Instructions for writing reports

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A project or lab report is not just a listing of results and answers to questions. Below is a list of recommendations designed to help you write better reports.

1. **Structure the report appropriately**:
   - The names and email addresses of all students must be listed, together with the current semester and date, the course code, and the project or lab title.
   - The abstract summarizes the main aspects discussed in the report. The introduction then explains the context of the work, its goals and outlines the rest of the report.
   - Next, the methodology should be clearly described (using equations, source code extracts, etc.) and choices justified. Results must be listed and analyzed in details, following scientific methods (see below).
   - The conclusion summarizes the previous elements, emphasizes the lessons learned, and proposes a series of perspectives for future work.
   - A bibliography should finally list all relevant references (see below).
   - Appendices may be added for elements that are peripherical to the report topic, such as full source code. Avoid adding something to the appendix if it necessary to understand the rest of the report, such as commented code extracts.
   - The number of pages must be appropriate: neither too short, which tends to indicate insufficient analysis of results or description of methods, nor needlessly long.

2. **Use sound scientific methods and reasoning**:
   - Overall, use the scientific method to approach problems and solve them.
   - Clearly explain the followed methodology. List the initial hypotheses and assumptions, the goals, the main steps of the method, and the expected results. Use diagrams such as flowcharts if relevant.
   - Justify the choices you make. For example, when several methods can be used to solve a problem, explain why a specific one and not any other was selected. If simplifying assumptions are used, explain why, and try to evaluate whether they could impact the validity of results.
   - Analyze your results. Are they coherent? Do they match what was expected? Is there something surprising? If so, how can it be explained? Conduct a critical analysis of the work, in order to determine its weak points and how it could be improved.
   - Be as rational and precise as possible. For example, when comparing two curves, do not just write that they look similar. Such a comparison can be done using different methods, e.g., by computing the mean absolute percentage error and the maximum error.
   - Do not feel shy about the difficulties that you may face. List them together with the solutions that were found, whether they are satisfactory or not. If you think that you results may be wrong, try to understand why this may be the case, and explain what you tried or could try in the future to solve the issue. Do not manipulate data to try to make it look better.

- Draw conclusions based on the results. What was learned from this work? What could be improved? What could be the next steps?

3. **Design and integrate figures, tables, equations and algorithms suitably**:

   - Select the right type of graph (bar graph, pie chart, stacked plot, etc.) for each figure, depending on the data to display. Do not use 3D graphs, unless really necessary.
   - The text must refer to each figure, table or equation ("as shown in Fig. 1, ..."), which should appear only after they are mentioned. A figure or table that is not mentioned in the text is not useful, as an equation that is not described remains obscure.
   - All graphs should include, if relevant, axes labels with units, and a legend (see Fig. 1). Without these, the reader cannot know what quantity is displayed, what scale is used, etc., and as a consequence cannot extract any useful information from it.

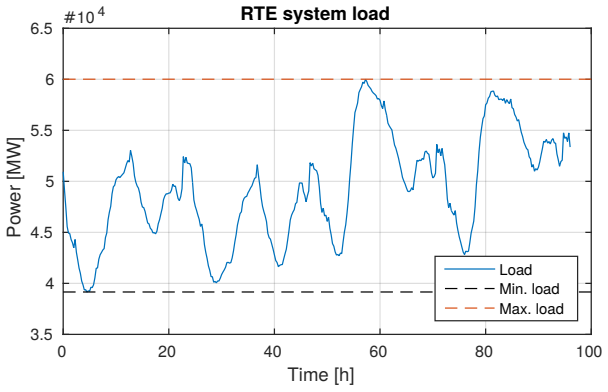

Figure 1: A sample figure showing how to suitably display data in a graph.

   - All figures, tables, equations and algorithms must be numbered, centered, and captioned. The caption should enable the reader to easily unerstand what is shown in the figure or table.
   - Do not include screenshots of tables of numbers. Create a proper table, in which you paste data and format it adequately.
   - Equations must also be numbered and typeset using an equation editor, as for equation (1) below. Remember to define all variables used in equations, whenever necessary.

$$y = ax + b \tag{1}$$

   - All figures should be easily readable. Make sure that all figures are large enough, and that `.pdf` compression does not deteriorate figures beyond acceptable quality levels.

4. **Document your work using source code and software screenshots**:

   - Source code must be heavily commented, and included as text (no screenshots) in reports. Long code extracts can be added in the appendix.
   - For graphical software such as PowerWorld Simulator, screenshots may be included.

5. **Use the designated template** (if required by the instructor):

   - The A4 format `.doc` template is available on the IEEE website.
   - You may also use the LaTeX template available on another IEEE webpage.

- The styles, fonts, font sizes and types, alignment, spacing, etc., should not be modified.
- The template can be adapted to have large figures and tables span both columns.

6. **Avoid unwanted plagiarism and forget intentional plagiarism**: your report and attached files are expected to be your own work.
   - All used references, whether they are from books, websites or other sources, should be cited and listed in the bibliography at the end of the report.
   - A guide on how to avoid plagiarism is available online. As a general rule, a reference must be provided for everything that you did not create yourselfs, which includes text, but also figures, tables, etc. For example, a reference must be provided for all figures that you did not create yourself. Similarly, the source of data must be specified, if you did not collect it yourself.
   - References can be cited as follows: "the power flow algorithm described in [1]...".
   - Examples on how to format bibliographical references are provided by IEEE, although many other reference formats exist (e.g., MLA, APA, Chicago, etc.). Dedicated tools such as EasyBib can be useful to automate such formatting.

7. Finally, **make sure your report is easy to read**:
   - Ensure that English spelling, grammar, syntax and style are correct. Many classical books exist on these topics, including *The Elements of Style* (W. Strunk Jr.) or *On Writing Well* (W. Zinsser). Online resources such as Purdue University's Online writing lab (OWL) may also be useful.
   - Note that English and French typography rules are different: there is no space before columns and question marks, double quotation marks are used, etc. More on such typography rules and on scientific style conventions.
   - While this item is not considered when grading, you should pay attention to the quality of the documents you write. A poorly written document will negatively reflect on your work, whether this is at university or at work.