

## ELEC 3040/3050 Midterm Design Report Guidelines (Spring 2019)

The midterm report is to discuss **one element** of the semester design project from week 5 (keypad), or week 7 (PWM generator), or week 8 (motor drive). In this report, students are expected to demonstrate the following ELEC/ECPE student outcomes (with the exception of oral communication).

1. *Graduates of the ELEC/ECPE program will have the ability to design and conduct experiments to acquire needed data, and to analyze and interpret data to solve engineering problems.*
2. *Graduates of the ELEC/ECPE program will have proficiency in communicating ideas and information orally and in writing.*

Attainment of these outcomes (and several others) is expected to be demonstrated by all ECE majors by the time of graduation.

**Report grading.** The design report will be graded using rubrics and criteria for each of the two student outcomes stated above. These rubrics are posted on the course web page.

**Report content.** The report should include these items:

- Summary of design requirements, i.e. performance requirements for the keypad controller, or PWM generator, or motor drive
- List of desired data that could be used confirm the design, e.g. motor drive transistor voltages and currents
- Description of experiment(s) that can acquire the desired data, e.g. use logic analyzer to measure keypad controller signals
- Presentation of experimental data, i.e. tables, figures, etc.
- Analysis of the presented data, i.e. what conclusions can be made from the data?

The format of the report is to be as follows.

1. *Heading:* Use the same format as for weekly memos, but only name the author of the report (not all teammates).
2. *Abstract:* In less than 50 words, summarize what is being reported. Example: "This report presents experimental validation of a..." Possibly give one or two noteworthy outcomes. Keep the abstract short in length.
3. *Brief description of what was designed, and list of desired performance:* Do not explain details of the designed system, other than to set the context of the discussion. Focus on the performance requirements.
4. *Description of desired data:* List and explain the data that should be acquired so that the actual performance of the design can be analyzed. For example, if an amplifier is designed, then amplifier voltages and currents may be desirable pieces of information.
5. *Experiments:* Describe the experiments used to gather data. Describe the instruments and procedures in sufficient detail for a reader to recreate the measurements.
6. *Data and analysis:* Present the data, using figures and tables as needed. Draw conclusions from the presented data, e.g. does the experimental data confirm the desired performance?

7. *References*: Include a list of references, each item numbered [1], [2], ... or by name (year), e.g. *Nelson (2013)*. When a citation is made in the body of the report, use the number [3], or the name (*Nelson, 2013*).
8. *Appendices*: Items that are difficult to format “nicely” can go here.

**Page Format.** Single-space the heading. Double-space the remainder of the report. Appendices, especially program code, should be single-spaced.

**Tips:**

1. Write in third person point of view (avoid first person unless absolutely necessary.)
2. Consider when it would be appropriate to use *active voice* (“He does this”) vs. *passive voice* (“This was done”). This issue, and a number of other technical writing tips for engineers, are available in the article “Write Clearly and Concisely”, on the IEEE Professional Communications Society web page:  
<http://pcs.ieee.org/communication-resources-for-engineers/style/write-clearly-and-concisely/>
3. Avoid subjective statements, e.g. “The design worked great” is a subjective statement.
4. Figures, tables, appendices: remember to provide a label and caption for each one, and place them in the order referenced. In the text of the report, refer to these items by label, e.g. “See Fig. 1 and Table A.” Understand that a label is an identifier for an object (figure, table, etc), whereas the caption is a brief description of the object’s content.
5. Proofread for grammar and spelling - do not rely solely on automatic checkers. This sentence will pass the spell checker, “I went two there house a round ate at knight.”
6. Ability to use and cite references is one of the outcomes measured on the rubric used to evaluate writing. **Even if you do not believe that you need to use a reference, you must still find one or more sources that you can cite, to demonstrate that you can properly list and cite references in a formal report.** Citing a data sheet or the laboratory manual are suggestions. Use a standard bibliography and citation style.