EPFL

COM-500 Statistical Signal and Data Processing Guidelines for writing Project/Lab Reports[1]

Preliminary Remarks

- Think about your reader and his/her purpose in reading.
  - Who: The reader of your project/lab report might be
    - knowledgeable or expert in your field, and/or,
    - interested but with no deep technical knowledge, and/or,
    - important for future contacts / developments, and/or,
    - a supervisor that needs to assess your work to give you a grade.
  - Purpose: The reader is
    - interested in the results and discussion of your work and also in the credibility of your methods, and/or,
    - looking for inspiration for her/his own work, and/or,
    - interested in recruiting you.
- Remember that an effective project/lab report begins with pre-project/lab planning. Usually, your supervisor will clarify the purpose of the project/lab and the procedures, but if not, then you need to think this through.
  - What do you want to learn?
  - What are the variables?
  - What are the procedures?
  - What materials and facilities will be used?
- Remember that an effective project/lab report requires careful in-project/lab procedure and on recording data accurately and completely.

Structure of the Report

- **Title**
  The title should be short (about 10 words), interesting, and it should describe the assigned task/project and/or what you found.
- **Abstract**
  In some but not all cases. Again, learn what your reader expects. The abstract is a very short summary (usually around 150-250 words) of what the question is, what you found, and

[1]Sources of this document include the "MIT OpenCourseWare".

why it may be important. The importance of abstracts is increasing as more scientists/engineers/industries are using search engines to keep up with the literature. Since search engines can only search for words in a paper,Äôs title and abstract, these may be the only parts that many people read. Consequently, a well written abstract is extraordinarily important.

- **Introduction**
  Introduce what your question is. Explain why someone should find this interesting. Summarize what is currently known about the question. Introduce a little of what you found and how you found it. You should explain any ideas or techniques that are necessary for someone to understand your results section.
  - Context/Purpose/Objective(s) Why are we doing the project/lab? What questions are you trying to answer?
  - Hypothesis. Which are the assumptions? What do you expect the results to be? This should relate directly to the problem

- **Materials and Methods/Procedures**
  This is like a cooking recipe. Include enough detail so that someone can repeat the experiment. It is important that the reader be able to interpret the results knowing the context in which they were obtained. The Materials and Methods section should be written in the past tense, since your experiments are completed at the time you are writing your report. It should contain:
  - Materials, apparatus, facility used;
  - Methods used;
  - Procedure, step-by-step. The steps should
    * be listed and numbered,
    * be clearly written, detailed, and brief,
    * clearly indicate how the data is obtained.
  - Be careful not to mix results into this section!

- **Results**
  To write the results section, use the figures and tables as a guide. Start by outlining, in point form, what you found, going slowly through each part of the figures. Then take the points and group them into paragraphs, and finally order the points within each paragraph. Present the data as fully as possible, including stuff that at the moment does not quite make sense.

  Verbs in the results section are usually in the past tense. Only established scientific knowledge is written about in the present tense, “the world is round”, for example. You cannot presume that your own data are part of the body of established scientific knowledge, and so when you describe your own results, use the past tense, “a band of 1.3 KB was seen”, for example. There are, however, exceptions to this general rule. It is acceptable to say, “Table 3 shows the sizes of the DNA fragments in our preparation”. It is also acceptable to say, “In a 1991 paper, Ebright and coworkers used PCR to mutagenize DNA”.

- Write a sentence that summarizes all your findings.
- Develop your results section with concise text followed by graphics that show your data.
- Be sure to use units and be careful to make units readable!
- Tabulated data Must be in the form of a table.
- Include legends in every figure/table. Legends to the figures and tables explain the elements that appear in the illustration. Conclusions about the data are not included in the legends. Your figure legends should be written in the present tense since you are explaining elements that still exist at the time that you are writing the report.

- **Discussion**
  This is the section of the paper for you to show off your understanding of the data. You should summarize what you found. Explain how this relates to what others have found. Explain the implications.

  Depending on the project/lab, and onr the findings, the section "Discussion" might be
  - A section on its own;
  - Integrated into the section "Results";
  - Integrated into the section "Conclusions".

- **Conclusions**
  This summary closes the report with a general statement of what you learned from this experiment.

  A good conclusion answers 3 questions:
  - What did you do in the project/lab? Restate the purpose/problem A brief description of how you tested it What you used to gather data
  - What does your data say? Look at your data table or sketch and turn it into a sentence or two. Be sure to include both the control & experimental groups.
  - What did you learn? This should answer the question posed in the purpose/problem.

- **References**
  Include only those references that pertain to the question at hand. You should list the references alphabetically by the first author's last name or according to their order of appearance in your report. Include all the authors, the paper's title, the name of the journal in which it was published, its year of publication, the volume number, and page numbers. .

  A typical reference should look like

  [1] Pavletich N. P., C. O. Pabo. "Zinc Finger-DNA Recognition: Crystal Structure of a Zif268-DNA Complex at 2.1 A". Science 252 (1991):809-817.

  In the body of your report, this article would be cited as follows: "The crystal structure of the Zif268-DNA complex has been solved (Pavletich 1991)" or "The crystal structure of the Zif268-DNA complex has been solved [1]".

If two or more articles can be cited for this finding, then they are ordered alphabetically, separated by a comma.

Format/Style

- Use headings and subheadings to help your reader find sections.
- Use page numbers in a document over one page long.
- Label, title all graphics, and refer to them in the text.

General Evaluation Criteria for Project/Lab Reports

Content

Section	**Goal**	**Evaluation**		
		Good	*Ok*	*Not Good*
Title	To give content information to reader.	Engaging.	Appropriate.	Not enough content information or too much.
Abstract	To concisely summarize the experimental question, general methods, major findings, and implications of the experiments in relation to what is known or expected	Key information is presented completely and in a clear, concise way. All information is correct. Organization is logical. Captures any reader's interest	Sufficient information is presented in proper format. Would benefit from some reorganization. Understandable with some prior knowledge of experiment.	Some key information is omitted or tangential information is included. Some information is misrepresented. Some implications are omitted. Incorrect format is used.
Introduction	To identify central experimental questions, and appropriate background information. To present a plausible hypothesis and a means of testing it.	Relevant background information is presented in balanced, engaging way. Your experimental goals and predictions are clear and seem a logical extension of existing knowledge. Writing is easy to read. All background information is correctly referenced.	Relevant background information is presented but could benefit from reorganization. Your experiment is well described and a plausible hypothesis is given. With some effort, reader can connect your experiments to background information. Writing is understandable. Background information is correctly referenced.	Background information is too general, too specific, missing and/or misrepresented. Experimental question is incorrectly or not identified. No plausible hypothesis is given. Writing style is not clear, correct or concise. References are not given or properly formatted

Materials and methods	To describe procedures correctly, clearly, and succinctly. Included a correctly formatted citation of the lab manual.	Sufficient for another researcher to repeat your experiment. Steps presented.	Procedures could be pieced together with some effort. Steps presented.	Procedures incorrectly or unclearly described or omitted. Steps not presented.
Results	To present your data using text AND figures/tables.	Text tells story of your major findings in logical and engaging way. Figures and tables are formatted for maximum clarity and ease of interpretation. All figures and tables have numbers, titles and legends that are easy for the reader to follow.	Text presents data but could benefit from reorganization or editing to make story easier for reader. Text includes interpretation of results that is better suited for discussion section. Figures and tables are formatted to be clear and interpretable. All figures and tables have numbers, titles and legends.	Text omits key findings, inaccurately describes data, or includes irrelevant information. Text difficult to read due to style or mechanics of writing. Text difficult to read due to logic or organization. Figures and tables missing information, improperly formatted or poorly designed. Figures and tables have inadequate or missing titles or legends.
Discussion	To evaluate meaning and importance of major findings.	Appropriate conclusions drawn from findings. Connections made between experimental findings. Connections made between findings and background information. Future directions considered. Writing is compelling.	Appropriate conclusions drawn from findings. Experimental limitations considered. Writing is clear.	Conclusions omitted, incorrectly drawn or not related to hypothesis. Relationship between experimental findings and background information is missing or incorrectly drawn. Writing style and mechanics make argument difficult to follow.
References	To give credit work on which your own is based.	Complete list of reliable sources, including peer-reviewed journal article(s). Properly formatted in body of report and in reference section.	Adequate list or reliable sources. With minor exceptions, properly formatted in body of report and in reference section.	List is incomplete or includes sources not cited in body of report. List includes inappropriate sources. List not properly formatted. References not properly cited in body of report.

Style

Writing Style and Mechanics	**Evaluation**	
	Good	*Not Good*
Verb Voice	Appropriate for audience. Consistent passive or active voice.	Too simple or too advanced. Irregular use of passive and active voice.
Word choice	Concise. Says what you mean. Scientific vocabulary used correctly.	Verbose. Ambiguous or incorrect. Scientific vocabulary misused.
Fluency	Sentences and paragraphs well structured. Punctuation correct or only minor errors Grammar correct or minor errors. Spelling correct.	Sentences repetitive or awkward. Paragraphs not logical. Periods, commas, colons and semicolons misused. Significant number of run-on sentences, sentence fragments, misplaced modifiers, subject/verb disagreements. Significant number of spelling errors.
Scientific format	Past tense for describing new findings. Present tense used for accepted scientific knowledge and figure legends. All sections included and properly formatted.	Misleading verb tenses. Some sections missing. Figures missing legends. References not properly formatted.