab week of October 6 - 10.
Lab report for experiment #5 due in lab week of October 13 - 17.

Note: Members of CTC’s professional staff will grade lab report #2, the proposal, and final project report. We encourage you to make at least one CTC appointment for feedback during the lab report writing process. Use the comments and feedback you receive from CTC to guide all the writing you do in this course.