Reporting Experimental Laboratory Results

ELC 3114: Electronic Design Laboratory

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“I got into engineering so I don’t have to write!”

- Engineers actually have to write more clearly and precisely than most disciplines.
- Different types of engineering writing:
  - Technical memos and reports
  - Proposals
  - Papers
  - Technical instructions
- Engineers must take difficult concepts and communicate them simply → Challenging!

Proposals

- Designed to award of a project (usually for funding).
- Proposals should tell a good story that has a happy ending only if you are awarded the funds.
- Proposals should include
  - A clear and compelling description of the problem
  - A clear statement of research objectives, along with measurable outcomes and metrics to evaluate each.
  - Project timing chart
  - Anything the evaluators want (read the requirements carefully).
  - Adherence to page limits and format guidelines.

Proposal Tips

- Reviewers are tired and busy.
- Put what you plan to do right up front.
- Each page should convince the reviewer to pay close attention to the next one.
- A simple rule: If you lose the reviewer, you lose the proposal.

Proposal Components

- Motivation/introduction.
- Specific aims of the research should be numbered.
- Thorough review of the literature – show you know the state of the art.
- Show initial work/research at a high enough level to be understood quickly, but a deep enough level to show you know what you're doing.
- Very specific work statement. Be as specific as possible.

Example Proposal

Papers

- Papers show demonstrated research or results.
- Papers are sent for peer review, so they should be able to stand scrutiny.
- Papers can be sent to conferences or journals.
- The review and respond process is often lengthy.

Paper Tips

- Send initial work to conferences; mature work to journals.
- If you're not sure how something will come across, present it at a conference and assess the response.

Paper Components

- Motivation of the problem
- Describe your contribution.
- Literature review: show you know the state of the art and describe your contribution in light of this.
- Theory Description
- Simulation Results
- Experimental Results
- Descriptions should be technical and non-emotional (less emotional or dramatic than proposals).
- Conclusions: Summarize again what your contribution is.

Example Paper

Technical Memos/Reports

- The audience is usually your boss, supervisor, or project sponsor.
- These will be fairly frequent.
- This should be similar in approach to a paper, but the topic level should cover one significant experiment or study.
- Explain things technically (unemotionally).
- Sections are often similar to a paper.
- Put everything in: it will useful when you are writing a paper or proposal later to copy and paste things from your memos (especially figures and tables).

Example Technical Memo

Habits for Good Writing

- Keep a writing log (see example).
- Write at least 30 minutes per day. However, don't write for time periods that are too exhaustingly long.
- Don't wait for the right conditions to write; these conditions never exist!
- Work with others that can review your work and provide feedback (and help them as well).
- Your productivity and quality will increase tremendously!

Your Formal Lab Report

- Lab 3 will be a “formal lab.”
- Use the formal lab report guidelines on the ECE website.
- The approach is very similar to a technical memo.
- You will be graded not only on content, but heavily on how you present it (grammar, writing approach, etc.), so edit it.