

**University of Pennsylvania**  
**Electrical & Systems Engineering Undergraduate Laboratories**

**ESE 112: Introduction to Electrical & Systems Engineering**  
**Lab 5: Technical Writing**

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## **Objective**

Rewrite the report for Lab 1 to meet the standards of technical writing.

## **Background**

This lab will give you practice recognizing and using clear, concise technical writing. You will practice by rewriting an earlier lab report to meet the standards set out in the following writing guidelines. These guidelines are for general technical writing, but have been modified to give you more guidance with writing your lab report.

## **Writing Guidelines for Formal Reports (Including Lab Reports)**

- 1. Make sure the reader can interpret your report without a list of questions at hand.** Write a real Results section; don't just paste in charts with no explanation of their meaning or significance. In the Answers to Questions section, don't assume that the reader knows what specific question you are answering. Repeat the questions themselves.
- 2. Choose a logical order in which to present your information.** The sections of the report provide basic organization. However, within each section, you must clearly indicate the relationship of one idea to another by careful choice of logical connectors.
- 3. Choose careful, exact wording.** Avoid vague wording. Don't depend on the reader to invent meaning you have failed to communicate.
- 4. Indicate the degree of certainty of your results or your interpretation of them.** This does not mean you should hedge your bets by inserting "I think" or "In my opinion" in front of assertions. On the other hand, don't make statements you can't support.
- 5. Accurately and appropriately cite sources in your text.** Each citation must be linked to an item in the List of References at the end of the article (or in your case, in the Appendix to your Lab Report).
- 6. Keep the focus on the process or discovery.** In technical writing, this focus is often, but not always, achieved with the use of the passive voice. Compare these examples:

**Active voice:** Grammatical subject = actor ('agent', in grammatical terms).

**6a.** We conducted two tests: one with the batteries in series, and another with the

batteries in parallel.

**6b.** The output from the amplifier drives the speakers.

**Passive voice:** Grammatical subject = recipient of the action ('patient', in grammatical terms).  
The verb consists of a form of the verb *be* + a past participle:

**6c.** Tests were conducted, first with the batteries in series, and next with the batteries in parallel.

**6d.** The speakers are driven by the output from the amplifier.

**Since the focus is on the process, use *we/our* sparingly.** However, do not resort to awkward or unclear use of the passive just to avoid saying *we*. Choose an active-voice subject other than *I/we* as in example b. Here are more examples:

**6e.** **The data** show a statistically significant increase ....

**6f.** **This analysis** indicates a need for....

**6g.** **These data** agree....

**We/our** may be used for clarity. Sentence **a**. is an example. Here is another:

**6h.** By connecting the batteries in series, **we were able to** increase the available power.

However, the same information could be presented without using 'we', as in sentence **i**:

**6i.** Connecting the batteries in series produced an increase in the available power.

**7. Make sure your sentence structure is clear.** Avoid leading the reader astray with misplaced modifiers, or introductory modifying phrases that don't modify what the reader expects them to, like this one:

**7a.** After recording the images, they were digitized and transferred to a computer for evaluation...

This sentence momentarily misleads the reader, who expects that the understood subject (*we*) of the modifying phrase will be the same as the subject of the sentence. However, the subject of the sentence is *they*. Sentence **k** keeps the focus on the images and the process, while avoiding the confusion of sentence **j**:

**7b.** After the images were recorded, they were digitized and transferred to a computer for evaluation....

The following example makes the reader go back to reinterpret the sentence:

**7c.** A legged robot is less prone to tip over and more reliable.

By simply adding 'is' to the second part of the sentence, we can correct the problem and keep the reader from having to back-track:

**7d.** A legged robot is less prone to tip over and is more reliable.

A final example: What is ambiguous about the comparison being made in this sentence? (Be prepared to give an answer in class.)

**7e.** Our lab works with biologically-inspired robots more than their lab.

## **8. Don't use redundant or confusing terms or constructions.**

**Redundant terms.** An example of redundant wording is the use of 'such as' and 'etc.' (or even worse, 'and etc.') in the same sentence. *Et cetera* (etc.) should also be avoided if the reader has no way of finishing the list, as in this example:

The developments made so far in the study of legged robots have dealt mostly with the issues of leg co-ordination, gait control, stability, incorporation of various types of sensors, etc.

**Confusing terms.** Terms that are generally misunderstood should be avoided. The abbreviations *i.e.* (*that is*) and *e.g.* (*for example*) are such terms. Use clear English, not obscure Latin.

**Confusing constructions.** Acronyms (expressions consisting only of the first letters of words, such as CIA or VIP) are frequently confusing to the reader. Even if you've identified the acronym somewhere in Section 2, the reader may have forgotten what those letters stood for by Section 3. Reduce use of acronyms to a minimum. In longer papers, provide a table of important acronyms used.

## **Lab Instructions**

Rewrite the report you submitted for Lab 1 so that it meets the standards for technical writing.

Bring a copy of your Lab 1 report to class. You will have time in class, as well as guidance from Technical Communication Fellows, to begin revision. After class, complete your revisions and resubmit the report by the specified due date. The revised report will be graded for quality of writing.

NOTE: Your Lab 6 report will be graded, not just for content, but for quality of writing as well. We suggest that you make an appointment with a Technical Communication Fellow to review a draft of that report. To make an appointment, go to

<http://www.seas.upenn.edu/~tcp>

Click on 'Contact a Fellow.' Follow the directions there to schedule an appointment.