TECHNICAL REPORT WRITING

Technical Report Writing

- In Engineering, one of the major forms of communication is the technical report. This is the conventional format for reporting the results of your research, investigations, and design projects.
- A technical report is a formal report designed to convey technical information in a clear and easily accessible format. It is divided into sections that allow different readers to access different levels of information.

Technical Report Writing

- Technical reports are documentation of a technical and engineering activity so they should reflect this professional and technical attitude.
- The ability to produce a clear, concise, and professionally presented report is a skill you need to develop.

Outline

- Essential Contents of Technical Reports
- Important Remarks
- Remarks about Figures
- Proposal Report
- Conceptual Design Report
- Critical Design Review Report
- Final Report

Essential Contents

- Title Page
- Table of Contents
- Executive Summary
- Introduction
- Conclusion
- References
- Appendices

Title Page

- A brief descriptive title of your project
- The names of the individual(s) to whom the report is being submitted
- The names and phone numbers of the individual(s) submitting the report
- The date of submission
- The starting date of the project, the proposed project duration, and completion date
- The cost of the project or amount of funding required

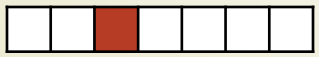
Essential content 

Table of Contents

- Lists each of the main and sub sections of the report and the beginning page numbers for each section.

Executive Summary

- An overview of the report
- A detailed summary of the development in the project work
- Information about the scope, content, and conclusions of the report



Introduction

- Complete background information about the project/problem/organization
- The current situation about the work on the project/problem
- The scope of the report
- Organization of the report

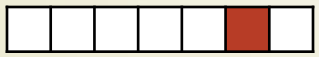
Essential content

Conclusion

- Briefly recaps the key points of the report.
- Includes final conclusion about the content presented in the report.

References

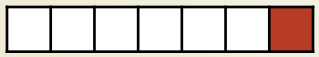
- List of materials that you directly used in your report such as algorithms, experimental results, figures, and/or tables that are not originally yours
  - Books
  - Papers
  - Websites



Appendices

- Supporting information that would disrupt the main flow of the report
- Data backing up your claims in the body
- Detailed calculations if necessary and contribute to the document

Essential content



Important Remarks

- Organization of the report
- Figure captions should be below the figure
- Table captions should be above the table
- Do not start a section with a figure or a table
- Spell check and grammar check
- Common mistakes
  - Redundant redundancy
  - Lengthy sentences

Remarks about Figures (1/2)

- Have appropriate captions and should be cited in the text before placing the figures.
- Can be placed in between the text blocks if small or on the next page after citation if large.
- All drawings should be of professional quality, generated with a drawing program.
- Figures for the body should not appear in an appendix.
- Figures in appendices would be included in their respective appendix with a different numbering scheme, e.g., Figure A2-5 for the fifth figure in appendix two.

Remarks about Figures (2/2)

- Each axis of the plots should have a label with unit.
- Text in plots should be readable.

Proposal Report

Proposals are submitted to a potential sponsor. They must include:

- executive summary,
- problem statement and requirement analysis,
- objectives,
- team organization,
- solution approach,
- standards the product need to comply with,
- Gantt chart, cost analysis, deliverables.

Executive Summary

Must answer the following questions:

- ✓ What problem will your project solve? What need will it address?
- ✓ Why is your proposal important to potential sponsors?
- ✓ Is your team capable of solving this problem?
- ✓ Do you have a plausible solution procedure to the problem?
- ✓ What the customer would be getting from a given project?
- ✓ How much these deliverables will cost?
- ✓ When will be the project delivered and what are the important milestones of the project?

Problem Statement and Requirement Analysis

- To define the problem
  - Possible societal impacts
- To indicate all the requirements with related details
- To establish the scope and boundaries of the project

Objectives

- Measurable objectives
  - May be in the form of functional specifications
- Weighted objective tree
- In addition to performance related objectives do not forget consumer oriented objectives like safety, environmental issues, etc.

Team Organization

- Academic background
- Tasks in the project
- Roles in the company

Solution Approach

- The approach that the team will use to meet the project objectives
- Your principal tasks and their particular purposes
- Wherever possible, the methods and tasks to be performed should be outlined in a logical sequence and explained in detail.
- The relevant instrumentation and facilities required to complete the research or product development
- Test and integration plans for subsystems

Standards

- The team is supposed to come up with initial ideas for what kind of standards would be required to successfully implement the project.

Gantt Chart

- Identify project milestones and due dates
- Use a graphic representation of the task relationships and their duration
- Remember the importance of parallel tasks

Cost Analysis

- Tentative cost analysis of the solution procedure

Deliverables

- A description of the products and/or services customer can expect from your efforts such as
  - documents
  - equipment
  - software
  - etc.

Conceptual Design Report (CDR)

- Problem Statement
- Solution
- Plans

Problem Statement

- Design requirements
- Measurable objectives
- Constraints

Solution (1/2)

- Overall description of the system with a block diagram
  - Inputs and outputs of each block should have appropriate names
- Solution for each subsystem and relevant algorithms
- Functional specifications
- Plan B
  - If there is a risk in a subsystem, there should be an alternative solution

Solution (2/2)

- Standards compliance (Table)
- Test and integration plans (Test procedures, measure of success)
- Test results and comparative analyses
- Weight, dimensions, and power consumption
- Justification that the solution satisfies requirements and objectives

Plans

- Team organization (individual tasks)
- Time plan (Gantt chart with individual tasks)
- Foreseeable difficulties and contingency plans
- Cost analysis
- Deliverables

Critical Design Review Report (1/2)

- Overall system description and block diagram
- Modifications made after CDR
- Subsystems
  - Technical specifications
  - Flow diagrams
  - Compatibility

Critical Design Review Report (2/2)

- Test procedures and detailed test results
- Are the requirements satisfied? Justify
- Is your design robust? Discuss
  - Analyze hidden or explicit systematic error sources, i.e., make an error budget
- Power consumption
- Cost updates
- Time plan updates

Final Report

- Technical details
  - Related calculations, circuit diagrams, flow charts, results of performance tests, etc.
- List of deliverables
  - User manual is a must
- Budget
  - Actual Expenditures (Cost of the final product)
  - Total Cost (Total expenditures including engineering cost, infrastucture cost, etc.)