Electrical and Computer Engineering Laboratory
Lab Report Expectations and Rubric

February 5, 2026

1 Lab Report Expectations

This document specifies the lab report expectations, the expected format structure, the associated grade percentage per section, and the formatting expectations for tables, figures, and text are outlined. Each section has a definition, a list of expected components, and some examples of good and bad content.

Questions and clarifications regarding the content should be directed to your lab Teaching Assistant (TA).

Expected Lab Report Sections and Overall Grade Percentage:

1. **Lab Demonstrations**

   Lab Demonstrations will be asked in the lab manual. These require you to video yourself performing the task asked by the lab manual. Additionally, you need to show your face in the video. These are worth 15% of the final grade. The report and the lab demonstrations are graded separately, i.e. the lab report is worth 85% of the final grade.

2. **The Use of AI**

   The use of AI to generate the report, however, you will need to state where AI was used and what prompts were used to generate the AI response.

3. **Cover Page**

   This should be the first page of the document. The only thing on the cover page should be the following items. Draft the rest of the report starting from the second page.

   a.) Experiment Number

   b.) Experiment Title

   c.) Date lab was performed

   d.) Your Name

4. **Introduction (10%)**

   Concisely describe he topic and experiments to be conducted in the lab. Full paragraphs and complete sentences are expected. This doesn't need to be long, but it should be complete. Your grade for this component will be from 0 to 10%.

5. **Pre-Lab and In-Lab Results and Discussion (70%)**

   After grading the Pre-Lab and In-Lab with raw scores, the total earned score divided by the max score will be weighted by 70% to get the contribution to the overall lab grade. Your grade for this component will be from 0 to 70%.

   For each bulleted item in Pre-Lab or In-Lab the grader will look for your response to the items requested by the $\Longrightarrow$. To assist the grader, present your results then discuss them and be sure to answer any questions. Introduce each result in order, i.e. "The equivalent resistance is calculated to be xΩ using the following equations:", "The measured voltage across resistor R is illustrated in Figure y and listed Table z. When presenting your results, refer to Analysis of Data and Errors.

   Each of these items will be graded on a 3 or 4 point scale. Full points are given for acceptable responses. Partially acceptable responses will be given a point or two less than full marks. Poor or absent responses will be given one and zero points, respectively. Be sure to use full sentences in your narrative.

   Clean plots or tables with captions and headings are desired. If you include a **hand drawn** figure or a picture of your math/equations you will receive 0 points. If your oscilloscope captures are **taken with your phone**, you will also receive 0 points. Bring your USB to lab, if you forget it, there are USBs in the lab.

   Analysis of Data and Errors

   (a) All lab measurements are subject to some degree of uncertainty. Although these uncertainties are casually referred to as "errors," it is better to realize that they represent a fundamental constraint on any physical measurement. Specifically, it is vital to understand and specify the uncertainties in all measurements: it is unreasonable to obtain a result using a calculator to 10 significant digits if the measurements used in the calculation have only 3 significant digits. Each electrical component and measurement instrument has a limitation of tolerance, accuracy, and precision.

   (b) **Tolerance** refers to the discrepancy between the marked or "nominal" value of a component and its actual value. Tolerance is often expressed as a percentage of the nominal value, such as a voltage source specified by the manufacturer to be "10 volts ±1%", meaning that the actual voltage is somewhere between 9.9 volts and 10.1 volts.

   (c) **Accuracy** refers to the discrepancy between the actual quantity and the reading given by a particular measurement instrument. Accuracy is related to the concept of calibration, where an extremely accurate instrument or measurement technique is used to adjust the accuracy of another instrument. Precision is different from accuracy.

(d) **Precision** refers to the repeatability and stability of a particular instrument, i.e. the deviation of the reading from measurement to measurement.

(e) **All jobs in engineering require proficiency in technical writing**. The written lab report is just one example. The report should be written specifically to meet the needs of the reader, meaning that the writing must be brief, interesting, and complete. It is good engineering practice when writing to always begin with a summary of each important conclusion, followed by the results and reasoning that led to that conclusion, and finally a review of what was stated. Keep in mind that the specific format and content requirements of the lab report may vary depending upon the preferences of the reader, in this case your lab instructor. The report for each experiment will be written in your lab notebook. Before finalizing the notebook to turn it in, look over the entire report with a critical eye. Is the report complete and concise? Is the substance of the report good enough that you would show it to a potential employer as an example of the quality of work you do? Does it indicate that you know what you are doing? Are the sections labeled? Are the graphs labeled and interpreted (slopes, breakpoints, etc. identified)? Are the circuit diagrams accurate and labeled? Do you tend to use imprecise, meaningless phrases like "very large", "negligible", "this experiment demonstrates to the student…", "the results validate the theory", etc.?

6. **Concluding Remarks and Observations (10%)**

   Concisely describe what was observed in the context of the overall lab topic and experiments. Of particular interest are surprises, difficulties, or problems with the lab assignment itself. This feedback allows the lab assignments themselves to be improved. As with the rest of your report, full paragraphs and complete sentences are expected. Your grade for this component will be from 0 to 10%.

7. **Formatting (10%)**

   In the sequel to this section there are general guidelines for what is desirable in your lab report formatting. Please pay attention to the suggestions herein. Note that poorly formatted figures and tables will also likely be docked in the Pre-Lab and In-Lab Results and Discussion section. The formatting grade here applies primarily to the overall presentation and look of your report. Your grade for this component will be from 0 to 10%. Follow the instructions in the Formatting section.

2 Formatting

Formatting guidelines keep lab reports looking consistent across multiple documents. Readers can become familiar with an expected style of documents and can easily identify information within it. It also helps an author by knowing what is expected of them when drafting a document. Take care to present your information well.

1. Your lab reports should not be bulleted lists copied from the lab manual. Neither should they just state values and measurements without context. Imagine these reports as almost like a professional conversation about the lab you performed.

2. Font Size: 12pt
3. Font Type: Times New Roman
4. Text Spacing: Single spacing
5. Margin: 1-inch for top, bottom, left, and right
6. No bold, italics, or underline except for references to mathematic symbols or variables like phasors.
7. Equations should have their own line and numeric. Refer to equations using (1) parenthesis.
8. Use units when discussing measurements or component values wherever possible. Look up Alt-Codes for typing the correct greek symbol. Hold [ALT], type [2] [3] [4] on the number pad, release [ALT]. This should type the greek omega symbol for Ohms for Windows machines. [Option] + [z] should type it for Mac. Try not to type "10 kiloOhms".
9. No personal pronouns such as I, he, him, her, me, my, she, they, them, us, we, you, our, and so on.
    a.) Bad: "We connected our op-amp up to the function generator."
    b.) Bad: "You should begin by first connecting your function generator to your op-amp input."
    c.) Good: "The function generator was connected to the input of the op-amp."
10. Figures
    a.) Example: "Figure 1: Non-Inverting Op-Amp Schematic"
    b.) Figure captions are created by using the word "Figure" followed by the figure number, a colon, then a concise and descriptive label of the content within the figure.
    c.) When it says 'draw' a waveform or a figure in the lab manual, it doesn't literally mean draw it by hand and take a picture of your notebook. If it's a circuit you can use the Snipping Tool and a photo editor to add values to the circuit you're working on, or generate waveforms with a software, etc.
    d.) When collecting oscilloscope waveforms, present a picture of the screen alone with the 'measure' option on so I can see the values you are getting on your waveforms. Don't take a picture of the entire oscilloscope, crop the waveform screen only.
11. Tables
    a.) Tables need a title, column labels, row labels, and units wherever applicable for the labels. Formatting such as line width, cell borders, and cell shading should not interfere with the readability of the data being presented. Courier or courier new would be good fonts to use inside a table.

Figure 1: Alien Icon to Demonstrate a Figure

b.) Organize your results in legible tables and discuss them appropriately, it's not enough to only list your results in a lab report.

Time (s)	Data One (V)	Data Two (m/s)
1	1	2
2	5	6

Table 1: Example Table with Labels and Units

12. Plots and Charts

a.) Plots, charts, and graphs need to have a title, axis labels, units if applicable to axis labels, and a legend if there are multiple lines on a single plot. Plots, charts, and graphs should be labeled as figures as well.

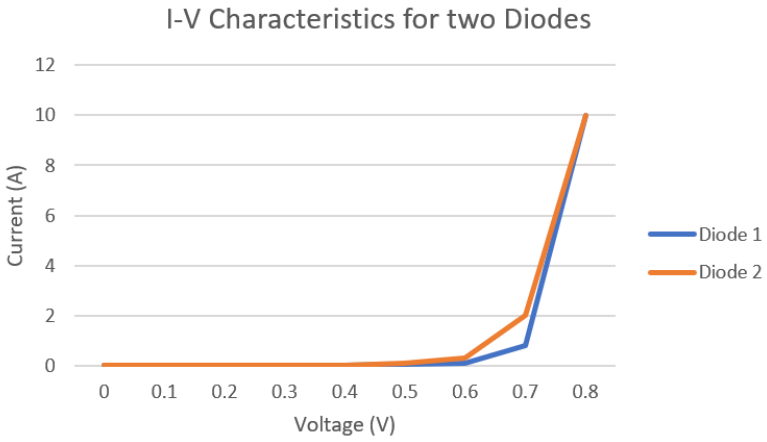

Figure 2: Example Plot with Required Elements

13. Code

```
1  void setup() {
2      // put your setup code here, to run once:
3  }
4
5  void loop() {
```

```
6         // put your main code here, to run repeatedly:
7     }
```

Listing 1: Code Example

14. Appendix (Optional)

    Include all code, extra figures, extra large figures, reference datasheets, and other supplementary resources here for reference.