

Writing About Engineering and Technology and Computer Science

I. General Information

Engineers use the language of mathematics, the methods of science, and the experiences of society. They design tools, machines, processes, or systems to solve problems and accomplish tasks efficiently. Writing is often collaborative and creates reports and recommendations based on research and design ideas; devises technical reports; and provides real solutions to real problems. The field of engineering includes industrial, mechanical, chemical, electrical, civil, geological, environmental, aerospace, and computer engineers. **Audiences** include other engineers, decision makers, policy experts, school administrators, government leaders, corporate clients, and the general public. Research and design occurs in universities, non-profit research institutions, private industry and government.

II. TYPES OF WRITING

1. Project Notebook
 - Signed and dated personal journal, record of progress with observations, data from experiments and design process; explanations or interpretations of data
 - Description of materials, procedures, designs; notes of tests
 - Reflections on readings, meetings, logistics, peers' comments or critiques
2. Laboratory Reports
 - Procedures, materials, results of experiments
 - Pose question or problem; background information, objective of lab work, step-by-step procedures
 - Description, commentary, explanation of results; patterns, future implications, unanswered questions
 - Differences between expectations and results
3. Technical Reports
 - Structure and functions of design
 - Executive summary (1-page, concise statement of important points of report)
 - Introduction/Purpose and Goals/ Methods/ Data/ Recommendations/ Conclusion/ Appendices/ tables, charts, spreadsheets, maps, figures, illustrations
4. Proposals
 - Funding from academic or government sources; description of project for potential clients
 - Background and rationale for project, including need addressed
 - Materials and methods (task descriptions); method of evaluation; expected outcomes

- Organization plan/ short paragraphs about project staff
 - Timeline and itemized budget with deadlines; résumé
5. Progress Reports
 - Business letter/ memo of work completed
 - Project description; summary of progress; problems encountered; solutions designed or suggested; alterations to deadlines or budget; work remaining
 6. Articles for publication in journals
 7. Presentations

*NOTE: **Computer engineers** do not typically write lab reports or project journals; they do, however, write code documentation and user manuals.

III. TYPES OF EVIDENCE

- Data from lab reports published by other engineers
- Quantitative data (countable) and qualitative data (observable)
- Observations and measurements inside laboratory
 - From building models of projects
 - Computer simulations and models
 - In real-world settings

IV. WRITING CONVENTIONS

- Use specialized vocabulary and technical detail.
- Collaboration is often required in research and lab work.
- Use standard sections for each type of writing with headings and subheadings in reports and proposals.
- Provide visuals: diagrams, charts, tables, graphs, and illustrations.
- Use past tense for lab reports; future tense for proposals; present and past in progress reports.
- Use 3rd person and active voice (try to avoid passive voice).
- Minimize use of acronyms; use only the most often cited.
- Writing must be brief, clear, and logically ordered.
- Others need to replicate work and confirm results.

V. CITATION STYLE

- CMS (Chicago Manual of Style)
- IEEE (Institute of Electrical and Electronics Engineers): *IEEE Editorial Style Manual*
- USGS (United States Geological Survey): *Suggestions to Authors of the Reports of the United States Geological Survey*, 7th edition (1991)
- Cite references in style recommended by professor or organization
- **Computer engineers** typically use LaTeX, a document preparation system

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