

SEMM 1921

Lecture 6.0

TECHNICAL REPORT WRITING

Learning Outcome

At the end of this chapter, students should be able to prepare technical reports in a clear and concise manner.

Introduction

- **An engineer spends a considerable amount of time writing reports**
- **It is therefore important to develop the skills for report writing early in a future engineer's life**
- **The report must be easily read and understood by your audience (whoever is going to read the report)**

Introduction

- **As an undergraduate student, you will be required to prepare various reports including**
 - **Laboratory (Experimental) Report**
 - **Class Project Report (Group or Individual)**
 - **Industrial Training Report**
 - **Thesis (Final Year Project)**
 - **Journal/Conference Paper (Final Year Project)**

Technical Report Structure

- In general, a technical report may consists of the following elements
 - Title Page
 - Abstract/Summary
 - Table of Contents
 - List of Tables
 - List of Figures
 - List of Abbreviations & Symbols
 - List of Appendices
 - **Main Report (see next slide)**
 - Conclusion and Recommendation
 - References
 - Appendices

Technical Report Structure

- The **Main Report** element of a technical report may consists of the following items
 - Introduction
 - Background
 - Literature Review
 - Project Description/Methodology
 - Results & Discussion

Short Report Structure

- **A Short Report (such as a laboratory report or a Class Project Report) may consists of the following elements**
 - Title Page
 - Summary
 - Table of Contents
 - Introduction/Background
 - Project Description/Methodology
 - Results & Discussion
 - Conclusion
 - References

Journal/Conference Paper

- In general, a journal/conference paper may consists of the following elements
 - Title of Paper
 - Author(s) and Affiliation(s)
 - Abstract
 - Keywords
 - Introduction
 - Materials & Methods
 - Results & Discussion
 - Conclusion
 - Acknowledgements
 - List of References

Description of Main Elements

Elements	Description
Acknowledgement, Abstract, Table of Content, List of Tables & Figures, Abbreviations & Symbols, Appendices	In the sequence given, these should use roman numerals i.e. i, ii, iii, iv etc. The table of content should follow the preferred format as in the UTM's Thesis Guidelines .
Abstract/ Summary	A brief summary of the project/work carried out highlighting purpose, methods and outcomes/key findings
Introduction	Introduce the project/work done. This should contain the Objective, Problem Statement (a statement defining the problem), Scope of Work, brief content of the following sections (what to expect). Do not forget to cite any references used.

Description of Main Elements

Elements	Description
Background/Literature Review	Describe all related materials that have been studied/searched (from journal/conference papers, thesis, books) and relevant to the project e.g. Design process, possible materials characteristic, production processes, costs, currently available methods, systems or solutions, patent search results etc. Cite at the appropriate points in the text the names of the authors and the year the work was published. Include the theoretical background of the study/work.
Methodology (Method used to solve the problem)	Include description of experiment/numerical methods etc. Describe the procedures employed to conduct the study/project & instrumentation used. In a design project, it includes concept evaluation, concept development sketches and any detailed explanation of the various stages of work. Include description of tools/software used for analysis. Do not forget to cite any references used.

Description of Main Elements

Elements	Description
Results and Discussion	<p>Complete data gathered, properly presented in tables, graphs etc. Tables and figures properly captioned. Complete analysis with good supporting evidence. Discuss problems faced & their solutions. Describe relationship, trends, etc. Discuss the findings in-relation to theory and any deviation from the expected result. Include error/uncertainty analysis.</p>
Conclusion	<p>Explain briefly whether the objective(s) have been achieved and any deviation from the target. Highlight key findings & make recommendations. State limitations of the study and suggest future work/study</p>

Description of Main Elements

Elements	Description
References	The list of references should consist of a listing of sources actually cited, compiled either alphabetically (Harvard System), numerically (Number System) or American Psychological Association Style (APA Style).
Appendices	Put any information that can help the reader to understand some of the explanation in the report, if required. This information supports the report.

Do's and Don'ts of Report Writing

Do's	Don'ts
<ul style="list-style-type: none"> • Make sure all figures or tables have been described or discussed • The title of a table is placed above the table while the title of a figure is placed below the figure. 	<p>Do not forget page numbering</p>
<p>Use the spelling and grammar tools in the Word Processing software to help improve your English proficiency</p>	<ul style="list-style-type: none"> • Do not cut and paste or retype any sentence from other sources without proper referencing (Beware of Plagiarism!!!) • Plagiarism is unacknowledged use of the words or ideas of others & is a serious violation of academic integrity • Try to understand the information from other sources/references and summarize using your own words

Do's and Don'ts of Report Writing

Do's	Don'ts
<ul style="list-style-type: none"> Equation is centred-justified Place the equation number in round brackets at the right-hand margin ex: $y = mx + c \qquad (1)$ 	<p>Do not forget to include citation which provide the source of a theory when you present the theory in the background/literature review.</p>
<p>Refer to UTM's Thesis Guidelines on thesis preparation/organization and formatting: http://sps.utm.my/thesis-formatting-2018/</p>	<p>Do not forget to reference all sources of information</p>

Note on Units

- **Practicing engineers pay careful attention to the units in a calculation**
- **When carrying out calculations, it is important to ensure that calculations are dimensionally consistent**
- **Dimensionally consistent means that the units associated with the numerical values on each side of an equality sign must match.**

Note on Significant Figures

- **A significant digit is one that is known to be correct and reliable**
- **Answers should not have more significant digits than the given data**
- **Three to four significant figures should be sufficient in most of your calculations in class.**
- **Zeros within a number are always significant. Both 8808 and 80.08 contain four significant figures**
- **Leading zeros are not significant. For example, 0.00088 has two significant figures.**
- **Trailing zeros in a number containing a decimal point are significant. For example, 8.00 has three significant figures.**

Reference For Report Writing

- **Silyn-Roberts, H 2012, *Writing For Science And Engineering*, 2nd Edition, Elsevier, New Zealand**
- **Thesis Guidelines 2018, *Thesis Preparation*, 5th Edition, School of Graduate Studies, Universiti Teknologi Malaysia, Johor Bahru, Malaysia (<http://sps.utm.my/thesis-formatting-2018/>)**