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.”
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 part of the letter of submittal

* - no page number
** - roman numeral page number
Letter of Submittal

- Address to department chair
  - Mechanical (Michael Collins)
  - Mechatronics (William Melek)

- **Do not** bold the title and employer

- **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>
<thead>
<tr>
<th>Table of Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table of Contents</td>
<td>i</td>
</tr>
<tr>
<td>List of Figures</td>
<td>ii</td>
</tr>
<tr>
<td>List of Tables</td>
<td>iii</td>
</tr>
</tbody>
</table>

- 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

- It is a brief version of the full report
  - It is a synopsis, not a preview

- Include quantified specifics
  - Results of implementation

- Should be 1 to 2 pages long
  - Preferably 1 page

- Should be the last section written
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
  - ???

- **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 problem the report is trying to solve
  - Why has the company commissioned the project?

- Define 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 introduction
  - 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

• May be included in the introduction if brief

• Supply technical background
  • Define **all** important acronyms and technical terms

• Teach reader enough of technical content to get through the report
Engineering Judgement and Analysis

- How this part of the report looks can depend strongly on 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 criteria and constraints, put forward design options, produce a (justified) decision matrix.
  - A design. Present criteria and constraints, explain redesign process (FEA, CFD, etc), produce a (justified) final product.
  - Etc.....

- Provide reasoning and justification for all decisions

- Need to display engineering analysis and judgement, or else report will be resubmitted or failed
Results and Implementation

• **How** the solution is/will be implemented

• Discuss results of implementation
  • Refer to criteria, constraints 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 “criterions”. Not “criterias” or “criterion”. The word “criteria” is not singular.
Conclusion

- No new information should be presented in the conclusion
  - Brief summary of solution and results
  - Do not use point form

- Refer to 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.”
Recommendations (Optional)

• Provide recommendations for the **project**
  • This **is not** a self reflection
  • Do not use point form

• Should be specific, measurable and attainable

• Look forward
  • **Do not** state what could have been done better during the process of the project
Advice by Section

End Matter
References

• Use a standard format, **must** contain sufficient information to locate 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.
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
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

- 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

- Type 1: 32
- Type 2: 9
- Type 3: 8
- Type 4: 2

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Tables

- Captions appear above the table

Table 2: Total cost per fixture

<table>
<thead>
<tr>
<th>Type of Fixture</th>
<th>Fixture Price</th>
<th>Bulb Price</th>
<th>Number of Bulbs</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$150</td>
<td>$8</td>
<td>3</td>
<td>$174</td>
</tr>
<tr>
<td>2</td>
<td>$60</td>
<td>$4</td>
<td>4</td>
<td>$76</td>
</tr>
<tr>
<td>3</td>
<td>$30</td>
<td>$2</td>
<td>1</td>
<td>$32</td>
</tr>
</tbody>
</table>
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
- Place the equation after it is first referenced
- Usually, numbers have units
Formatting

• Ensure consistent formatting throughout
  • 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
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
Questions?