

# Writing for ELEC 3040/3050

John Hung & Victor Nelson

Dept. of ECE

Auburn University

# Do Engineers Really Write Much?

- Sources we regularly poll:
  - ECE Industrial Advisory Board
  - Companies that hire YOU
- They consistently say:

“Effective communication is equally important to technical know-how.”

# Some Forms of Technical Writing

- **Email:** dominant form of professional correspondence
- **Letters:** becoming less common, feels more “formal”
- **Memos:** common before email age, still in use
- **Resumés**
- **Reports:** design, laboratory, progress, proposals, instructions, theses
- **Lab notebooks:** archive of ideas and raw data

# Writing assignments this term

- **Memos:** three (two graded)
- **Design report:** a draft, plus a revision
- **Proposal:** your solution to an engineering ethics problem
- **Lab notebook:** evaluated six times (five for grade)

# Online resources

Michael Alley, Penn State Univ

<https://www.craftofscientificwriting.com>

Miller Writing Center, Auburn Univ

[Writing in the Sciences](#)

# Memo guidelines

# Memos

- Memo audience: *within* the place of work
- Letter audience: outside the place of work
- Often serve as short (*progress*) reports
- Subject line: Readers often decide “read” or “trash” based on the words here.
- People directly affected should be cc’d

# 3040/3050 memo guidelines

- **First lines** (heading block, single spaced)
  - To: John Hung, Victor Nelson
  - From: My name and my teammate's name
  - Section: Thursday, 12:30 p.m.
  - Date: 19 January 2019
  - Subject: Remember, this line is important!
- **Body** (double spaced, see Syllabus for length guideline)
- **Supporting materials** (start new page, single spaced)
- [“Poor” vs “better” samples](#) (at course homepage)



# More about the memo Body

- Consider using headings and subheadings
- Open with description of goals (2-5 sentences)
- Then, present:
  - results
  - ongoing issues
  - Conclusions
- Figures and tables can be effective
  - If inserted, then be sure to discuss it
  - Each need a label and a caption

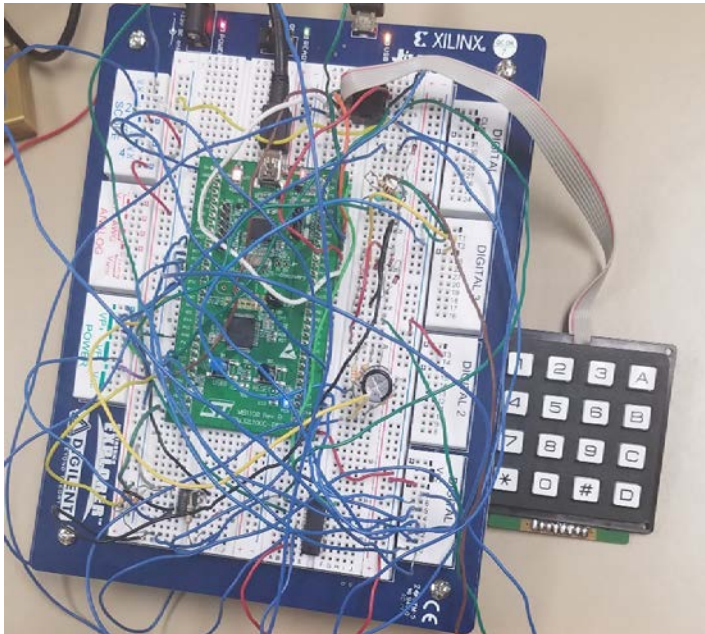
# Supporting materials

- “One picture is worth a thousand words”
  - only if it is well-designed
- Computer programs
  - Single space
  - Add explanatory comments
    - Above blocks of instructions
    - Adjacent to key instructions
  - Number each line, then refer to line numbers
  - Is the complete listing necessary?

# Figure examples

**Less effective**

Fig. 1. Keypad interface

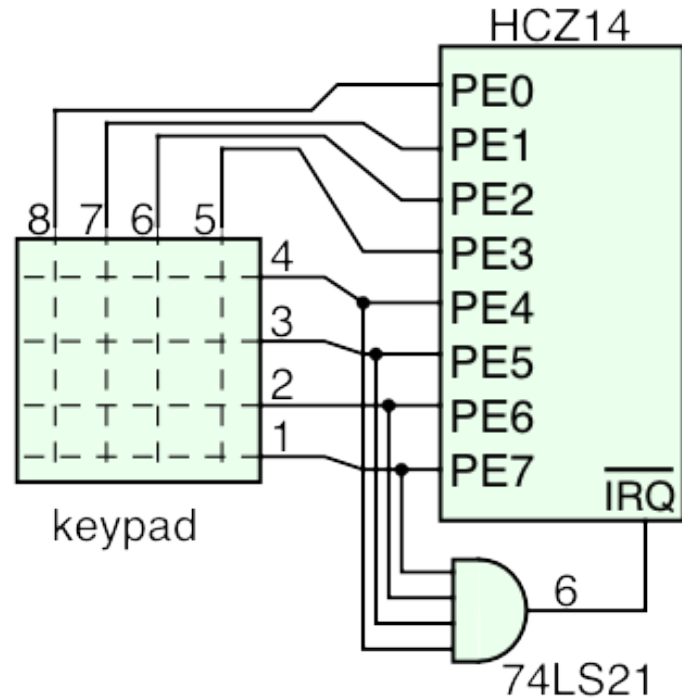


*caption*

*label*

**More effective**

Fig. 1. Keypad controller schematic



# Memo grading

- Two numbers:
  - Writing (4 point scale), assigned to memo author
  - Progress (4 point scale), assigned to both teammates
- [Grading rubric](#) (at course website)

# Design report guidelines

# Objectives of Design reports

- Detailed description of a design
- Present evidence that the features work
- Concise presentation of data
- Highlight important features in data

# 3040/3050 Design report structure

- First lines (same heading block as for memos)
- Executive summary
- Problem description, desired performance
- Design description
- Testing methods
- Experimental results
- Concluding remarks, references
- Supporting materials (appendices)

# The executive summary

- Describe contents of the report
- Summarize the report structure



# Problem summary

- Open with description of problem that is solved, using layman's terminology
- Present specific (detailed, quantifiable) performance expectations and constraints
  - Tables and figures may be appropriate

# Design description

- Describe device, circuit, algorithm, program, etc. that solve the problem
- Explain implementation of the design
- Describe how parameters are designed, e.g, circuit component values, software values
- Give sufficient detail to enable design reproduction

# Testing methods

- Describe the desired data that must be collected
- Describe equipment and procedures used to collect the data

# Experimental results

- Use graphs, tables, and figures to concisely present data
- Include labels and descriptive captions
- Try to present “desired” and “actual” results in ways that are easy to comprehend

# Concluding remarks

- Draw conclusions from reproducible data
- Avoid vague, subjective comments
  - Not, “The design works great...”
  - Rather, “The design produces a signal whose amplitude is within 2% of the desired values...”

# References

- Use established bibliographic styles, e.g.
  - [1] V. Nelson, “A bidirectional gazahnplatz valve,” IEEE Trans. on XYZ, vol. 1, no. 12, Jan 2019, pp. 2-5.
  - Nelson, V. (2018). “A unidirectional gazahnplatz device,” 2<sup>nd</sup> IEEE UVW Conference, Boston, May 2018, pp. 123-130.
- Cite references in the report by using their labels [1], or (Nelson, 2019).

# 3040/3050 Design report grading

- Drafts are assessed in three areas (see rubrics)
  - Ability to [design](#)
  - Ability to design and conduct [experiments](#)
  - Ability to communicate in [writing](#)
- Revised reports are re-assessed

# Lab notebook guidelines

[Notebook grading rubric](#)

(used by the TAs)



# Why a notebook?

- Primary record of work
- Record-keeping
- Helps organize ideas and data
- Legal proof of work

# Typical notebook characteristics

- Permanent binding (no loose sheets)
- May be graph paper ruled
- Contains “all” work
  - Hypotheses, ideas, sketches
  - Experimental materials and setups
  - Calculations, raw data, preliminary analysis
  - Signatures of witnesses
  - Some companies permit only ink (no pencil)
- Neatness and grammar are secondary