Engineering Writing & Presentation

The Engineering Writing Strategy as Implemented in ENGR 290: Engineering Writing & Presentation

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Presentation Overview

Engineering Writing & Presentation

- The Engineering-Writing Strategy
  - The Importance of Engineering Communication
  - The Types of Engineering Documents
  - Common Elements in Engineering Documents
  - The Engineering-Writing Strategy Implemented in ENGR 290
  - The Engineering-Writing Process vs. The Design Process
  - Student Assignments
  - Representative Assignment: Engineering Proposal
  - Benefits to the Student
  - Challenges for the Instructor
The Importance of Engineering Communication

• How well engineers communicate affects their career
  – Surveys indicate engineers spend from 20% to 40% of work week writing or presenting their work

• How well engineers communicate affects the well-being of others

![Space Shuttle Challenger (January 28, 1986)](image)

Explosion was caused by failure of O-rings in the solid rocket boosters

Engineers knew of O-ring problems well before fatal launch

Engineers failed to communicate seriousness of problem

Types of Engineering Documents

- Mechanism Description
- Process Description
- Informal Proposal
- Formal Proposal
- Progress Report
- Feasibility Report
- Recommendation Report
- Lab Report
- Project Report
- Business Letters
- Instruction Set
- Manual
- Research Report
- Abstract
- Summary
- Journal Article
- Website
- Resume & Cover Letter
- Memo
- E-Mail
Common Elements of Engineering Documents

• Ethics
  - Accuracy
  - Fact not speculation
  - Proper credit to others

• Documentation
  - What is documentation
  - When to document sources
  - How to document sources

• Visuals
  - Types of visuals
    • Equations, formulas, schematics, diagrams, graphs, photos, tables, charts
  - Guidelines for design and use of visuals
    • Reproducibility, Simplicity, Accuracy

• Grammar, Style, and Punctuation
  - What is it and why is it important
  - Precise and to the point
Engineering Writing Strategy

• Analysis of each type of engineering document
  - Purpose
    • Why is this document being written
  - Audience
    • Who is this document being written for
  - Content
    • Establish document outlines
    • Establish document checklists
    • Examine sample documents
    • Class exercises: evaluate representative documents with both strengths and weaknesses
      - in the future to include student examples
    • Assignments: provide students with the opportunity to write documents
The Engineering Writing Process

- The engineering writing process is multi-step and iterative, much like the design process

The Engineering Writing Process

1. Identify the need and define the problem
2. Perform an audience analysis
3. Plan the document (develop the outline)
4. Write the document (usually requires multiple drafts, i.e., an iterative process)
5. Submit the document
6. Evaluate the results

The Engineering Design Process

1. Identify the need and define the problem
2. Identify the constraints and criteria
3. Search for & evaluate possible solutions
4. Create the detailed design (usually an iterative process)
5. Communicate & construct the final design
6. Verify and evaluate the design
Student Assignments

- Assignments throughout the semester consisted of
  - 6 Papers
    - Mechanism Description
    - Process Description
    - Proposal
  - 8 Exercises
    - Abstraction
    - Ethics
    - Technical Definitions
    - Visuals
  - 3 Presentations
    - Mechanism Description
    - Process Description
    - Student Project or Work Experience
  - Lab Report
  - Instruction Set
  - Resume & Cover Letter
  - Progress Report
  - Abstract & Summary
  - Memos
  - Portfolio
Representative Assignment

• Engineering Proposal (Paper #3)
  - Write an informal unsolicited proposal to do extra work in a class to earn a higher final grade in the class.
  - The class must be in your engineering program (it could be a class you are currently taking or one that you have had in the past)
  - The proposal must explicitly state the work to be completed and how the work done will translate into an increase in your final grade
  - Fiscal Costs do not need not be included as part of the proposal
  - Resources may include your past experience with a similar task in another course
Benefits to the Student

• Writing strategy aligned with the engineering design process

• Writing strategy aligned with the approach used in technical classes
  – Theory developed
  – In-Class example problems reviewed
  – Assignments

• Outlines and checklists developed for reference in future classes and industry
Challenges for the Instructor

• Grammar
  – Lecturing on Grammar
  – Correcting Grammar in Papers
  – Grading with Grammar

• Grading
  – Best grading method
  – Developed rubrics
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