Laboratory Short Report Process

A laboratory short report is a genre or category of writing that aims to provide a summary of the goals,  
methods, results, discussion, and conclusions of a set of related experiments. The length is intended to be short enough that a busy technical professional (e.g., your supervisor in an engineering firm) can read the entire document, but long enough that all essential results and analyses are presented in enough detail that they can be understood and evaluated.

In this class, the expected length of the laboratory short report is at least 4 and no more than 5 pages  
(single-spaced, 11- or 12-point font, one-inch margins on all sides). These pages include any figures and  
tables needed to help convey information. Additional pages not counted in the 4 to 5 pages are a Cover  
Page (title, course name, experiment performed, date of report, and author), a separate page presenting the Abstract (150 words) and Acknowledgments, a separate page or pages with a list of References, and any (optional) Appendices.

Writing an effective short report is challenging and requires careful consideration of detail versus length.  
An effective short report will present a narrative that captures the reader's attention, builds suspense, and provides resolution. To achieve this goal, in this course we will follow a process for developing the  
laboratory short reports.

I. Prepare answers to the following questions before starting to write the report.1. Who is your audience?In 318L, we will assume that the short reports are intended for an audience with a scientific or  
engineering background. With this knowledge, you can adjust the level of detail that is appropriate to  
include in providing context for the work and reporting technical results.

2. What is the content of your opening?Prepare a few brief statements (e.g., bullet points) that summarize the context of the work you are  
describing. In answering this question, you will also need to consult references that contain relevant  
information. These references should be noted for inclusion as citations as the report is written. The  
statements listed here should provide background information that allows the reader to understand the  
significance of your topic, leading to the next question...

3. What question will your report answer?The question may also be formulated as a hypothesis, though that step is not necessary for this class.  
Within the length constraint of a short report, it would be unusual to pose more than one question to be  
answered, as the answer will require enough supporting detail to be convincing to your audience. Note  
that the overall question you intend to answer in your report is probably not the same as an objective of  
the experiment.

4. What steps did you take to answer the question?Prepare a set of brief statements (e.g., bullet points) that provide a high-level summary of the approach  
used to develop an answer to the question of Step 3. The level of detail needed should be guided by the  
expected knowledge of the intended audience. You may find that the steps taken to answer the question are closely related to the objectives of the experiment. Note that this section should not be a detailed stepby-step list of actions done in the laboratory. There is not enough space for this information and your intended audience does not need that level of detail to understand what you did.  
  
5. What results did you obtain?For technical reports, an effective method of organizing the results at this stage is to develop figures,  
tables and, if needed, equations that present the results. Each figure and table should present information that illustrates one or more of the key results of your study and also include information on the uncertainty of each result. Given the length constraints of a short report, you will need to carefully consider how to develop the set of figures and tables that present your results in a concise, clear and well-organized manner.

6. How did you interpret your results?Briefly list (e.g., bullet points) or diagram the interpretation or analysis of the results within the overall  
context of your question as presented in Step 2. The progression of your ideas should show how you used the factual results reported in the figures and tables to develop an answer to the question of Step 3. Your argument should be logical, based on the results, and also include consideration of the uncertainty in the results.

7. What's your answer?Your investigation has now found the answer to the question posed in Step 3. As in any good mystery  
story, suspense has built as you've moved through the process of figuring out what steps are needed in  
your investigation, what the results of those steps are, and how these results can be put together with one another and interpreted. Now, resolve the suspense and just answer the question!

8. What's the sequel?Most stories have some aspects that are left unresolved or even raise entirely new questions. Provide a few brief statements of unresolved or additional questions that would be interesting for future investigations.

II. Initial RevisionsOnce all the above questions are answered, go back and carefully consider the set of answers that you've developed. What revisions are needed to improve the story? Does the story make sense? Will the  
expected audience be able to follow along? Is there too little information presented to support the answer, or is there so much information presented that the reader may have trouble following the story? Are the figures and tables effective in presenting the results? Have you gathered up all the references necessary to support the story? If possible, show your answers to some colleagues and ask if they can follow along? Are they convinced by your answer?

Based on these questions, make revisions to the material you developed in answering the eight questions above.

III. First Written Draft

Prepare the first written draft of the report, following the template below, but focusing on the key sections of Introduction (answers to Questions 2 and 3), Methods (answer to Question 4), Results (answer to Question 5), Discussion (answer to Question 6, building to the answer to Question 7), and Conclusions (answers to Questions 7 and 8). The first draft will usually include the figures as they provide the framework that some of the text will be built upon. References and citations can also be inserted if convenient, but don't let these steps interrupt the flow of developing the text. Although it's possible to edit later for small changes in length, it's generally best to keep length guidelines in mind as you are preparing the first written draft. Your text will normally closely follow and just expand upon the answers to the questions that you've already written down.

IV. Peer Evaluation and Feedback.One week after the post-lab calculations are submitted, students are expected to have completed Steps I and II and be partway through Step III. They should bring to the Peer Evaluation and Feedback Process  
meeting two printed copies of the material they have prepared, which should present the answers to all  
questions of Step I in the context of a report organized according to the sections found in the Report  
Format below. A substantive effort and meaningful participation in this process will contribute to the  
Course Participation component of the overall grade.

V. More Revisions.Set aside the text you've written and come back to it at a later time. Read through and ask again questions similar to those of Part II. Is the story compelling? Will the organization make sense to the reader? Is there enough information presented to support the answer? Is there too much information presented, possibly confusing the reader? Do the new questions being posed fit in the context of the problem? Are the figures, tables or equations effective when embedded in the text? Use the answers to guide high-level revisions such as removing, combining or adding figures, moving paragraphs, inserting or deleting equations. As this step is completed, it's also a good time to start more detailed copy editing, checking for clarity of expression, overly complex or lengthy sentences, consistency of symbols and abbreviations, content of figure captions or table titles and notes, citation formatting and so forth.

VI. Final Revisions and Edits.Complete the Cover Page and Abstract, add all remaining needed Citations and References, double-check formatting and location of figures, tables, and equations, verify length is within guidelines, add (optional) Acknowledgments, add (optional) Appendices.

VII. Submission.Submit the final report as a pdf file through the UNM Learn system before the submission deadline.

**Laboratory Short Report Format**

1. General

Use a standard 11- or 12-point font such as Times New Roman or Calibri (the content of the Cover Page  
can be in larger font size). Use one-inch margins on all sides. All pages should be numbered sequentially,  
starting with Page 1 on the Cover Page. The use of any pre-formatted MS Word styles is strongly  
discouraged. The report should be single-column and single-spaced. Add a small amount of vertical space (e.g., 6 to 12 points) between paragraphs. Each section of the main body of the report should start with a numbered boldface title on a separate line (e.g., **1. Introduction.**).

2. Figures and Tables

Figure and Tables should be numbered (e.g., Figure 1., Table 1.). Tables should have a title at the top.  
Figures should have a descriptive caption. These elements will be discussed in class, but a good starting  
point is to look at examples from textbooks that you use in your engineering classes. Figure captions and  
table contents can be in a smaller font than the main text, but usually no smaller than 8 or 9 point. All  
content must be large enough to be readable.

3. Equations

Equations should be sequentially numbered and all symbols described in the text. In general, all equations should be offset from the text, as illustrated here:

𝑦 = 𝑚𝑥 + 𝑏 (1)

where *m* is the slope, *b* is the intercept, *x* is the index of refraction and *y* is mole percent. Mathematical  
symbols are usually italicized in equations and the text (with vectors or matrices sometimes in bold text). Again, you can refer to textbooks you are using in other engineering or science classes for examples of equation formats.

4. References

References should conform to American Chemical Society guidelines (link Accessed September 8, 2019).  
Citations in text can either be superscripted numbers or italic numbers contained in parentheses.  
References should be placed on a separately titled page at the end of the report. In the list of references, adding a small amount of vertical space (e.g., 3 pt.) after each item in the list will improve readability.

5. Sections and Points (A detailed rubric is presented in a separate file)

Each short report is worth 120 points. A format for the overall content of the report and the contributions of each section to the total report grade is given below.

**Cover Page** (1 page, 5 points).

Contains title, course name, experiment performed, date of report, and author name.

**Abstract and Acknowledgments** (1 page, 5 points).

Contains an Abstract no longer than 150 words. The abstract should summarize the contents of the report, stating the question answered, the methods used, the results obtained, and the answer to the question. An Acknowledgment section that indicates other individuals who made any contributions to the report should also be included on this page. As a minimum, the acknowledgment statement should indicate contributions made by other team members. Instructors, course assistants or other students should also be acknowledged if they provided any assistance with your report. A typical acknowledgment statement might include: "The author acknowledges Catharine Hubka for helpful discussions that assisted in the preparation of Figure 1. Also, the course assistants for CBE318L helped with the interpretation of results presented in the Discussion section."

**Main Body of Report** (at least 4, no more than 5, pages, organized with the following sections).

**Introduction** (15 points)  
Present the context and background of the problem and a statement of the question you intend to answer.  
**Methods** (10 points)  
Describe steps taken to answer the question, presented at a level appropriate to the intended  
audience of the report.  
**Results** (25 points)  
State results of the study. This section is often organized around figures or tables presented in the text.  
**Discussion** (25 points)  
Provide your interpretation of the results. What do they mean in the context of the problem and  
how do they lead to an answer to the question posed in the Introduction?  
**Conclusions** (10 points)  
Summary of the original question and the answer provided. Discussion of new questions that have arisen from the investigation.

**References** (10 points).

List references, starting on a separation page (not counted in the 4-to-5 page length).

**Figures and Tables** (15 points).

These elements are embedded in the sections of the main report but will be graded separately.

**(Optional) Appendix.**An Appendix (or Appendices) can be added to the report to provide supporting information or other  
material that might be useful for some readers, but which is not necessary for understanding the main  
report. Generally, material in an Appendix would be detailed information too lengthy or distracting to  
include in the main body of the report. For example, sometimes long mathematical derivations are placed in an Appendix and only the result is stated in the main report. Textbooks often contain one or more Appendices, so you can find examples in some of your textbooks to see what kind of material might appear in an Appendix. No separate grade is assigned to an Appendix, but appropriate or inappropriate use of an Appendix could affect readability and grades of other sections of the report.

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| **Grading Rubric for Laboratory Short Reports (120 total points). (Note: Optional Appendices are not directly graded but could affect grades of other sections of the report)** | | | | | | | | | | | |
|  | | | | **Main Body of Report – At least 4, no more than 5, pages. Points will be deducted for length outside of these limits.** | | | | |  | | |
| **Graded Sections (Points, 120 total)** | **Cover Page (5)** | **Abstract and Acknowledgments (5)** | **Introduction (15)** | | **Methods (10)** | **Results (25)** | **Discussion (25)** | **Conclusions (10)** | **References (10)** | **Figures and Tables (15)** |
| **90-100% of possible points** | • All requested content present and cleanly formatted. | • Abstract clearly and concisely summarizes content of full report within word limit • Acknowledgments complete and briefly, but clearly, describe contributions of others. | • Context of problem presented in organized manner at level matched to audience of report • Citations used effectively to support statements of fact • Statement of question clear and concise • Content of section directly connected to subsequent report content | | • All steps taken to determine answer described in sufficient, but not excessive, detail (matched to expected knowledge of audience) | • Results presented in organized and logical manner with effective use of figures or tables • Uncertainties in results indicated • No off-topic opinions or discussion included in this section, just a direct presentation of facts determined during the investigation | • Presents discussion of the meaning and interpretation of the results • Provides a clear description of uncertainties in the results, sources of those uncertainties, and how uncertainties might be reduced in future work • Should build toward and present an answer to question posed in Introduction, resolving the narrative of the report | • Concisely summarizes the question(s) and answer(s) addressed in the report • Describes possible future work related to the original question or poses important new questions that developed during investigation | • Effective use of citations in text and correctly formatted and complete list of references | • Overall formatting is clear and readable • Information is effectively presented and well organized • Makes good use of captions and titles • Informative and readable axis labels • Consistent use of units • Readable legends, numbering, and symbols |

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| **80-90% of possible points** | • Missing one item of requested content or content not easily readable | • Abstract not matched to word limit • One item of important content missing from Abstract • Acknowledgments incomplete or overly detailed | • One or two missing components of context • One or two missing or incorrect citations • Question not precisely worded or not well posed | • One or two important steps missing or poorly described • Level of detail of methods not well matched to technical background of report audience | • Sequence of presented results is confusing or not clearly ordered • One major result missing • Presentation of uncertainties confusing • One or two aspects of figures or tables ineffective or unclear • Some content more appropriate for discussion section | • Discussion of uncertainties not complete • Organization lacks one or two elements in moving toward answer to question • Answer to question unclear in minor ways | • Summary of report missing one or two items • Future work or new questions incomplete or off topic | • Mistakes in formatting or some references with incomplete information | • Some figures or tables missing key information such as units, axis labels, or captions • A few symbols or labels not legible |
| **70-80% of possible points** | • Missing two items of content or low readability of entire page | • More than one missing important item of content in Abstract • Missing or ineffective Acknowledgments | • Multiple missing components of context • Numerous missing or incorrect citations • Poorly stated question not directly connected to content of report | • Several missing steps or steps poorly described • Information provided is inadequate to allow reader to understand the process followed during the investigation | • Several key results missing • Figures or tables with multiple problems • Presentation of uncertainties not correct • Content not well organized or not focused on results | • Discussion of uncertainties incorrect or missing • Organization does not support answer to question • Answer not clearly stated or unrelated to original question | • Summary of results and answer incomplete in several ways • Little or no presentation of future work or new questions arising from investigation | • Multiple references with incomplete information • Missing citations or references | • Multiple figures or tables with missing information or symbols or text not legible |
| **<70% of possible points** | Majority or all of above content missing, ineffective, or not readable. | | | | | | | | |