

Work Term Report

Basic Formatting

MME Department

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Presentation Outline

1. Why are you writing a work term report?
2. Topic selection
3. Advice by section
 - a. Front matter
 - b. Main body
 - c. End matter
4. Formatting advice

Why are you writing a work term report?

- Waterloo Engineering students are required to write a total of 3 work term reports
- Typically 20-30 pages
- Main Purposes:
 - To demonstrate written communication skills
 - To demonstrate engineering proficiency

Why are you writing a work term report?

- Main Purposes:
 - To demonstrate written communication skills
 - To demonstrate engineering proficiency

by describing and solving a technical problem to an audience that does not need technical knowledge in your field

- The Technical problem should be something that was done on your work placement, but can be ‘self-study’

Why are you writing a work term report?

- Acceptable Topics:
 - Research reports, design reports, case studies, feasibility assessments, transition document, etc.
 - Something that a mechanical engineer would do, and which demonstrates some aspect of technical proficiency
- Unacceptable Topics
 - Descriptions of processes, systems, equipment, mathematical models
 - Literature review
 - Company practices or standards

Topic Selection

Example: Project Topics

✘ “Describing all the different current light fixtures in the plant.”

✔ “Determining if replacing current light fixtures with energy efficient fixtures is worth spending the initial capital.”



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Advice by Section

Front Matter

Front Matter

- Order of front matter
 - Title Page *
 - Letter of Submittal *
 - Table of Contents ** (start numbering here)
 - List of Figures **
 - List of Tables **
 - Summary ** (always after List of Tables)
- **Do not** include a section called “Contributions”
 - Include this as a paragraph in the letter of submittal

* - no page number

** - roman numeral page number

1st page after the summary is page 1

Letter of Submittal

- Address to the Associate Chair for Mechanical or the Director of Mechatronics
 - Mechanical (Bill Owen)
 - Mechatronics (Andrew Kennings)
- Do not bold the title and employer.



This report titled “**Lighting Retrofit Project Proposal for XYZ Foods**” was prepared for my first work report at my 2A Co-Op placement at **XYZ Foods**. This report is submitted to

- **Must** contain the statement of declaration
 - “This report was written entirely by me and has not received any previous academic credit at this or any other institution”

Table of Contents, List of Figures, List of Tables

- Table of contents **should not** contain table of contents

Table of Contents

Table X Contents	i
List of Figures	ii
List of Tables	iii

- Connect entry to its page number with a dotted line
- Ensure that the page numbers are aligned
- List of figures and list of tables should be on separate pages

Summary / Executive Summary

- It is a brief version of the **full** report
 - It is a synopsis, not a preview
 - Consider the summary to be the spoiler that provides all the exciting details of the project (not vague statements)
- Include quantified specifics
 - Results of implementation
- Should be 1 to 2 pages long
 - Preferably 1 page
- Should be the last section written



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Advice by Section

Main Body

Outline of Main Body

- Work report should be like a technical story
 - A general outline for work term reports

Introduction

Background about problem

Define the problem

Define the objective of the report

Engineering Judgement and Analysis

Can take many forms

Should demonstrate engineering competence

Support your decisions with engineering analysis

Results/Implementation

Explain how solution is implemented

Results and analysis of implementation

Conclusions

Conclusions about objective, solution and results

Recommendations on how the project should move forward



Introduction - General

- Generic background information
 - Introduce important concepts
- Define the problem or project the report is trying to address
 - Why has the company commissioned the project?
- Define the objective of the project
 - What should be accomplished by the end of the report?
- **Must** use in text references

Introduction - Objective

- **Must** clearly state the objective in the introduction
 - The topic is not an objective

Example

- ✘ “The company would like to replace lighting fixtures to save energy costs.”
- ✔ “The **objective** is to select and install lighting fixtures that provide the most savings to XYZ Foods.”

Introduction - Background

- The background may be included in the introduction if it is brief
- Supply technical background
 - Define all important acronyms and technical terms
- Teach the reader enough of the technical content so they can get through the report

Engineering Judgement and Analysis

- How this part of the report looks can depend strongly what the report is about.
- Some Examples:
 - Description of an experiment. Describe the test equipment, test procedure, report the results, analyze the results.
 - A design decision. Present the design specifications (objectives and constraints) and criteria, put forward design options, produce a (justified) decision matrix.
 - A design. Present the design specifications (objectives and constraints) and criteria, explain the redesign process (FEA, CFD, etc), produce a (justified) final product.
 - Etc.
- Provide reasoning and justification for **all** decisions
- Many students have the misconception that a decision matrix is a required part of a work report. This is not the case. While a decision matrix can be a useful tool during the design process, it is not always required.
- Need to display engineering analysis and judgement.

Results and Implementation

- **How** the solution was or will be implemented
- Discuss results of implementation
 - Refer to objectives, constraints, and criteria, and previous analysis as needed
 - **Quantifiable** results are preferable

Example

- Actual cost of the project
- Achieved energy savings



Note: The plural of “criterion” is “criteria” or “criteria”. Not “criterias” or “criterion”. The word “criteria” is not singular.

Conclusions

- No new information should be presented in the conclusion
 - Brief summary of solution and results.
 - Do not use point form
- Refer to the objective (was it met?).

Example

✘ “Installing more light fixtures will increase the productivity in the plant.”

✔ “Installing solution 2 provides the most savings to XYZ Foods. Savings of X dollars was realized.”

Recommendations (Optional)

- Provide recommendations for the **project**
 - This **is not** a self reflection
 - Do not use point form
- Should be specific, measureable and attainable
- Look forward
 - **Do not** state what could have been done better during the process of the project



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Advice by Section

End Matter

References

- Use a standard format, **must** contain sufficient information to locate the source
 - **Avoid** confidential sources (if possible)
 - If citing a web page, note the date last accessed
 - Do not reference an entire textbook. Be more specific
 - Too few references is likely going to cause a re-submit

References – Standard Formats

- IEEE Format

- References are noted by [1], [2], etc.
- Order corresponds to the order in which they are first referenced in the text. The first reference to appear is [1], the next is [2], etc.
- Reference section is numbered consecutively

- APA Format

- References are noted by (Name, Year).
- Reference section is numbered alphabetically.

More information on referencing and plagiarism can be found in the *MME_WorkReportWriting (rev Fall 2021)* document.

Glossary (Optional)

- Only include if main text has numerous technical terms, company specific terms, or mathematical symbols
- Otherwise, define all terms or mathematical symbols in main text

Appendices (Optional)

- Relevant information that is not required for comprehensive understanding
- Reader **should not** need to look at the appendix while reading the report
- Must be referenced in text
- The appendices must be formatted to match the rest of the report



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Other Stuff

Figures and Tables - Captions

- Captions should be with the figure / table
- Captions should be descriptive enough to know what the figure is from its description
- If the caption is shorter than one line, centre it. If it is longer than one line, right or fully justify it.
- If the table / figure **is not** your own, cite it in the caption
- Distinguish figure / table captions from the body text

Figures and Tables - Other

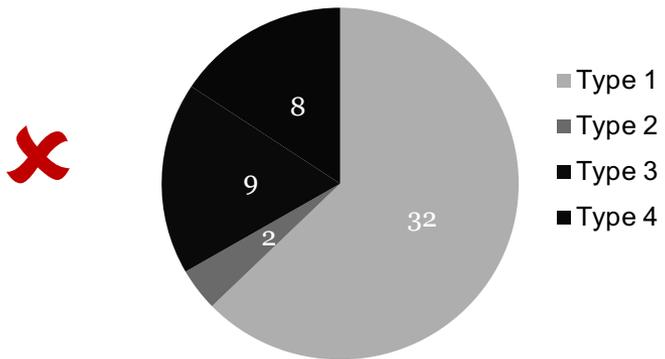
- Refer to **all** figures / tables in text by number
 - Ensure figures/tables have significance to discussion
 - Make sure the figure/table is actually discussed in the text. If you don't discuss the figure/table in the text, then it should not be in the report.
- Make sure the table / figure is legible
- Don't make figures so small that they are rendered useless
- Centre figures / tables
- Place the figure / table in the first convenient location after it is referenced

Figures

- Captions should be below figure
- If referring to a color in a picture, print in color
- Make sure data is distinguishable if printed in greyscale

Figure 10: Amount of different light fixtures

Different Light Fixtures



Different Light Fixtures

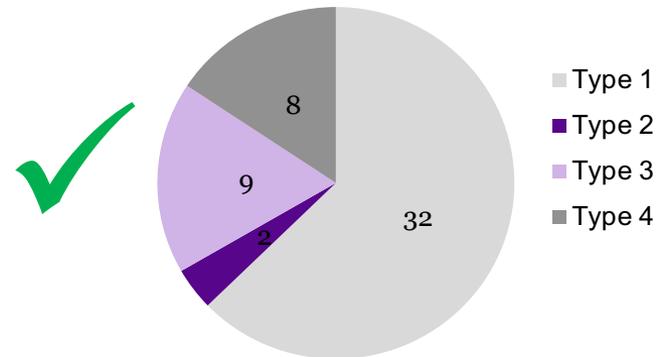


Figure 10: Amount of different light fixtures

Tables

- Captions appear above the table

Table 2: Total cost per fixture



Type of Fixture	Fixture Price	Bulb Price	Number of Bulbs	Total Cost
1	\$150	\$8	3	\$174
2	\$60	\$4	4	\$76
3	\$30	\$2	1	\$32

Equations and Numbers

- Refer to all equations in text by number
- Don't insert figures as graphics. Insert them using the equation editor
- Number all equations
- Reference all variables in the text using the same font as the equation
- Place the equation after it is first referenced
- Usually, numbers have units

Formatting

- Ensure consistent formatting throughout the report
 - Font Selection: do not use ornate fonts
 - Font Color: black only in the main text
 - Justification: Full or right, except for figures and tables
 - Paragraph spacing: Indent with no space, or no indent with space
- Formatting changes are distracting to the reader
- Random formatting changes show a lack of attention to detail, which is not what an engineer wants to portray.

Formatting

- 1.5 line spacing is normal
 - Can use 2.0, but it is generally for editing.
- Avoid a lot of white space
- Avoid Widows and Orphans
 - Widow: when a single line in a paragraph moves to the next page
 - Orphan: when a single word from a paragraph moves to the next page

Most Common Formatting Mistakes

From your markers – the most common (and easily fixed) work report formatting errors.

- Incorrect page numbering
- No or too few in-text referencing in the introduction
- No objective statement in the introduction
- Conclusions don't refer back to the objective statement
- Figures / Tables / Appendices not referenced in the text

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QUESTIONS?