

Final Research Project Report (1A) and Oral Presentation (1B)

EGH400-2 RESEARCH PROJECT 1, SEMESTER 1 2023

Assessment #	1A and 1B
Unit Learning Outcomes Assessed	<p>ULO1. Formulate a solution to an engineering problem using a process that displays rigorous research and investigation practice, and accounts for risk, ethics and sustainability considerations at a mastered level.</p> <p>ULO2. Practise professionally in the collaborative environment of an engineering project at a mastered level.</p> <p>ULO3. Report a project delivery that addresses an engineering problem using written communication and defend that delivery using oral communication at a mastered level.</p>
Task Weight (%)	60% (Written report 40% and oral presentation 20%)
Due Date	Week 13, 11:59pm Wednesday 31 st May 2023 (Written submission), during exam period (Oral defence)
Nature of Submission	<p>Written Report, incorporating:</p> <ul style="list-style-type: none"> • Title page, formatted according to the supplied template • Maximum 20 pages incorporating the main body of the report (see details below) • References • Appendices <p>Oral presentation: 15 minutes allocation, incorporating 10 to 12 minutes of presentation and 3 to 5 minutes of answering questions.</p>

Overview

Engineers report the outcomes of engineering projects to other members of the engineering team and to clients and stakeholders. In this assessment you will produce a written report on your delivery of your capstone engineering research project and an oral presentation highlighting the key areas of delivery and approach in undertaking the project. You will be questioned at the conclusion of your oral presentation to justify and defend your engineering decisions and outcomes. You should refer to the Engineers Australia [Stage 1 Competency Standard for Professional Engineer](#) to provide context for this aspect of engineering practice.

What you will do

You will prepare a Written Report on the delivery and outcomes of your Capstone Engineering Research Project. Following submission of this written report, you will then give an Oral Presentation with a summary of the methodology and outcomes from your capstone engineering research project. Following your presentation, you will answer questions from a panel of academic supervisors and fellow students. There may be invited professional engineers from industry in attendance.

Your written report should incorporate sections relevant to your project to convey the work you have completed across the year in delivering on your capstone engineering research project. It must include a Title page in the format provided, main body, references and appendices.

Title page: use the supplied template for Title page

The main body of your report must include:

- **Abstract:** precise and concise overview of the capstone engineering research project report. An abstract must highlight all essential findings about the project, including data. It should be possible to read the abstract and gain all key findings without reading the full report.

- *Table of contents*: list all headings and subheadings used,
- *Introduction*: research question or problem statement, incorporating the importance and significance of the project, aim(s) and 3 to 5 objectives of the capstone engineering research project. Provide the aim(s) concisely in one to two sentences (consult with your supervisor if necessary) and the objectives that support the aims in bullet form.
- *Literature review*: synthesis of previous research related to the topic and methodology of your research project. Identifying the gaps which your project has addressed in one paragraph and as a subsection.
- *Methodology*: **describe** the methods used to address the research questions and why these are appropriate to your project, outline any stakeholder engagement, design, simulation, data collection or testing approaches used and interpretation, validation, and analysis techniques. Modelling work requires a detailed description of assumptions. Include any risk, ethics, and sustainability considerations which you accounted for in your research project.
- *Results, Analysis, and Discussion*: present the outcomes including any stakeholder feedback, engineering designs, simulation outcomes, data analysis, and performance data. Discuss these in relation to the gaps identified in the literature review and explain their significance. Briefly address the outcomes of your consideration of risk, ethics, and sustainability. Identify any limitations in your study.
- *Conclusions*: summarise the key findings and any recommendations for further work

References: list all sources that have been referred to within the research project report, including research publications, regulations or codes, or technical and conference reports.

Appendix 1 Research Project Timeline: include a summary of how the project was completed, including interim milestones and progress achieved across the two semesters.

Other appendices: include materials which support your research project report but are too detailed to include within the main body.

Your oral presentation should present a summary of your capstone engineering research project approach and outcome and will be in person on campus. You will be allocated 15 minutes for your presentation, which includes 10 to 12 minutes for presentation and 3 to 5 minutes for questions. You need to carefully structure and organise your presentation and manage your time. Your audience will be a panel of academic supervisors and fellow students and may include professional engineers from industry. Consider ways in which you can engage and inform your audience. Your presentation should include:

- A brief description of the context for the project, aims and objectives (in one slide which must match the text in the report), background literature and the research gaps.
- A short overview of your research project approach and outcomes (methodology, results, conclusions). You may use text, diagrams, images, graphics, or visualisation to convey your message. Choose this with consideration of your audience.
- Your reflections on the significance of your research project outcomes, particularly with regards to other work you have identified via your literature review.
- Your reflections on any limitations, challenges or difficulties of the research project approach and outcomes, and recommendations for future work or lessons learned.

Your presentation should make effective use of presentation technology and give due consideration to the audience, including choosing fonts, images, colours, and other visuals that clearly convey your message.

What you will submit/present (what artefacts will be used to judge your performance?)

Your written report should meet conventions found within the Engineering Report Style Guide, formatted to print on A4 paper using a font size of 12 points for the main text, using a standard font (Arial, Calibri or Times New Roman). Margins are to be: top 20mm, bottom 20mm, left-hand side 20mm, and right-hand side 20mm, with headers and footers within these margins.

You should prepare your oral presentation in a format that can be uploaded to the QUT Standard Operating Environment for presentation in the room you have been allocated to. Your presentation slides should be submitted via the unit Blackboard site prior to your allocated presentation time. You are strongly encouraged to practice your presentation and become familiar with the presentation technology before your scheduled presentation time.

Criteria for Assessment

There are three criteria that will be used to assess your submission 1A (Written report):

1. **Engineering knowledge (weight: 15 marks)** – extent to which research project demonstrates knowledge of contemporary engineering research practice incorporating clarity of formulation of research aims and objectives, synthesis of relevant literature and identification of gaps, appropriateness of methodology, validity and reliability of analysis and conclusions.
2. **Engineering research application (weight: 15 marks)** – application of systematic engineering techniques, tools, and resources to an engineering research project to achieve outcomes; appropriateness of consideration of risk, ethics, sustainability, and stakeholder engagement.
3. **Professional communication: Written (weight: 10 marks)** – effectiveness of written communication in presenting engineering work, that is succinct, justified, and clear including appropriate structuring of report, and effective use of textual, diagrammatic, pictorial, and graphical media suited to the project context.

There are three criteria that will be used to assess your submission 1B (Oral presentation):

1. **Understanding Context (weight: 5 marks)** - Introduction, prior work, description of project context and resulting research question (This allows the audience to quickly grasp the relevance of the project and suitability of the approach.
2. **Understanding of Topic (weight: 5 marks)** - Show how approach (design/experiment and data gathered so far) responds to research question and project context. Otherwise identify necessary changes to project approach/research question.
3. **Professional Engineering Communication (Oral) (weight: 10 marks)** - Effectiveness of oral communication, incorporating: Choice of presentation media, Structure and organisation of presentation, and quality of delivery with regard to clarity, timing, and audience engagement.

Resources and Support Available

Lectures from EGH400-1

Week 5: Professional & Technical Communication: Writing

Week 11: Professional & Technical Communication: Presentations

Support

Library: consult with Faculty Librarians

Student Success: Book an appointment or attend a workshop at qut.to/academicsupport

Resources

Engineering Technical Report Style Guide

Library Guide: <https://libguides.library.qut.edu.au/engcap>

Check the unit Blackboard site for other useful resources related to writing and presentation.

Academic Integrity Statement

You are reminded that maintaining academic integrity is an important professional capability in all assessment. See the QUT [MOPP C/5.3 Academic Integrity](#) and the Engineers Australia [Code of Ethics](#) and Guidelines on Professional Conduct. For this assessment academic integrity will be monitored via:

- Interactions with your supervisor where you should discuss the details of your project and the preparation of your report and presentation.
- Plagiarism detection during submission via Turnitin.
- Questions from a panel of markers and fellow students.

In finalising your mark, you may be asked to verify aspects of your submission through an interactive oral. Note that if the Unit Coordinator has reasonable concerns about your academic integrity, they may ask you to authenticate your learning in line with MOPP C/5.3 Section 5.3.7 (e) *Authentication of learning*.

MARKING RUBRIC for PROJECT REPORT (1A) – 40%

REF	CRITERIA	7	6	5	4	3	2
1.0	Engineering knowledge						
/15	<p>Extent to which research project demonstrates knowledge of contemporary engineering research practice incorporating clarity of formulation of research aims and objectives, synthesis of relevant literature and identification of gaps, appropriateness of methodology, validity and reliability of analysis and conclusions.</p> <p>(Evidence for this criterion will be drawn from both the written report, oral presentation, and answers to questions at the end of the presentation).</p>	<p>Comprehensive knowledge of contemporary engineering research practice in domain of research project, with succinct and clear articulation of research aims and objectives.</p> <p>Establishes clear research gap and makes a convincing case for the chosen methodology and significance of research outcome.</p> <p>Sophisticated analysis, insight, and interpretation of project outcomes in areas pertinent to the research project.</p>	<p>Significant knowledge of contemporary engineering research practice in domain of research project, with clear articulation of research aims and objectives.</p> <p>Establishes research gap and makes clear case for the chosen methodology and research significance.</p> <p>Thoughtful analysis and some insight and interpretation of project outcomes in areas pertinent to the research project.</p>	<p>Important knowledge of contemporary engineering research practice in domain of research project, with reasonable articulation of research aims and objectives.</p> <p>Identifies research gap and makes a case for the chosen methodology and research significance.</p> <p>Reasonable analysis and insight and interpretation of project outcomes in pertinent areas of the research project.</p>	<p>Reasonable knowledge of contemporary engineering research practice in domain of research project, with articulation of research aims and objectives.</p> <p>Identifies a research gap and makes moderate case for the chosen methodology and research significance.</p> <p>Recognition of most project outcomes with some analysis in pertinent areas of the research project.</p>	<p>Some areas of contemporary engineering research practice in domain of research project not addressed.</p> <p>Limited or unclear articulation of a research gap being addressed or limited arguments for why particular methodology was chosen.</p> <p>Limited or unclear analysis of research project outcomes or lack of appropriate conclusions.</p>	<p>Missing key areas of contemporary engineering research practice in domain of research project.</p> <p>No clear research gap identified and no justification for chosen methodology.</p> <p>Missing analysis or consideration of research project outcomes or inappropriate conclusions drawn.</p>
2.0	Engineering Research Application						
/15	<p>Application of systematic engineering techniques, tools, and resources to an engineering research project to achieve outcomes. Appropriateness of consideration of risk, ethics,</p>	<p>Systematic and thorough application of engineering research methodologies, highly appropriate to</p>	<p>Comprehensive application of engineering research methodologies, highly appropriate to project topic.</p>	<p>Considered application of engineering research methodologies, appropriate to project topic. Useful</p>	<p>Appropriate application of reasonable engineering research methodologies, applicable to project</p>	<p>Some required aspects of engineering research methodologies not addressed or applied inappropriately.</p>	<p>Missing major components of engineering research methodologies</p>

REF	CRITERIA	7	6	5	4	3	2
	<p>sustainability, and stakeholder engagement.</p> <p>(Evidence for this criterion will be drawn from both the written report, oral presentation, and answers to questions at the end of the presentation).</p>	<p>project topic. Comprehensive coverage of key issues in research project outcomes around risk, ethics, sustainability, and stakeholder engagement.</p>	<p>Thoughtful coverage key issues in research project outcomes around risk, ethics, sustainability, and stakeholder engagement.</p>	<p>coverage key issues in research project outcomes around risk, ethics, sustainability, and stakeholder engagement.</p>	<p>topic. Has addressed most key issues in research project outcomes around risk, ethics, sustainability, and stakeholder engagement.</p>	<p>Limited consideration of key issues in risk, ethics, sustainability, and stakeholder engagement.</p>	<p>required for project completion.</p> <p>No consideration of risk, ethics, sustainability, and stakeholder engagement.</p>
3.0	Professional Engineering Communication: Written						
/10	<p>Effectiveness of written communication in presenting engineering work, that is</p> <ul style="list-style-type: none"> • succinct, structured, justified, and clear • includes effective use of textual, diagrammatic, pictorial, and graphical media suited to the project context. <p>(Evidence for this criterion will be drawn from the written report)</p>	<p>Masterful written communication (at the standard of a Professional Engineer) including structuring and organisation of report.</p> <p>Writing shows very effective consideration of audience.</p> <p>Report is concise and complete, clearly conveying aims, objectives and outcomes of engineering research.</p> <p>Graphs, diagrams, or pictures make significant contribution to</p>	<p>Highly effective written communication with clear structure and organisation of report. Writing shows effective consideration of audience. Report is concise and complete in all pertinent areas, conveying aims, objectives, and outcome of engineering research.</p> <p>Graphs, diagrams, or pictures used to excellent effect on report readability.</p> <p>Most referencing written in consistent</p>	<p>Effective written communication with structure and organisation evident in report. Writing shows good consideration of audience. Report is concise and complete in most pertinent areas, conveying aims, objectives and outcome of engineering work.</p> <p>Graphs, diagrams, or pictures used to contribute to report readability.</p> <p>Attempt made to write the referencing in APA style with numerous mistakes.</p>	<p>Mostly clear structure and organisation of report. Writing shows some consideration of audience. Reasonably concise, with some redundancy, and all major areas covered to show progress of engineering research.</p> <p>Most graphs, diagrams, or pictures contribute to report readability.</p> <p>Some referencing provided with some references insufficient to find source. Most</p>	<p>Lack of clear structure and organisation in report. Writing uses jargon or confusing language, with no consideration of audience. Longer than necessary with redundancy or missing components so that aims, objectives or outcome of engineering research is not clear.</p> <p>Inappropriate use of graphs, diagrams, or pictures.</p> <p>Too few references provided and not accurately written according to APA</p>	<p>No structure or organisation in report. Unclear language. Longer or shorter than is necessary to convey outcome of engineering research. No or inappropriate use of graphs, diagrams, or pictures.</p> <p>Very few references (e.g. <7) and most not peer reviewed.</p>

REF	CRITERIA	7	6	5	4	3	2
		overall report readability. Almost all referencing written correctly in consistent style. Substantial quantity of peer reviewed references.	style with small mistakes allowed. Substantial quantity of peer reviewed references.	All information provided to find reference. Adequate number of peer reviewed references.	references are not peer reviewed (e.g. most websites).	style. References are not peer reviewed.	
Feedback: What was done well				Feedback: What you could improve			
Result for this Assessment Task:							

MARKING RUBRIC for ORAL PRESENTATION (1B) – 20%

REF	CRITERIA	7	6	5	4	3	2	1
1.0	Understanding Context							
/5	Introduction, prior work, description of project context and resulting research question (This allows the audience to quickly grasp the relevance of the project and suitability of the approach)	Exceptional and detailed description and analysis of context of project Relevant research question	Clear, effective description and analysis of context of project relevant research question	Good description and analysis of context of project Relevant research question	Sufficient description and analysis of context of project relevant research question	Insufficient description and analysis of context of project relevant research question	Work provides minimal evidence of learning in relation to these criteria	Work provides very little evidence of learning in relation to these criteria
2.0	Understanding of Topic							
/5	Show how approach (design/experiment and data gathered so far) responds to research question and project context. Otherwise identify necessary changes to project approach/research question	Approach aligns well with research question Excellent progress Technically sound - technical Questions/difficulties identified Creative and innovative solution. Logically argued, comprehensive. Good insight into priorities for next step	Approach aligns well with research question Very good progress Technically sound - technical questions/difficulties identified Creative elements Logically argued, thorough Good insight into priorities for next steps	Approach aligns well with research question Good progress Technically sound Creative elements Logically argued Next steps identified	Approach relevant to research question Sufficient progress Largely technically sound Logically argued, but with gaps in knowledge	Approach not well substantiated Little progress	Work provides minimal evidence of learning in relation to this criterion	Work provides very little evidence of learning in relation to this criterion

REF	CRITERIA	7	6	5	4	3	2	1
3.0	Professional Engineering Communication: Oral							
/10	<div>Effectiveness of oral communication, incorporating:<ul style="list-style-type: none">Choice of presentation media,Structure and organisation of presentation, andquality of delivery with regard to clarity, timing, and audience engagement.<div>(Evidence for this criterion will be drawn from the oral presentation, including answers to questions)</div></div>	<div>Sophisticated use of presentation media to convey meaning. Well structured presentation with organised transitions and within time limits.</div> <div>Effective engagement of audience through modulation of voice, use of effective speech patterns and enthusiasm for topic.</div>	<div>Highly effective use of presentation media to convey meaning. Clearly structured presentation with transitions and within time limits.</div> <div>Engagement of audience through modulation of voice, use of effective speech patterns and clearly conveying interest.</div>	<div>Effective use of presentation media to convey meaning. Structure of presentation is clear and within time limits. Engagement of audience through clear voice and showing interest in the topic.</div>	<div>Mostly effective use of presentation media, conveying meaning. Some structure to presentation. Spoken in clear voice and within time limits.</div> <div>Conveys interest in topic to engage audience.</div>	<div>Use of presentation media not effective. Disorganised presentation outside of time limits. Voice unclear in some sections. Little attempt made to consider or engage audience.</div>	<div>Poor, unclear or inappropriate use of presentation media. Disorganised and outside time limits.</div> <div>Mumbled or unclear speech. No attempt made to engage audience.</div>	No submission
Feedback: What was done well				Feedback: What you could improve				
Result for this Assessment Task:								