



## Third Work Term (APSC 310) – Technical Assignment

### Technical Report (Option 1)

#### Objective

To communicate well, engineers need to be able to write effectively. Writing a report is one of the most formal ways of presenting the results of professional engineering work. Engineering reports can be written about any professional engineering activity, including test results, failure analysis, accidents, design proposals, environmental impact studies, economic or technical feasibility studies, and project summaries. Reports are usually submitted after a major engineering effort; they are often read by multiple audiences, including people involved in decision making or affected by the completed work, and both technical and non-technical audiences.

#### Assignment

Your technical report should be fifteen to twenty pages in length, excluding all prefatory material (i.e., title page, preface, summary, etc.), references and appendices. The technical report contains four essential parts:

- Introduction: a clear, concise summary and statement of the problem or project addressed by the study
- Discussion: details of the study including assumptions, alternatives and predicted outcomes
- Conclusion: the conclusions you have drawn following from the details presented in the report
- Recommendations: derived from the conclusions and addressing the problem

#### Choosing a Topic

Your report should be based on your co-op work term experience and a problem or project that you, your manager or your department have encountered during your work term. If there is not an obvious problem or specific project you are working on, you should ask your supervisor, manager, or a Co-op Coordinator for suggestions.

#### Style

The technical report is analytical rather than descriptive in style. This report should contain accurate, factual information together with sound arguments and conclusions. The format of the report should normally follow the guidelines provided here, but you may follow the company's guidelines if the report will be used internally.

#### Formatting Guidelines

Your report should be formatted according to the following guidelines:

- Double-space and use 12-point Times New Roman or Arial font, with 1-inch margins.
- Use standard, formal English. Do not use slang terms, contractions, or colloquialisms.
- Define technical terms and introduce acronyms the first time they are used.
- Use section headings and subheadings where appropriate. Start all major sections of the report on a new page.
- Number the pages. All prefatory parts (i.e., the pages that come before the introduction) are numbered using lower case Roman numerals. The title page is page i, although it is not numbered. The body of the report begins with the introduction on page 1.

#### Detailed Section Information

The following table explains the purpose and content of each report section:



Section	Purpose	Content
Title Page	Identifies the topic and ownership of the report	<ul style="list-style-type: none"> <li>Title of the report (clearly identifies the subject of the report)</li> <li>Name of student and student number</li> <li>Date and place</li> </ul>
Preface and Foreword	Provides the reader with background of the report	<ul style="list-style-type: none"> <li>Purpose, background, scope of subject coverage</li> <li>Contributions of others to the report</li> </ul>
Summary - considered by many to be the most important part of report, often only this part is read, so it is important to state your case succinctly	Provides a one-page summary. No reference is made to any part of the report; a summary is complete in itself.	<ul style="list-style-type: none"> <li>States the more important information in the report including the purpose, method, reason for the report</li> <li>Succinctly defines the problem the report addresses</li> <li>Summarizes the findings, conclusions, decisions, recommendations</li> <li>Summarizes all major generalizations or assumptions of the report</li> </ul>
Table of Contents	Identifies contents and organization of document	<ul style="list-style-type: none"> <li>Section headings</li> <li>Page numbers</li> </ul>
List of Figures (optional)	Identifies any figures, drawings, or photographs shown in the report	<ul style="list-style-type: none"> <li>Number of figures</li> <li>Title of figures and corresponding page numbers</li> </ul>
List of Tables (optional)	Identifies any tables shown in the report	<ul style="list-style-type: none"> <li>Number of tables</li> <li>Title of tables and corresponding page numbers</li> </ul>
Introduction	Introduces the subject of report as the reader may be from a different branch of the discipline and will require some orientation to the subject of your report	<ul style="list-style-type: none"> <li>Subject and purpose of the report (states briefly why the report is written and it is intended to achieve)</li> <li>Scope (describes the breadth and limitations of the treatment of the subject)</li> <li>Plan of development (outlines which areas will be covered)</li> <li>Thesis of the report (the general conclusion and/or the general recommendation)</li> </ul>
Discussion	Presents evidence (facts, arguments, details, data, test results, etc.) necessary to the purpose of the report	<ul style="list-style-type: none"> <li>This section contains the main part of the report. All evidence must be developed in an organized, logical and orderly manner and must be relevant. It should contain pertinent figures, tables, footnotes, references to material in appendices. Any additional information should be placed in an appendix, but referenced in the discussion.</li> </ul>
Conclusions	States briefly the major inferences that can be drawn from the discussion	<ul style="list-style-type: none"> <li>Must be based on information presented in the discussion</li> <li>Each conclusion should be presented as a separate paragraph, with paragraphs numbered in sequence for easy reference</li> </ul>
Recommendations	Suggests a course of action based on the findings and conclusions	<ul style="list-style-type: none"> <li>Must follow logically from the conclusions</li> <li>Must be supported both by conclusions and by data in the discussion</li> </ul>
References	Acknowledges use of materials from printed sources in the preparation of your report. Indicates exact source of all quotations and/or results of previous work.	<ul style="list-style-type: none"> <li>Author's name, title of book, year published, publisher's name, city, page number</li> <li>References are listed alphabetically by the name of the author or by the first major word of the title</li> <li>Common knowledge does not require a reference (e.g., the speed of light), but if a new value for a commonly accepted quantity is cited, the source should be referenced</li> <li>All sources must be cited correctly; please refer to the following UBC website for proper citation of all sources: <a href="http://help.library.ubc.ca/evaluating-and-citing-sources/how-to-cite">help.library.ubc.ca/evaluating-and-citing-sources/how-to-cite</a></li> <li>Follow APA (American Psychological Association) style for all referencing</li> </ul>



Section	Purpose	Content
Appendices (optional)	Includes data which are not necessary for an immediate understanding of the discussion	<ul style="list-style-type: none"> <li>Appendices may contain program listings, drawings, extra figures, technical specifications, or other detailed explanations of some aspects of your report</li> </ul>

### Submission

The technical written report must be submitted and reviewed for confidentiality by your work supervisor prior to submission via Canvas. A signed Release Form (<https://engineering-coop.sites.olt.ubc.ca/files/2019/09/Co-op-Work-Term-Technical-Assignment-Release-Form.pdf>) must accompany your non-confidential report or it cannot be accepted by the Co-op Program. Submit your report and release form via Canvas on or before the deadline outlined in the Work Term Checklist (<https://coop.apsc.ubc.ca/current-students/undergraduate-checklist/>)

**If your supervisor deems the report to be confidential**, your supervisor must grade your report using the confidential report grade form (<https://engineering-coop.sites.olt.ubc.ca/files/2019/09/Co-op-Work-Term-Technical-Report-Confidential-Evaluation-Form.pdf>). Both the signed release and completed confidential grade forms must be submitted to Canvas on or before the deadline outlined in the Work Term Checklist (<https://coop.apsc.ubc.ca/current-students/undergraduate-checklist/>).

### Grading

A technical evaluator grades all technical reports. Your report receives an overall evaluation on a scale ranging from “Excellent” to “Unsatisfactory”.

If your report is marked “Unsatisfactory”, you will be given one (1) attempt to re-write and be provided with 30 days to make revisions and re-submit your report to the Co-op Office for re-evaluation by the technical evaluator.

The Technical Work Term Report is graded out of 100 points and will be assessed according to the following table:

<b>Literary Quality</b>	25 Points	<ul style="list-style-type: none"> <li>Grammar</li> <li>Spelling</li> <li>Clarity</li> <li>Style</li> <li>Structure / Flow</li> </ul>	<p><b>Excellent: 80 to 100</b> <b>Good: 65 to 79</b> <b>Satisfactory: 50 to 64</b> <b>Unsatisfactory: 0 to 49</b></p>
<b>Technical Quality</b>	50 Points	<ul style="list-style-type: none"> <li>Introduction</li> <li>Discussion: tables/ figure presentation, analytical content, authority &amp; accuracy, thoroughness of treatment</li> <li>Conclusion</li> <li>Recommendations</li> <li>Appendix/ices (optional)</li> </ul>	
<b>Report Requirements</b>	25 Points	<ul style="list-style-type: none"> <li>Suitability of Topic</li> <li>Title Page</li> <li>Table of Contents</li> <li>List of Figures / List of Tables</li> <li>Preface / Forward</li> <li>Summary</li> <li>References</li> </ul>	



## Technical Memo (Option 2)

### Objective

To communicate well, engineers need to be able to write effectively. Memos are common correspondence in the workplace. A memo is a professional document designed to be read quickly. The memo should have only one main idea, be short and well-structured, and get to the point within the first paragraph, or the first sentence, if possible. Engineers and scientists use memos to make or respond to requests, provide updates and announcements, and sometimes to communicate a condensed version of a report.

Memos are often circulated, forwarded, and posted, which means they can reach large audiences. Principles of good technical writing, such as accuracy, clarity, knowing your audience, and using a professional tone, are important considerations when writing memos. Do not be fooled by the short length of the document; proper and effective memo writing can be more difficult than a full technical report.

Examples of technical memos:

Type of Memo	Example
Field Reports	<ul style="list-style-type: none"> <li>• Soil Quality Changes in the Columbia Basin from April to July 2013</li> <li>• Analysis and Comparison of Concrete Samples at Sites 1, 2, and 3</li> <li>• Overview of Occupational and Safety Hazards at the New Afton Mine</li> </ul>
Lab / Analytical Reports	<ul style="list-style-type: none"> <li>• Extreme Temperature Effects on Bio-diesel Blends</li> <li>• Limitations of Optical Lithography for Semiconductor Etching</li> <li>• Statistical Analysis of Defects Found in Product X</li> </ul>
Progress or Status Reports	<ul style="list-style-type: none"> <li>• Status Report for Stage 2 of M-phone Testing</li> <li>• New Production Numbers due to Manufacturing Line Improvements</li> <li>• Top Construction Challenges Facing the George Massey Tunnel</li> </ul>
Policy / Process / Operational Changes	<ul style="list-style-type: none"> <li>• Updates to Test Script for Amazing Game XII</li> <li>• Replacement of BC Hydro Energy Meters in the Lower Mainland</li> <li>• Flex-time Procedures for Union and Non-Union Staff</li> <li>• Amendment to Mechanical Changeover Procedure for Filler Machine</li> </ul>

### Assignment

The length of your technical memo will be between 650-1000 words, double-spaced, in a 12-point font (approximately three pages), and should include informative headings. The word count does not include the header. Select a topic and type of memo that is relevant to your current work term. Consult the table above for examples and ideas, or speak with your employer, work colleagues, or a Co-op Coordinator.

### Detailed Section Information

The following table explains the purpose and suggested content of each memo section.



Section	Purpose	Content
Header	Identifies the date, writer of report, intended audience and topic of the memo.	<ul style="list-style-type: none"> <li>• Date: spelled out</li> <li>• To: name(s) &amp; title(s)</li> <li>• From: name &amp; title</li> <li>• CC: list of names &amp; titles</li> <li>• Subject: as specific as possible</li> </ul>
Purpose	To immediately inform the reader of the reason for the memo.	<ul style="list-style-type: none"> <li>• Who are the stakeholders?</li> <li>• What is the situation?</li> <li>• Where does the situation take place?</li> <li>• When does the situation take place?</li> <li>• Why is it necessary to change / update; why are you writing this memo?</li> </ul>
Summary	To summarize content of memo, mostly the discussion and recommendations.	<ul style="list-style-type: none"> <li>• Key points</li> <li>• Key recommendations</li> </ul>
Discussion	To provide enough information / evidence to justify your recommendations.	<ul style="list-style-type: none"> <li>• Include necessary background information</li> <li>• Expand on details of the situation</li> <li>• Include data / findings</li> <li>• Explain the result (e.g., theory behind change)</li> </ul>
Action / Recommendations	To lay out the next steps with specific tasks and timelines.	<ul style="list-style-type: none"> <li>• Based on the results / situation, describe your recommended course of action and next steps</li> <li>• Be specific with clear roles (name &amp; title) and responsibilities with timelines</li> <li>• Include follow-up action for your audience and yourself</li> </ul>

### Submission

The technical memo must be submitted and reviewed by your work supervisor for confidentiality prior to submission on Canvas. A signed Release Form (<https://engineering-coop.sites.olt.ubc.ca/files/2019/09/Co-op-Work-Term-Technical-Assignment-Release-Form.pdf>) must accompany your non-confidential memo or it cannot be accepted by the Co-op Program. Submit your memo and release form via Canvas on or before the deadline outlined in the Work Term Checklist (<https://coop.apsc.ubc.ca/current-students/undergraduate-checklist/>).

**If your supervisor deems the memo to be confidential**, your supervisor must grade your memo using the confidential memo grade form (<https://engineering-coop.sites.olt.ubc.ca/files/2019/09/Co-op-Work-Term-Technical-Memo-Confidential-Evaluation-Form.pdf>). Both the signed release and completed confidential grade forms must be submitted to Canvas on or before the deadline outlined in the Work Term Checklist (<https://coop.apsc.ubc.ca/current-students/undergraduate-checklist/>).

### Grading

A technical evaluator grades all technical memos. Your memo receives an overall evaluation on a scale ranging from “Excellent” to “Unsatisfactory”. If your memo is marked “Unsatisfactory”, you will be given one (1) attempt to re-write and be provided with 30 days to make revisions and re-submit your memo to the Co-op Office for re-evaluation by the technical evaluator.

The Technical Memo is graded out of 100 points and will be assessed according to the following table:



<b>Technical Quality</b>	15 Points	<ul style="list-style-type: none"> <li>• Appropriate topic</li> <li>• Effective structure</li> </ul>	5	<p><b>Excellent: 80 to 100</b> <b>Good: 65 to 79</b> <b>Satisfactory: 50 to 64</b> <b>Unsatisfactory: 0 to 49</b></p>
		<ul style="list-style-type: none"> <li>• Presentation of data (table / figure)</li> <li>• Information is reliable, repeatable, accurate</li> <li>• Information is justified (i.e., evidence, theories, examples, citations)</li> </ul>	10	
<b>Literary Quality</b>	20 Points	<ul style="list-style-type: none"> <li>• Clear, concise, coherent, using professional tone</li> </ul>	10	
		<ul style="list-style-type: none"> <li>• Sentence structure, spelling, punctuation</li> </ul>	10	
<b>Structure</b>	65 Points	<ul style="list-style-type: none"> <li>• Subject is specific</li> <li>• Appropriate names and titles are included</li> <li>• Date is spelled out</li> </ul>	5	
		<ul style="list-style-type: none"> <li>• Purpose is explained within the first few sentences</li> <li>• Thorough – 5 W-questions are answered</li> </ul>	10	
		<ul style="list-style-type: none"> <li>• Includes all key points and recommendations</li> </ul>	10	
		<ul style="list-style-type: none"> <li>• Background information</li> <li>• Sufficient data / evidence</li> <li>• Valuable explanation of results</li> </ul>	25	
		<ul style="list-style-type: none"> <li>• Convincing</li> <li>• Clear directives - role &amp; responsibility</li> <li>• Timelines</li> <li>• Follow-up for all stakeholders</li> </ul>	15	



## Technical Presentation (Option 3)

### Objective

Throughout your professional engineering career you will be expected to give a variety of presentations. You may find yourself hosting “lunch-and-learn” sessions to disseminate information to colleagues, outlining proposals to clients, or updating senior managers on your project outcomes. This technical oral presentation will provide you with the opportunity to gain practice with delivering formal presentations.

### Delivery of Presentation

You will deliver a formal, ten-minute technical oral presentation on an aspect of your work term or project. The presentation should include an overview, summary, analytical content, ending with conclusions and recommendations.

Your presentation slides should be created using PowerPoint.

Students must sign up for presentation times through PD Portal when directed by Co-op Staff. Each student will receive feedback from Co-op representatives after their presentation, and a grade will be submitted. Presentation timetables will be scheduled with a new student presenting every 25 minutes. Students may invite their employers to attend.

Alternatively, students may wish to conduct their presentation for their supervisor or company on site before the completion of the work term. In this case, a Co-op Coordinator may be able to attend to make the presentation. Contact the Co-op Office in advance of the presentation to make arrangements.

### Submission

A Release Form (<https://engineering-coop.sites.olt.ubc.ca/files/2019/09/Co-op-Work-Term-Technical-Assignment-Release-Form.pdf>) is required for all technical presentations indicating whether the presentation is confidential or non-confidential. Submit your release form via Canvas on or before the deadline outlined in the Work Term Checklist (<https://coop.apsc.ubc.ca/current-students/undergraduate-checklist/>). Co-op staff cannot attend or grade your presentation without the release form.

**Confidential/On-Site Presentations:** If you present for your supervisor or company, your supervisor will need to complete the confidential technical presentation evaluation form (<https://engineering-coop.sites.olt.ubc.ca/files/2019/09/Co-op-Work-Term-Technical-Presentation-Confidential-Evaluation-Form.pdf>). Both the signed release and completed confidential technical oral presentation grade forms must be submitted via Canvas on or before the deadline outlined in the Work Term Checklist (<https://coop.apsc.ubc.ca/current-students/undergraduate-checklist/>).

### Grading

Your presentation will receive an overall evaluation on a scale ranging from “Excellent” to “Unsatisfactory”. If your presentation is marked “Unsatisfactory,” you will be given one (1) attempt to re-do it and will be provided with 30 days to make revisions and re-present.

The Technical Oral Presentation is graded out of 100 points and will be assessed according to the following table:



<b>Structure</b>	20 points	<ul style="list-style-type: none"><li>• Overall Structure of the Presentation</li><li>• Knowledge of the Audience</li><li>• Clarity</li><li>• Style</li></ul>	<b>Excellent: 80 to 100</b> <b>Good: 65 to 79</b> <b>Satisfactory: 50 to 64</b> <b>Unsatisfactory: 0 to 49</b>
<b>Content</b>	40 points	<ul style="list-style-type: none"><li>• Suitability of Topic</li><li>• Reliability and Accuracy</li><li>• Analytic Content</li><li>• Thoroughness of Treatment</li><li>• Table/Figure Presentation</li></ul>	
<b>Expression</b>	40 points	<ul style="list-style-type: none"><li>• Quality of Visual Aids</li><li>• Ability to Engage the Audience</li><li>• Oral Communication Skills</li></ul>	