Technical Writing

Why is it important?

How to write a good ESE 205 lab report

Nick Howarth
Revised 10/28/11

What is technical writing?

- Technical writing is used when the author wants to clearly deliver a message or specific information to the reader.
  - Memos
  - Lab reports
  - Instruction manuals
  - Recommendation letters
  - Etc.

Why is it important?

- No matter what career path you choose in engineering or business, you will always need to use writing skills on a daily basis.
  - Email
  - Project description
  - Research findings
  - Progress report
  - Grant request
  - Consulting
  - Patents & Law
  - Etc.

Writing as a Signal

- Imagine that the message that you are trying to convey to the reader is a signal.
- The goal is to transmit the message with as little noise as possible.
- Unclear writing, excessive spelling mistakes/typos, too many long sentences, vague wording, etc. all add noise to your signal.
- The result: the reader does not receive the message as you have intended.

How to Write a Good (or Decent) ESE 205 Lab Report

- Major sections:
  - Introduction
  - Theory
  - Experimental Results & Data
  - Discussion & Conclusion

Introduction (Abstract)

- This section should let the reader know exactly what your document is about.
- Why should the reader take the time to read your report?
  - What is the experiment?
  - How was it performed?
  - What were the results?
  - Why are they important?

Theory

- What background information does the reader need to know in order to understand your method & results?
  - Technical theories
  - Fundamental equations
  - Circuit diagrams and ideal operation

Experimental Results

- Use this section to describe the procedure, as well as any observations, data, and results that were recorded.
- Do not just list data. Present the data in a logical manner (i.e. procedurally/chronologically).
- ALWAYS use past tense to describe what was done.
- Passive voice is preferable, but can be avoided if it confuses the meaning of the sentence.

Experimental Results

- This is where you report the data found by performing the experiment.
  - Raw data should only be included if necessary in table format
  - All tables, figures, and graphs must be labeled appropriately
    - Include axis labels (with units) in graphs
  - Labels should be included as captions BELOW a figure or ABOVE a table
  - Explicitly reference and support a figure/table with text BEFORE it appears in your report
  - Figures/tables should be CENTERED

Example of Figure Formatting

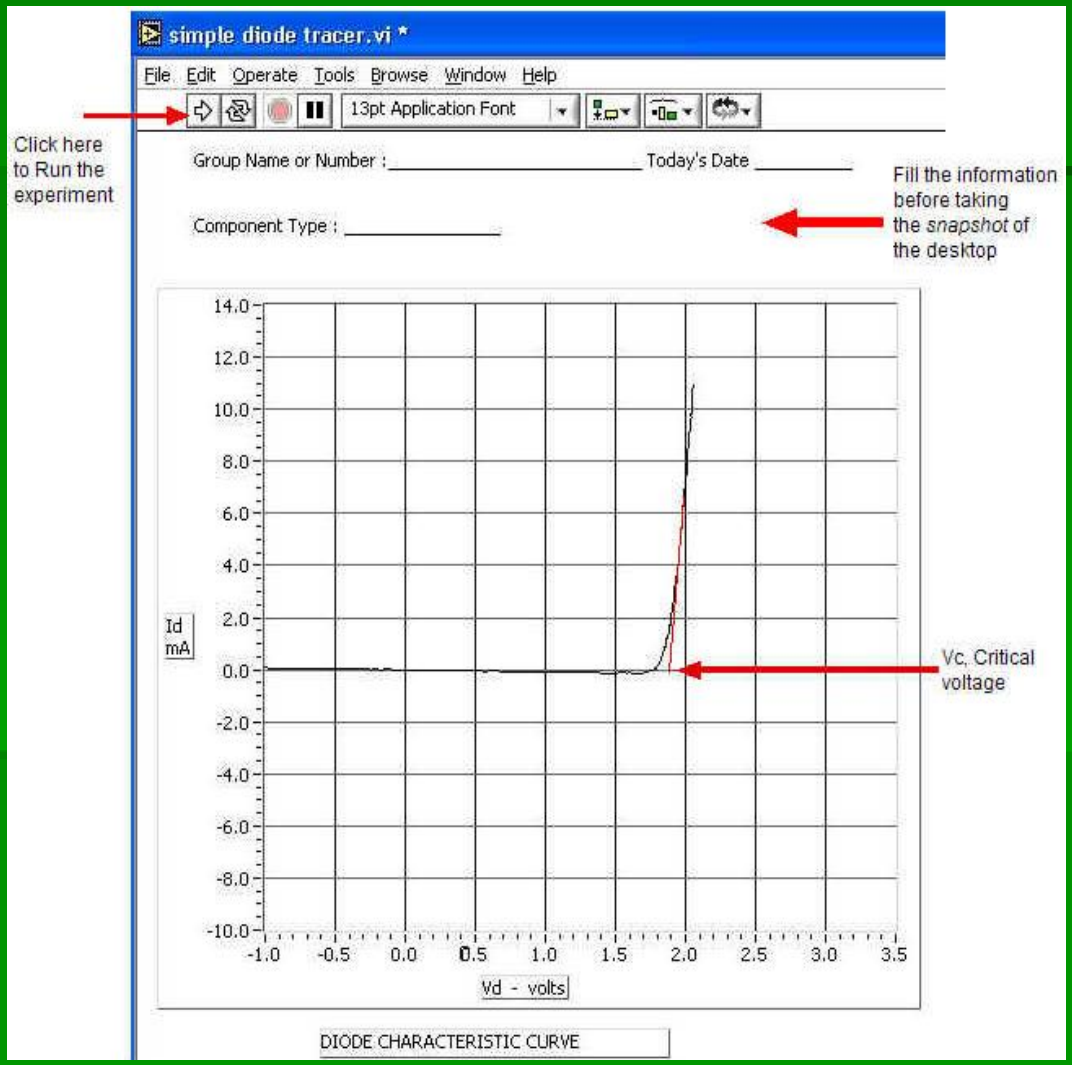

Figure 1 – LabVIEW-generated voltage-current characteristics of red LED

Example of table in context

Based on the previous calculations, R_{G1} was chosen to be 150kΩ and R_{G2} was chosen to be 86.8kΩ. The nominal and actual resistor values are listed in Table 1.

Table 1 – Nominal vs. actual resistance values of resistors used in common-source amplifier

Component	Nominal Value (kΩ)	Actual Value (kΩ)
R_{G1}	150	148.6
R_{S1}	2	1.974
R_{S2}	3	2.996
R_{Stot}	5	4.970
R_D	10	10.027

R_{G2} was adjusted until the value of V_D was measured to be 9.09V. The corresponding value of R_{G2} was found to be 85.9kΩ. V_G was measured to be 5.463V and V_S was 2.92V (within 3% of 3V), yielding:

$$I_D = \frac{V_{DD} - V_D}{R_D} = \frac{15 - 9.09}{10.027k} = .589\ mA$$

The actual value of I_D is within 2% of the desired .6mA.

Discussion & Conclusion

- Discuss your results and their importance
- Discuss possible changes to the experiment that you might implement to yield better results or different results altogether
- Introduce relevant ideas/concepts that might interest the reader