

# Engineering Thesis Handbook

ENGG4600/4601, ENGG7340, ENGG7341/3442, ENGG7381/3882



(Copilot, 2025)

**In cases of discrepancy with the Course Profile, the Course Profile is correct.**

- Need help with research directions, subject matter, lab access, etc: contact your advisor
- Need help with administrative matters: contact [studentenquiries@mechmining.uq.edu.au](mailto:studentenquiries@mechmining.uq.edu.au)
- Need help with academic matters: contact Prof Lydia Kavanagh [l.kavanagh@uq.edu.au](mailto:l.kavanagh@uq.edu.au)

## Table of Contents

<b>1</b>	<b>OVERVIEW.....</b>	<b>3</b>
<b>2</b>	<b>SCHEDULE.....</b>	<b>3</b>
<b>3</b>	<b>GUIDELINES FOR SUCCESS.....</b>	<b>4</b>
3.1	WORKLOAD.....	4
3.2	TIME MANAGEMENT.....	4
3.3	YOUR ADVISOR RELATIONSHIP.....	5
3.3.1	<i>Responsibilities.....</i>	5
3.3.2	<i>Meetings.....</i>	6
3.4	READINGS AND OTHER RESOURCES.....	6
3.5	GENERATIVE AI.....	8
3.5.1	<i>Why am I using AI?.....</i>	8
3.5.2	<i>Copilot.....</i>	9
3.5.3	<i>Technical verification of AI outputs (Anthropic, 2025).....</i>	9
3.5.4	<i>Reducing hallucinations.....</i>	9
<b>4</b>	<b>ASSESSMENT.....</b>	<b>10</b>
4.1	ACADEMIC INTEGRITY.....	10
4.1.1	<i>Overview.....</i>	10
4.1.2	<i>Generative AI and Machine Translation (MT).....</i>	10
4.2	PROPOSAL (10%, DUE: THURSDAY WEEK 4 OF YOUR 1 <sup>ST</sup> SEMESTER OF ENROLMENT) [ENGG7340: 12%, DUE THURSDAY WEEK 3].....	11
4.2.1	<i>Rationale.....</i>	11
4.2.2	<i>Proposal template.....</i>	11
4.2.3	<i>Marking.....</i>	11
4.3	INTERIM REPORT (15%, DUE: THURSDAY WEEK 13 OF YOUR 1 <sup>ST</sup> SEMESTER OF ENROLMENT) [ENGG7340: 13%, DUE THURSDAY WEEK 7].....	13
4.3.1	<i>Rationale.....</i>	13
4.3.2	<i>Structure.....</i>	13
4.3.3	<i>Writing and grammar.....</i>	13
4.3.4	<i>Marking.....</i>	13
4.4	PRESENTATION (10%, DUE: THURSDAY WEEK 10 OF YOUR LAST SEMESTER OF ENROLMENT).....	15
4.4.1	<i>Rationale.....</i>	15
4.4.2	<i>Structure.....</i>	15
4.4.3	<i>Generative AI.....</i>	15
4.4.4	<i>Marking.....</i>	16
4.5	FINAL REPORT (60%, DUE: THURSDAY WEEK 12 OF YOUR 2 <sup>ND</sup> SEMESTER OF ENROLMENT) [ENGG7340 DUE THURSDAY WEEK 13].....	17
4.5.1	<i>Rationale.....</i>	17
4.5.2	<i>Structure.....</i>	17
4.5.3	<i>Writing and grammar.....</i>	18
4.5.4	<i>Marking.....</i>	18
4.6	THESIS PROJECT EXECUTION (5% + HURDLE, CONSIDERED ACROSS THE COURSE).....	21
4.6.1	<i>Rationale.....</i>	21
4.6.2	<i>Marking.....</i>	21
4.7	WORKSHOP COMPLETION (GRADE CAP, WEEK 13 OF FINAL SEMESTER).....	24
4.7.1	<i>Rationale.....</i>	24
4.7.2	<i>Submission.....</i>	24
4.7.3	<i>Marking.....</i>	24
<b>5</b>	<b>CONFIDENTIALITY.....</b>	<b>25</b>
5.1	LEGAL AGREEMENTS.....	25
5.2	INTELLECTUAL PROPERTY:.....	25
Appendix A	Proposal: Examples and instructions .....	25
Appendix B	Interim Report: Examples and instructions .....	31

## 1 Overview

Engineering Thesis is an individual inquiry conducted by you under the general guidance of an academic advisor. This inquiry can take one of the following forms:

- a) an original theoretical and/or experimental investigation,
- b) design of an engineering product or service, or
- c) investigation of a substantive engineering problem for an external sponsor.

In each of the above, you must apply academic processes to provide reproducible evidence of outcomes whether positive or negative. Unlike consultancy, where a successful solution is expected, research may fail to produce a successful outcome. However, this is acceptable as long as you can *document the causes of failure and make recommendations as to future avenues of research*.

This course purposefully integrates generative AI technologies to prepare you for a professional environment where you'll need to effectively direct and validate AI-assisted work while maintaining your core research capabilities. You'll learn to use AI as a research tool – directing it effectively, critically evaluating its outputs, and documenting its use appropriately. Assessment in this course is not focussed on outputs which AI can help produce but instead looks to demonstration of your input to the research process, critical thinking and decision-making that AI cannot replace.

Engineering Thesis can be mentally taxing, so please seek help if you need it from your advisor, your family/ friends, and/or [Student Services](#).

## 2 Schedule

You are strongly encouraged to participate in all the learning activities outlined in Table 1 which shows only those weeks with a workshop or assessment due. They form part of the course assessment (see Section 4.7) and have been designed to ensure you maximise your marks.

ENGG7340: Attend those workshops marked with a double asterisk (\*\*\*) in your single semester.

*Table 1 Workshop Schedule*

Week	Semester 1 of enrolment	Semester 2 of enrolment
O-Week	<i>Podcasts: Welcome, Assessment, Safety</i>	-
1	<i>Workshop: Research skills/ Gen AI ***</i>	<i>Podcast: Welcome back</i>
2	<i>Workshop: Planning/ Proposal***</i>	-
3	<i>ENGG7340 only: Workshop: Interim Report (online); DUE: Proposal</i>	
4	<i>DUE: Proposal</i>	<i>Workshop: Thesis structure***</i>
7	<i>ENGG7340 only: DUE: Interim Report</i>	<i>Workshop: Seminar skills***</i>
8	<i>Workshop: Interim Report</i>	-
10	-	<i>DUE: Conference slides (Tuesday)</i> <i>DUE: Conference (Thursday – all day) ***</i>
11	-	<i>Workshop: Finishing the Thesis ***</i>
12	<i>Workshop: Finishing the Interim Report</i>	<i>DUE: Thesis</i>
13	<i>DUE: Interim Report</i> <i>ENGG7340 only: DUE: Thesis</i>	<i>DUE: Completed workshop templates</i>

**Check your timetable for dates/times and rooms.** Blackboard has links for workshop resources, and Turnitin.

### 3 Guidelines for success

#### 3.1 Workload

The hours indicated below provide a guideline for the time you should dedicate to Engineering Thesis. They are based on the UQ expectation that the study load for a #2 course is 10 h/week on average throughout the full semester<sup>1</sup>.

- ENGG4600/4601 (#4, 2-semester): 10 h/w for 30 weeks
- ENGG7340 (#4, 1-semester): 20 h/w for 14 weeks
- ENGG7341/7342 (#4, 2-semester): 10 h/w for 30 weeks
- ENGG7381/7382 (#8, 2-semester): 20 h/w for 30 weeks

**Engineering thesis requires a significant time commitment.**

“It is important to commence the activities of your project immediately at the start of the semester. In most projects, the available time of two semesters is barely sufficient to complete the work to achieve an outcome which you and your examiners will be happy with. The start of semester is the period when you will have the most time available to work on your thesis project, before assignments and mid-semester exams start demanding your attention in other courses.”

[Gates, J, 2021 ‘How to Succeed in your Thesis’ – Available on Blackboard]

#### 3.2 Time management

[Adapted from <https://www.monash.edu/rlo/graduate-research-writing/get-started/planning-and-time-management> ]

Use engineering tools (e.g. Gantt chart) to create a plan for the course. You know the drill:

- define your objectives – make them SMART<sup>2</sup>;
- define the longer-term tasks needed to achieve the objectives;
- split these into smaller chunks that are achievable in the short-term;
- identify those that are urgent and must be done at or by a particular time;
- set deadlines that match with course assessment due dates;
- plan meetings with your advisor to match with stages, drafts etc.;
- include life things such as work, holidays, and celebrations; and
- don’t forget other course assessment requirements.

Review and update your plan regularly. Learn from unrealistic expectations and adapt your plan accordingly.

#### 3.3 Your advisor relationship

##### 3.3.1 Responsibilities

**The thesis should be your individual work, with your advisor providing advice and guidance.** You are expected to drive all research phases whether the project has been developed by your advisor you, or industry. Table 2 gives some general details; these may need some nuancing depending on your situation.

<sup>1</sup> A ‘full semester’ includes the 13-week teaching period, mid-semester break, the revision period, and the 2-week exam period. As your thesis is submitted in Week 12, the final revision period and examination block have not been included.

<sup>2</sup> Specific, Measurable, Agreed, Resourced, Timed

*Table 2 Student/ Advisor responsibilities*

Phase	Student	Advisor
Confidentiality (if applicable)	Provide Advisor with legal agreements which detail requirements prior to Week 1 or as soon as practicable.	Advise School Manager re. UQ standard agreement or forward partner's legal agreements (allow up to 8 weeks if a non-UQ agreement is required).
Meetings	<b>Schedule at least six advisor meetings per semester of enrolment.</b> Devise the meeting agenda (Section 3.3.2). Keep records of these meetings.	Meet with student at least six times per semester; be available for other meetings upon request. (Keep a record.) Provide guidance as requested. Provide overall validation of student's work.
Planning (including use of generative AI)	Develop, implement, and update as necessary a project management plan for the research. Develop and discuss a plan for the use of generative AI tools.	Review project plan and advise on coverage and achievability. Ensure AI is to be used as a tool and not as a replacement for fundamental research steps (e.g., reading articles).
Risk analysis	Carry out a risk assessment, undertake necessary training and inductions, and define necessary contingency plans.	Review and approve risk assessments. Ensure training needs are met.
Equipment access	Schedule access to materials, critical equipment, technical staff, and other resources.	Provide access to materials, critical equipment, technical staff, and other resources.
Literature review	Identify and search relevant databases to find articles. Read and critically review source articles to synthesise a research-specific submission. Use generative AI tools to complement your work.	Provide seminal articles (where possible), and overall advice on directions.
Data collection/analysis	Generate raw data, analyse, and discuss interpretation/ presentation. Acknowledge use of generative AI and implement plan for critical use.	Provide guidance as necessary.
Oral presentation	Generate a draft for feedback. If possible, practice for advisor.	Provide feedback on draft presentation. Generate questions requiring meta-level thinking/ synthesis. Attend the conference.
Written reports	Generate drafts for feedback. Arrange <sup>3</sup> to meet with advisor (1 h) to obtain feedback on draft.	Be available for at least one draft review meeting per report. Provide feedback on drafts.

### 3.3.2 Meetings

**You must schedule at least six meetings with your advisor for each semester of enrolment. ENGG7340 students should schedule eight meetings in their single semester of enrolment.** This forms part of the course assessment, as your advisor is required to validate your involvement across the research.

You might consider creating a template for meetings with categories such as:

- meeting details: date, time etc.,
- agenda [complete before meeting],

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<sup>3</sup> Advisors will not provide detailed written feedback on draft reports. Instead, they will look over a draft with you and give you verbal feedback during a meeting of up to 1 h.

- progress/ achievements/ project management update [complete before meeting],
- issues/ concerns/ critical questions [complete before meeting],
- discussion points [complete during meeting], and
- actions: what, who, when by [complete during meeting].

The completed meeting record could be emailed to your advisor providing evidence of your work.

### 3.4 Readings and other resources

Area	Resource	Where to find it
The course	1. O-Week podcasts: Course overview, Assessment, Safety 2. Course profile	1. Blackboard (learn.uq.edu.au) – direct links from the course Learning Pathway  2. <a href="https://my.uq.edu.au/programs-courses/">https://my.uq.edu.au/programs-courses/</a>
Work, Health and Safety	1. Online training modules 2. Risk management database	1. Blackboard – Training courses 'UQ Workplace Inductions and OHS Training 2. <a href="https://www.riskcloud.net">https://www.riskcloud.net</a>
Time management	How to stop procrastinating	<a href="https://www.uopeople.edu/blog/your-productivity-guide-how-to-stop-procrastinating-in-college/">https://www.uopeople.edu/blog/your-productivity-guide-how-to-stop-procrastinating-in-college/</a>
Using the library	1. Accessing databases 2. Using UQ Library search 3. Evaluating literature 4. Materials, Mining, Metallurgy links 5. Mechanical and Aerospace links 6. Chemical links 7. Environmental Science links 8. Thesis library guide 9. Workshop schedule	1. <a href="https://www.youtube.com/watch?v=j0wSXIF8TAk">https://www.youtube.com/watch?v=j0wSXIF8TAk</a> 2. <a href="https://www.youtube.com/watch?v=RCX85YScJGQ">https://www.youtube.com/watch?v=RCX85YScJGQ</a>  3. <a href="https://www.youtube.com/watch?v=kMWcxhs8_F0">https://www.youtube.com/watch?v=kMWcxhs8_F0</a> 4. <a href="#">Materials, Mining and Metallurgical databases</a>  5. <a href="#">Mechanical and Aerospace databases</a>  6. <a href="#">Chemical Engineering databases</a> 7. <a href="#">Environmental Science databases</a>  8. <a href="#">Past Mechanical and Mining Theses</a> 9. <a href="#">UQL Training page</a>
Using generative AI tools	1. Digital essentials 2. AI in education	1. <a href="#">UQ AI Student Hub</a> 2. <a href="https://canvas.sydney.edu.au/courses/51655">https://canvas.sydney.edu.au/courses/51655</a>
Literature reviews	How to write a literature review	<a href="#">UQ Library literature review guide</a>
Referencing	1. Referencing video 2. Referencing module 3. APA referencing guide 4. How to get Endnote	1. <a href="https://www.youtube.com/watch?v=uCoFBMzdK0c">https://www.youtube.com/watch?v=uCoFBMzdK0c</a> 2. <a href="#">Write, Cite and Submit</a> 3. <a href="#">APA 6<sup>th</sup> - APA 7<sup>th</sup></a> 4. <a href="https://www.youtube.com/watch?v=lEVepz37cY8">https://www.youtube.com/watch?v=lEVepz37cY8</a>

## 3.5 Generative AI

### 3.5.1 Why am I using AI?

Artificial intelligence has fundamentally transformed engineering practice.

Whether you pursue a career in industry or research, you will work with AI tools that assist with design optimisation, data analysis, simulation, and technical documentation. The question is not whether you use AI in your career, it's whether you can use it effectively, ethically, and critically. Therefore this course requires you to develop the ability to direct AI tools, validate their outputs, and maintain engineering rigour while leveraging their capabilities. Learning to work with AI during engineering thesis prepares you for the reality of modern engineering practice where these technologies are standard tools – just as CAD, finite element analysis, and programming languages have become essential.

You might be concerned that mandatory AI use will diminish the value of your own research and thinking. This concern is understandable but reflects a misunderstanding of how AI is integrated into this course. AI will not replace you – you remain the engineer making critical decisions, designing experiments, interpreting results, and drawing conclusions. Instead, AI will serve you as a productivity tool for time-consuming tasks that don't require human insight, allowing you to focus more time on the substantive intellectual work of your thesis.

Examples of appropriate AI use as a productivity tool that preserve your intellectual contribution include:

- Literature synthesis: Use AI to summarise papers. You critically evaluate which sources are relevant, identify gaps in the literature, and determine how the research findings fit together to underpin your research.
- Data visualisation: Generate initial plots and charts with AI. You decide which visualisations best communicate the findings and work with AI to improve them.
- Code debugging and optimisation: Use AI to suggest fixes for syntax errors or optimise algorithms. You design the overall analysis approach and validate outputs.
- Proofreading and grammar: Use AI to identify spelling, grammar, and clarity issues. You ensure technical accuracy, structure the narrative, and maintain your voice and style.
- Method refinement: Prompt AI to identify potential weaknesses in your experimental design, suggest alternatives, or provide an initial framework. You make the final decision about methodology, justify your choices, and refine as necessary through the course of your research.
- Background research: Ask AI to explain unfamiliar concepts or standards. You verify the information, discuss with your advisor, and determine how move to the cutting edge.
- Calculation verification: Use AI to cross-check complex calculations. You set up the problems and validate that the approach and assumptions are appropriate

In each case, the engineering judgement, critical thinking, and decision-making are entirely yours. AI simply accelerates routine tasks, giving you more time for the intellectual work that defines engineering research.

### 3.5.2 Copilot

UQ has partnered with Microsoft to give you free access to Copilot – a secure generative AI tool that uses GPT-4 to generate text responses and DALL-E 3 to generate images.

It's important that you always [log in with your student UQ email](#) whenever you use Copilot to ensure you're using the University's 'protected' version of the tool. Using Copilot in the protected mode<sup>4</sup> means your inputs are confidential, anonymised and not stored or used for training purposes, so the risk of confidential information (i.e., your research IP) leaking is reduced. However, you should never upload any personal or sensitive information (e.g., your birthdate, health information, etc.).

### 3.5.3 Technical verification of AI outputs (Anthropic, 2025)

When using AI tools for technical engineering work, apply these strategies:

a) Validate mathematical and physical outputs

- Check dimensional consistency in equations
- Verify that results fall within physically realistic bounds and that solutions are not impossible (e.g., efficiencies >100%)
- Confirm conservation laws and basic physical principles are not violated
- Cross-reference with known cases and/or handbook values
- Check with order-of-magnitude estimates

b) Check for common AI technical errors

- Incorrect unit conversions or inconsistent units
- Misapplication of engineering principles
- Outdated technical standards
- Oversimplified assumptions that ignore critical factors

c) Use engineering judgement

- Assess if the solution makes practical sense
- Consider constructability and implementation
- Test edge cases and boundary conditions
- Evaluate safety margins and risk factors

d) Document all assumptions, simplifications and/or approximations made by AI

### 3.5.4 Reducing hallucinations

AI tools can generate plausible sounding but incorrect information. To minimise this, explicitly prompt the tool to stick to the facts and acknowledge when it's uncertain about something. Effective prompts include:

- Please search for current data and cite your specific sources.
- Only include statistics and claims that you can link to their original sources and give the date and source.
- If you can't find reliable data, please say so rather than estimating.
- Prioritise peer-reviewed sources, and data from government and established organisations.
- Let me know if sources seem outdated or if you're finding conflicting information.
- If you find limited information on a topic, tell me about the gaps..

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<sup>4</sup> To make sure you're in the correct mode, locate the University of Queensland logo in the top left corner and a green "Protected" badge next to the sign-in credentials in the top right corner of your browser.

## 4 Assessment

### 4.1 Academic Integrity

#### 4.1.1 Overview

**Plagiarism is a serious offence;** should it be identified in any of your submissions, your work will be referred to an integrity officer as per [UQ Policies and Procedures](#).

If you are unsure what plagiarism constitutes and how to ensure that you maintain academic integrity, then revisit the compulsory online [Academic Integrity Tutorials](#) and/ or discuss with your advisor.

All written assessment will be submitted through Turnitin. In this course, Turnitin has been set up so that you can see the Originality Report and to allow you to resubmit should you find unreferenced work. Be warned that after your initial submission, Turnitin takes 24 h to release an updated report.

#### 4.1.2 Generative AI and Machine Translation (MT)

The use of Generative AI and Machine translation (MT) must be acknowledged using the appropriate template for each of the course submissions; these templates can be found in the Blackboard 'Assessment' folder.

Although Generative AI is allowed to be used for this course, it must not be used without acknowledgement, verification, and appropriate consideration. Table 3 provides some guidelines for its use.

*Table 3 Guidelines for the use of generative AI as a tool*

Research phase	Potential tool usage	Your responsibility
Research Development	<ul style="list-style-type: none"><li>exploring potential research questions and refining scope</li><li>identifying knowledge gaps through literature review</li><li>brainstorming methodological approaches</li></ul>	<ul style="list-style-type: none"><li>critical evaluation of AI suggestions</li><li>justification of chosen approach</li></ul>
Literature Review	<ul style="list-style-type: none"><li>synthesising themes across multiple papers</li><li>identifying connections between works</li></ul>	<ul style="list-style-type: none"><li>verify accuracy</li><li>read key papers</li><li>demonstrate understanding</li></ul>
Research Execution	<ul style="list-style-type: none"><li>experimental design assistance</li><li>code development and debugging</li><li>data analysis suggestions</li></ul>	<ul style="list-style-type: none"><li>validate methods</li><li>verify results</li><li>ensure reproducibility</li></ul>
Writing and Communication	<ul style="list-style-type: none"><li>all aspects: structure, content, flow</li><li>editing, proofreading, formatting</li><li>preparing presentations</li></ul>	<ul style="list-style-type: none"><li>ensure accuracy of technical content</li><li>maintain coherent argument</li></ul>

## 4.2 Proposal (10%, Due: Thursday Week 4 of your 1<sup>st</sup> semester of enrolment)

[ENGG7340: 12%, Due Thursday Week 3]

### 4.2.1 Rationale

Success in Engineering Thesis requires you to be self-directed in terms of both your research and your management of the project itself.

The Proposal requires you to work with your advisor, and leverage available tools including generative AI, to clearly define your thesis topic, propose research questions, identify how you will answer the questions, and indicate the outcomes you expect. While AI can assist with aspects like literature synthesis and project planning, you must demonstrate your critical thinking in research design, evaluation of AI outputs, and decision-making about methodology.

This proposal will form the basis of your research project and your work over the period of the course. You'll also develop and document strategies for effectively using AI throughout your research while maintaining research integrity and proper verification processes.

Some of the work that forms part of your Proposal (e.g., background, context, research questions etc.) may be useful in the Interim Report and possibly in the Final Report. The AI planning and documentation frameworks you develop will also guide your use of AI tools throughout the course.

Note that the Proposal is not binding. You may update and refine your research direction (including your thesis title) throughout the course as your research progresses. Please email any change of thesis title to [studentenquiries@mechmining.uq.edu.au](mailto:studentenquiries@mechmining.uq.edu.au).

### 4.2.2 Proposal template

This submission uses a template to ensure that you address all aspects of planning for the research, orientate yourself to the field of study, and thus are best prepared to manage the research project.

You will find the template for the Proposal on Blackboard in the assessment folder; a partially completed template that shows you what is required can be found in Appendix A. In addition, the second workshop has been designed to take you through the completion of this first submission.

### 4.2.3 Marking

The Proposal will be marked by your thesis advisor using the rubric shown in Table 4.

Table 4 Rubric for Proposal

	<b>0 None</b>	<b>1 Very poor</b>	<b>2 Poor</b>	<b>3 Satisfactory</b>	<b>4 Good</b>	<b>5 Very good</b>
<b>Introduction (20%)</b>	Misssing	No clear context or poorly synthesised information. Literature engagement superficial. Missing terms, definitions incorrect. Gap not identified.	Limited context. Some literature but connections unclear. Some key terms undefined or poorly explained. Gap identified but justification weak.	Adequate context with relevant literature and basic synthesis. Key terms defined adequately. Gap clear with basic justification.	Clear context. Good synthesis of well-chosen sources. Clear definitions of all terms. Well identified gap, strong justification.	Excellent context with insightful integration of literature. Comprehensive precise definitions. Insightful gap ID, compelling justification, deep understanding.
	Misssing	RQs vague or misaligned. Outcomes missing or unrealistic.	RQs basic - limited scope. Outcomes limited or poorly aligned.	RQs clear and aligned with gap and with clear outcomes.	Well-crafted RQs. Well-defined achievable outcomes.	Excellent RQs. Comprehensive outcomes, perfect alignment.
	Misssing	Unclear boundaries. Too broad/narrow for course credit units.	Basic boundaries. Somewhat misaligned with course credit units.	Clear boundaries defined. Appropriate for course credit units.	Well-defined boundaries. Well-matched to course credit units.	Excellent boundaries with clear rationale and understanding of course units.
	Misssing	Methods don't match RQs. Insufficient detail. Unfeasible.	Poor alignment with RQs. Basic details. Questionable feasibility.	Methods align with RQs. Adequate details. Feasible.	Good alignment with clear rationale. Clear feasibility.	Perfect alignment, comprehensive rationale. Highly feasible.
<b>Timeline (15%)</b>	Misssing	Tasks missing. No milestones.	Basic task list with some sequencing. Few milestones identified.	Clear task sequence with relevant milestones. Key external commitments identified.	Well-structured timeline with appropriate milestones. Integrated external commitments.	Comprehensive timeline, clear dependencies, excellent planning. Includes all commitments/contingencies.
<b>ENGG7340 only</b>	Gantt chart missing	Chart missing resources/contingencies.	Limited resources/contingencies.	Basic resources/contingencies.	Workable Gantt chart.	Comprehensive Gantt chart.
<b>Risks (10%)</b> <b>ENGG7340 only</b>	Misssing	Many missing areas.	Limited risk identification.	Key risks identified.	Comprehensive identification.	Excellent analysis.
	Risk matrix missing	Many missing areas in risk matrix.	Limited mitigation strategies.	Basic matrix/ mitigation strategies.	Clear matrix/ mitigation strategies	Robust matrix, detailed mitigation strategies.
<b>Generative AI planning (10%)</b>	Misssing	No clear plan for AI use.	Basic plan for AI use. Limited consideration, overall.	Clear plan for AI documents & attribution. Clear quality control process defined.	Well-developed integrity framework & verification processes.	Excellent framework with comprehensive documentation plan.
<b>AI document- ation (5%)</b>	Misssing	No documentation. Prompts missing. No verification.	Limited documentation. Limited verification.	Clear documentation of tools used. Clear verification. Some critical thinking.	Well documented rationale/ usage and verification. Good critical thinking.	Excellent documentation with clear verification, excellent critical thinking.

### 4.3 Interim report (15%, Due: Thursday Week 13 of your 1<sup>st</sup> semester of enrolment)

[ENGG7340: 13%, Due Thursday Week 7]

#### 4.3.1 Rationale

The Interim Report is an important stage gate. It provides you with a place to evaluate your progress, and to begin to pull together some of the elements (see i, ii, iii, and vi below) that are required for your thesis (Final Report).

The elements of the Interim Report are:

- i. an executive summary,
- ii. a clear definition of the thesis topic including the purpose, aims/ research questions, coverage and relevance of the research project,
- iii. a review of relevant background material that supports your research (i.e., a literature review),
- iv. a refined methodology,
- v. a project plan for your second semester including the use of generative AI  
[ENGG7340: updated Gantt chart from the Proposal],
- vi. a finalised risk management plan, and  
[ENGG7340: not required]
- vii. a table of contents for your thesis.

The Interim Report is a place for you to demonstrate initiative, creativity, and problem-solving skills as well as project management skills. Your critical and ethical use of generative AI responses must also be clearly demonstrated.

You should receive detailed feedback from your advisor on the Interim Report which should give you a head start when it comes to writing your thesis.

All background and related material should be in your own words, appropriately referenced, and included in the reference list. This includes responses from generative AI.

#### 4.3.2 Structure

The Interim Report should be around 15 pages but not more than 20 pages not including front matter, references, and appendices.

Your report should use the Interim Report template that can be found in the assessment folder on Blackboard; Appendix B has a partially complete template with instructions. The template can be expanded to incorporate additional chapters as necessary.

#### 4.3.3 Writing and grammar

As a UQ student, you have access to professional writing assistance tools including GitHub, Copilot, and Grammarly. You are expected to use these tools to ensure your Interim Report meets professional engineering standards for written communication. While these tools can help identify spelling, grammar, and syntax issues, you remain responsible for reviewing and validating all suggestions to maintain technical accuracy and clarity. Your report should be polished and professional.

#### 4.3.4 Marking

Failure to appropriately acknowledge the work of others is plagiarism and will be treated as academic misconduct. Should plagiarism be detected, a misconduct allegation will be issued to you.

The Interim Report will be marked by your thesis advisor using the rubric shown in Table 5.

*Table 5 Rubric for Interim Report*

	0 None	1 Very poor	2 Poor	3 Satisfactory	4 Good	5 Very good
Research Foundation & Problem Definition (20%)	Missing	Problem definition vague. Research questions (RQs) lack specificity. Limited understanding of scope.	Problem definition, RQs, and scope defined but need refinement.	Clear RQs with well-defined scope. Impact and relevance clearly stated.	Sophisticated problem definition with innovative approach. RQs and scope show deep insight. Clear potential for significant contribution.	Exceptional problem formulation. RQs address clear knowledge gaps. Scope shows sophisticated grasp of constraints and opportunities. Compelling case for impact.
Critical Literature Analysis & Synthesis (25%)	Missing	Sources limited/poorly integrated. Little evidence of critical evaluation. AI-assistance poorly reported.	Basic synthesis of sources with some critical analysis. AI-assisted research documented but verification limited.	Good integration of sources with clear critical analysis. AI-assisted research well documented with appropriate verification.	Strong synthesis showing independent thinking. Excellent integration of AI and traditional research methods with robust verification.	Outstanding critical analysis and synthesis. Masterful integration of AI and traditional methods. Clear evidence of independent scholarly contribution.
Preliminary Results & Method Refinement (25%)	Missing	Minimal progress shown. Methods poorly justified.	Basic progress with some method refinement.	Clear progress with well-justified methods.	Strong progress with sophisticated method refinement. Excellent initiative shown.	Exceptional progress with innovative approaches. Outstanding initiative shown.
Project Planning, Risk Management & AI-use (20%)	Missing	Timeline unrealistic/not resourced. Limited risk assessment. Process/report for AI-use poor.	Basic timeline with identified resources. Simple risk assessment. Process/report for AI use basic.	Realistic timeline with well-identified resources. Good risk assessment and mitigation strategies. Clear process/report for AI use.	Comprehensive timeline with detailed resources. Strong risk assessment and mitigation. Sophisticated AI use process/report.	Exceptional project planning showing deep understanding. Comprehensive risk management. Innovative and ethical AI use process/report.
Narrative & Presentation (10%)	Report illegible.	Presentation unprofessional. Structure very poor. No executive summary.	Structure detracts from content. Engineering communication standards not used. Much editing required. Poor	Acceptable structure and executive summary. Some editing necessary before submission to external	Logical structure. Professional presentation using appropriate engineering communication standards. Minimal editing needed. Good	Excellent logical structure and executive summary. Report could be submitted to external client without editing.

			executive summary.	client.	executive summary.	
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## 4.4 Presentation (10%, Due: Thursday Week 10 of your last semester of enrolment)

### 4.4.1 Rationale

As an engineer you must be able to communicate your ideas and findings in both written and oral formats. You will therefore present your research at the Mechanical and Mining Engineering Student Conference in the final semester of your project.

### 4.4.2 Structure

Your seminar should outline the aim(s) of the project, existing knowledge, the approach you have taken, results to date and their interpretation, conclusions, and what remains to be done. You will need to explain your technical achievements and put them into context.

We suggest the following narrative:

- Introduction: context, relevance, gap & research questions (2-3 slides)
- Methods (1 slide)
- Main results (3 slides)
- Conclusions and recommendations for future work (1 slide)

To achieve high marks for the presentation, we strongly recommend that you:

- do not read a written speech;
- do not memorise your speech<sup>5</sup>;
- make your talk interesting for all disciplines; and
- engage with the audience.

The Student Conference is run in parallel sessions with 10 minutes of presentation and 5 minutes of Q&A per student. The Chair will ask you to stop for questions at the end of 10 mins, whether or not you have finished.

All presentations must be uploaded onto Blackboard on Tuesday of Week 10. This allows us to have the sessions pre-prepared and run in a timely fashion.

### 4.4.3 Generative AI

As Generative AI can script your presentation and produce PowerPoint slides, marks will not be awarded for these aspects. The seminar workshop will cover the prompts and platforms that are available for you to do this.

Instead, your presentation will need to demonstrate your ability to engage with the audience and to answer questions on the work that you have undertaken in the course. You will be expected to have a deep understanding of the topic and explain your initiative, process, and critical insights.

The Q&A part of your presentation will therefore be integral to your marks as this cannot be undertaken using generative AI.

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<sup>5</sup> Instead practise at least seven times – in front of the mirror, in front of family and friends, and on your way to the event. Don't worry about using different words or forgetting things – the audience won't know. You can use your PowerPoint to remind you where you're at but don't fill it with bullet points and words.

#### 4.4.4 Marking

**Conference attendance is compulsory for all students; you must attend all sessions and not just the session that you will present at. Failure to attend all sessions in the stream to which you are allocated<sup>6</sup>, will result in 0 marks for this item of assessment even if you present in your seminar.**

The marking criteria emphasise your understanding rather than presentational polish as the latter can be generated by AI. Your advisor (or their delegate) will ask questions that require you to synthesise information beyond prepared content to verify your depth of understanding. You may also be asked questions that ask you to reflect on your research process.

Your presentation will be marked by your advisor and the second thesis marker per the rubric shown in Table 6. Their marks will be averaged.

*Table 6 Rubric for Presentation*

	0 None	1 Very poor	2 Poor	3 Satisfactory	4 Good	5 (Excellent)
<b>Professional communication (30%) Engages with audience and keeps attention.</b>		Heavy reliance on slides/notes. Minimal eye contact/poor volume. Explanations not adapted or not clear (inc. diagrams in slides) for multi-disciplinary audience.		Natural delivery with good audience connection. Technical content well-adapted for audience. Active listening evidence in Q&A session.		Outstanding presence and engagement. Expertly manages technical depth while maintaining accessibility (inc. scientific diagrams in slides). Creates connection with audience.
<b>Mastery of subject matter (20%) Demonstrates deep disciplinary and research knowledge.</b>		Superficial understanding of concepts. Unable to explain technical aspects. Audience not apprised of research coverage.		Clear understanding of core concepts. Technical explanations mostly clear. Fair coverage of work to date.		Deep understanding of technical concepts. Ability to explain complex ideas clearly. Excellent coverage of work that has been done.
<b>Critical thinking (20%) Reflects on outcomes, methods, &amp; significance of findings to date.</b>		Limited evidence of independent thought. Minimal insight.		Evidence of independent analysis. Thoughtful discussion of implications.		Original insights clearly demonstrated. Sophisticated analysis of implications/broader impact.
<b>Q&amp;A (30%) Answers knowledgeably and respectfully</b>		Unable to address questions effectively. Answers not meaningful to audience.		Good responses showing clear understanding of content. Answers meaningful.		Exceptional handling of questions. Clear, meaningful and authoritative answers.

<sup>6</sup> If there are medical or other acceptable reasons for your absence, submit an exemption/ extension request via my.UQ.

## 4.5 Final Report (60%, Due: Thursday Week 12 of your 2<sup>nd</sup> semester of enrolment)

[ENGG7340 Due Thursday Week 13]

### 4.5.1 Rationale

The Final Report or thesis is the main assessment component in this course. The contents and structure of the thesis will depend on your Thesis Topic.

This is the report that you might show to prospective employers as evidence of your ability to manage a project and communicate in a professional and scientific manner. We therefore recommend that you apply yourself to producing this document to a very high standard.

### 4.5.2 Structure

As a guide, the Final Report should be 50-70 pages long (excluding front matter, references and Appendices).

For the general format and submission guidelines, see [Project or Thesis Submission](#). There are also a number of thesis writing resources on Blackboard that you are encouraged to read and engage with.

The Report format is flexible, but the following items are expected to be included:

- **Title page** (including thesis title, advisor etc.)
- **Executive summary (Abstract)**  
A summary of the entire thesis containing approximately 1 paragraph each on: background (including supporting literature), research questions/ aims, methods, results, conclusions, and recommendations.
- **Introduction**  
Include a number of sections that give: a clear definition of the topic, relevance and scope of the research, research questions/aims, outcomes/impact, and a roadmap to the thesis.
- **Literature review**  
Cover background theory, and a review of prior research where applicable. The literature review should support the aims and directions of the research. This section does not need to be called 'Literature review' but instead can be titled something that supports your research (e.g. '2. Material X: current and potential uses'), and it may be split into more than one section (e.g. '3. Common materials used in the manufacture of Y').
- **Methods (or Experimental Design)**  
This section should detail the methods that you use for both data collection and analysis such that the reader could reproduce your findings. It must also show how AI has been used in the research process with evidence of verification procedures.
- **Results**  
What your method/ experiments found, including a clear distinction between AI-assisted and independent work, and evidence of critical evaluation of AI outputs.
- **Analysis of results (or Discussion)**  
What do the results mean? Remember that if the research hasn't resulted in a positive outcome, you will need to explain why this happened, and in recommendations, you can document where the next researcher should devote their efforts. You should include a sensitivity analysis where you look at the effect of changing your assumptions (e.g. +/- 10%) on your outcomes.

- **Conclusions and recommendations**  
The conclusions should summarise your analysis and refer back to your research questions – were they answered. Recommendations as to the next tranche of research should also be made.
- **References**  
The report must demonstrate appropriate referencing and include a correctly formatted reference list.
- **Appendix A: Documentation of generative AI use**  
A template has been provided for this appendix. It is part of the thesis submission cover page pro-forma: see [Project or Thesis Submission](#).
- **Other appendices**  
As necessary.

#### 4.5.3 Writing and grammar

As a UQ student, you have access to professional writing assistance tools including GitHub, Copilot, and Grammarly. You are expected to use these tools to ensure your Final Report meets professional engineering standards for written communication. While these tools can help identify spelling, grammar, and syntax issues, you remain responsible for reviewing and validating all suggestions to maintain technical accuracy and clarity. Your report should be polished and professional.

#### 4.5.4 Marking

Failure to appropriately acknowledge the work of others is plagiarism and will be treated as academic misconduct. Should plagiarism be detected, a misconduct allegation will be issued to you.

The Final Report will be marked using the rubric shown in Table 6 by your advisor and by an independent second marker. Your final mark will be an average of the two marks.

The rubric will be used with the following caveat that considers your responsible and acknowledged use of generative AI. Each criterion will be evaluated based on evidence of original thinking, critical analysis, and your ability to articulate and justify your decisions. While AI tools may assist in tasks like literature review and writing, the emphasis is on your demonstration of higher-order thinking skills and research synthesis abilities.

Table 7 Rubric for Final Report

	0 None	1 Very poor	2 Poor	3 Satisfactory	4 Good	5 Very good
<b>Abstract, thesis definition and scope (15%)</b>	Missing	<p>Thesis topic and scope very unclear.</p> <p>Research context and relevance not established.</p> <p>Very poor executive summary (abstract); no structure evident.</p>	<p>Poor or incomplete definition of thesis topic and scope with limited critical framing.</p> <p>Executive summary (abstract) is poorly structured/not clear about the</p>	<p>Satisfactory definition of thesis topic, problem, and scope.</p> <p>Some strategic thinking in research positioning.</p> <p>Executive summary (abstract) satisfactorily captures the thesis topic and outcomes.</p>	<p>Good definition of thesis topic, problem (inc. purpose and relevance) and strategic scope (inc. context, boundaries &amp; assumptions).</p> <p>Structured executive summary (abstract) accurately captures thesis</p>	<p>Excellent, clear definition of thesis topic, problem (inc. purpose and relevance) and strategic/ insightful scope.</p> <p>Exceptional framing of research within broader context.</p> <p>Excellently structured exec summary (abstract) accurately yet concisely captures thesis topic,</p>

			thesis topic and its outcomes.	Structure could be improved.	topic, methods, and outcomes.	methods, outcomes, and relevance.
<b>Background (15%)</b>	Missing	<p>Very limited coverage of background material.</p> <p>Lack of understanding of the material in the topic area apparent.</p> <p>No critical evaluation of sources.</p> <p>Little to no synthesis evident.</p>	<p>Limited coverage of background material and/or missing specific research or relevant theory.</p> <p>Flaws in basic understanding of material in topic area evident.</p> <p>Sources presented without evaluation of reliability.</p> <p>Limited synthesis evident.</p>	<p>Acceptable coverage of background material (inc. specific research and relevant theory).</p> <p>Shows basic understanding of the material.</p> <p>Some evaluation of source reliability.</p> <p>Further critical thinking and synthesis is required.</p>	<p>Relevant, logically-organised review, analysis, and discussion of background material (inc. specific research and relevant theory).</p> <p>Questions existing literature effectively.</p> <p>Demonstrates a good grasp of material in topic area, and ability to synthesise knowledge with strong critical analysis of sources.</p>	<p>Comprehensive, focused, logically-organised review, and discussion of relevant background material with sophisticated critical analysis including source reliability.</p> <p>Effectively challenges and extends existing literature.</p> <p>Demonstrates clear mastery of the material in the topic area and ability to synthesise and abstract knowledge.</p>
<b>Methodology (inc. data collection and analysis method) (20%)</b>	Missing	<p>Very low volume of work.</p> <p>Methodology shows very little understanding of the field and/or research.</p> <p>No justification of choices or analysis methods.</p> <p>Data collection scarce.</p>	<p>Volume of work much less than expected given course credit units.</p> <p>Methodology shows flawed understanding and little application of background research and may be incomplete, unclear or not reproducible.</p> <p>Little discussion of limitations.</p> <p>Data collection patchy.</p>	<p>Volume of work only just commensurate with course credit units.</p> <p>A reasonably reproducible methodology flows from background research. Some analysis of alternatives included.</p> <p>Satisfactory data collection.</p> <p>Basic discussion of limitations, assumptions, and choices.</p>	<p>Volume of work slightly exceeds course credit units.</p> <p>A clearly set out &amp; reproducible and justified methodology flows from background research.</p> <p>Approach shows innovation and includes an evaluation of alternative approaches.</p> <p>Good data collection.</p> <p>Thorough discussion of limitations and assumptions.</p>	<p>Volume of work exceeds that commensurate with course credit units.</p> <p>Methodology is innovative, detailed, clearly set out and reproducible.</p> <p>Approach highlights creativity and innovation, and includes an evaluation of alternative approaches.</p> <p>Comprehensive data collection. Sophisticated understanding of limitations and assumptions.</p>

<b>Results (inc. data analysis) (15%)</b>	Missing	There are major analytical errors.  No handling of unexpected results.	Analysis shows limited comprehension and poor/ incomplete practices.  There may be some major errors in concepts or analysis.  Limited refinement of approach.	Analysis shows reasonable comprehension of the work and research practices. Some reference to background knowledge. Satisfactory handling of unexpected results and approach refinement.  There are no major errors in concepts or analysis.	Analysis is detailed and demonstrates good understanding of research practices. Background knowledge underpins analysis.  Clear evidence of iterative refinement.  No errors in concepts or analysis.	Attention has been given to detail. Analysis demonstrates mastery of research practices, & shows application of knowledge gained from background.  No errors in concepts or analysis. Mastery of analysis techniques evident with iterative adaptation.
<b>Interpretation of results (inc. discussion, conclusion, and recommendation) (25%)</b>	Missing	Little/ no attempt to answer research questions.  Very poor review of work and no real comprehension demonstrated.  No connection to existing knowledge.  Thesis fails to explain what was achieved.	Many research questions are not addressed.  Limited or no new knowledge evident – significance of outcomes not stated.  Poor or missing sensitivity analysis, summary of outcomes, and/ or recommendations.	Most research questions are addressed.  Some new knowledge but limited insight into result significance.  Sensitivity analysis provides some elucidation. Satisfactory conclusion and recommendation sections included.	Research questions answered.  New knowledge generated with good integration with existing knowledge and some insight into significance of results.  Includes good sensitivity analysis, clear summary of outcomes, and recommendations for future work.	Research questions insightfully answered showing deep synthesis.  New/ impactful knowledge clearly shown.  Includes: comprehensive sensitivity analysis, clear concise summary of outcomes, and recommendations for continuation/ improvement of the research.
<b>Narrative &amp; Presentation (10%)</b>	Report illegible.	Physical presentation unprofessional.  No narrative evident.	Structure detracts from content. Narrative and argument patchy.  Poor use of engineering communicatn standards.  Much editing required.	Acceptable structure and physical layout.  Narrative mostly cohesive with acceptable argument.  Some editing necessary to be publishable.	Narrative cohesive, structure logical, and argument coherent. Professional presentation using appropriate engineering communication standards.  Minimal editing needed.	PUBLISHABLE!  Excellent logical structure with a fully cohesive narrative that presents a holistic argument.

## 4.6 Thesis Project Execution (5% + Hurdle, Considered across the course)

### 4.6.1 Rationale

Engineering Thesis is a year-long course<sup>7</sup> that is largely self-directed in terms of both the research that you undertake, and the management of the research project. It is pitched at honours-level (i.e., 4<sup>th</sup> year) or higher and has a unit value higher than an average course – it will therefore not be easy and will require significant input from you. Thesis Project Execution is a measure of that input, awarding marks for your initiative, progress, and learning through the year.

The Thesis Project Execution mark also serves as validation that you have been responsible for the research and have taken a critical role in synthesis of ideas, results, and generative AI assistance. It will therefore be measured through meetings with your advisor, assessment submissions, and your responses to feedback. Per section 3.3.2, you must have a minimum of six meetings per semester with your advisor – eight meetings for ENGG7340 students – where your involvement with the research will be validated.

If you fail the validation mark, you will fail the course.

The mark that you achieve for Thesis Project Execution is another piece of evidence that you can submit to a prospective employer as it demonstrates your initiative, motivation, and ability to manage a project.

### 4.6.2 Marking

Thesis Project Execution will be marked by your advisor using the rubric shown in Table 8. There is also a Pass/ Fail element that serves as validation of your efforts and ascertains that generative AI was used responsibly and critically (Table 9).

Table 8 Rubric for Thesis Execution (5%)

	0 None	1 Very poor	2 Poor	3 Satisfactory	4 Good	5 Very good
<b>Ability to Start Research, First Sem (25%)</b>	No work done.	Student did not achieve much in first half of research. Scant preliminary results were produced.  Submissions were late and/or quality suffered due to lack of effort.	Advisor was required to prompt student several times to get work started. This delayed starting research. Very limited prelim results produced.  Submissions late or rushed.	Student was able to get research underway early with some prompting. A satisfactory volume of prelim results was produced. Submissions may have been a little rushed.	Input from student from start of research resulted in it being initiated very well with a good volume of preliminary results.  All submissions timely.	Student took charge of research from first week with outcomes starting to be developed early in research and excellent preliminary results.  All submissions timely.
<b>Ability to complete research, Second Sem (25%)</b>	No work done.	No evidence of time-management on part of student resulting in research aims not being achieved.	Student relied too much on help from advisor and other contributors to research. Poor planning and/or poor time	Student completed most planned tasks. However, some deficiencies in planning could have been avoided. Some	Student completed research tasks in a timely manner. A minor number of tasks were rushed but overall very good time	Student completed research tasks as planned in a considered/timely manner inc. compilation of thesis without needing to rush. Excellent project-

<sup>7</sup> ENGG7340 is semester long.

			management resulted in some research aims not being achieved.	tasks rushed and research quality may have suffered consequently.	management was observed with no input required from the advisor.	management skills evident and no intervention required from advisor.
<b>Initiative (25%)</b>	None	Very little volume of work.	Volume of work much less than expected given course credit units.	Volume of work is commensurate with course credit units.	Volume of work slightly more than course credit units. Research approach, execution of work, and outcomes were for most part student's own. Clear evidence of original thinking and critical analysis. Student given a brief (or developed a brief) and took research from there with minimal input from advisor.	Volume of work exceeds that commensurate with course credit units.
		Very limited or no initiative demonstrated by student during research project.	Student demonstrated limited initiative throughout research.	Initiative for research approach, execution of work, and outcomes came in equal part from student and advisor.	Research approach, execution of work, and outcomes were entirely student's own.	Sophisticated original thinking/critical analysis.
		No evidence of original thinking.	Minimal evidence of critical engagement with research process.	Some evidence of critical thinking in research synthesis.	Student was given a brief (or developed a brief) and took research from there.	Student was given a brief (or developed a brief) and took research from there.
<b>Relationship with advisor (25%)</b>	None	Student did not respond to advisor communication.	Meetings run by advisor with little input from student.	Student meetings usually run with advisor in charge.	Student well prepared for most meetings with relevant questions.	Student well prepared for all meetings with relevant questions.
		Drafts for advisor comment/feedback not produced.	Student mostly did not respond to advisor communication.	Student communication with advisor satisfactory.	Student communicated with advisor as necessary, using correct communication channel, ensuring that neither party's time was wasted.	Student communicated with advisor as necessary, using correct communication channel, ensuring that neither party's time was wasted.
		Student unable to validate their research contributions or explain their methods.	Drafts for advisor comment/feedback rarely produced.	Some meetings unnecessary or missed.	Most feedback from advisor, taken on board.	Feedback from advisor taken on board as appropriate.
		Advisor constantly concerned regarding student progress.	Limited ability to discuss research decisions.	Feedback occasionally not heeded.	Strong understanding of research decisions.	Exceptional ability to explain/justify research choices.
			Advisor somewhat concerned regarding student progress.	Drafts for advisor comment/feedback rushed or incomplete.	Drafts for advisor comment/feedback mostly produced in timely manner.	Drafts for advisor comment/feedback produced in a timely manner.
			Can explain most research decisions and methodology choices.	Advisor occasionally concerned regarding student	Advisor never concerned regarding student	Advisor never concerned regarding student

			progress.	progress.	progress.
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*Table 9 Thesis Execution validation (Pass/Fail)*

The student:	
a) demonstrated understanding of their research direction and methodology choices and was able to explain the rationale behind key decisions.	Yes/ No
b) showed evidence of iterative development in their work, incorporating feedback and demonstrating how their thinking evolved in response to new information.	Yes/ No
c) engaged in spontaneous, discussions that reflected genuine understanding.	Yes/ No
d) was transparent about their use of AI tools and clearly articulated which components of the work represented their original thinking.	Yes/ No
<b>A pass requires all questions to be answered with 'Yes'.</b>	<b>Pass/ Fail</b>

If your advisor fails to validate your input per Table 9, you will need to provide evidence of why you should pass the course to the Course Coordinator. This evidence could take the form of minutes from your advisory meetings, copies of draft documents at each iteration, email communications, entries to the UQ Research Data Manager (RDM) etc.

Note that if, at any stage, you feel that you are not receiving adequate support from your advisor, you should contact the course coordinator ([I.kavanagh@uq.edu.au](mailto:I.kavanagh@uq.edu.au)) as soon as possible.

## 4.7 Workshop Completion (Grade cap, Week 13<sup>8</sup> of final semester)

### 4.7.1 Rationale

This course can be considered the culmination of your degree program. Your final thesis should be of such quality that you would be proud to share it with a would-be employer as testament to your excellent research, project management, and communication skills. Indeed, it should help you nail getting that job.

Therefore, to ensure that you understand what is required to produce a quality thesis, seven workshops are offered; they target the key submissions.

Table 10 Workshop overview

Mode	Content
Podcast	Welcome! (An overview of the course)
Podcast	Assessment details
Podcast	Getting access to your laboratory
Workshop 1	Research skills/ Generative AI
Workshop 2	What should be in the Proposal
Workshop 3	What should be in the Interim Report (ENGG7340 self-paced online)
Workshop 4	Finishing the Interim Report (ENGG7340 N/A)
Podcast	Welcome back!
Workshop 5	What should be in the Thesis
Workshop 6	Seminar skills
Workshop 7	Finishing the Thesis

Advisors have noted that students who do not attend these workshops submit sub-standard theses, and do not understand what is required to undertake the research necessary to attain a grade of 7.

The grade cap is an added incentive for you to complete the workshops: you produce an excellent thesis that helps you get employment, and you receive a higher grade. Yes, not completing the workshops correlates with a lower grade, but the aim here is to have as many students get high grades as possible.

### 4.7.2 Submission

Upload your completed electronic template to Blackboard. Time is usually given at the end of each workshop.

If you miss a workshop, the recording of the session, PowerPoint, and template will be on Blackboard and you can complete in your own time. The benefit of attending, either in person or on zoom, is that you get to ask questions in real time.

### 4.7.3 Marking

There is no incorrect way to fill out the templates – if you make an attempt at all parts of the template, you will be deemed to have passed that template.

**If you submit less than 5 templates, your grade will be capped at a 5.**

**ENGG7340: If you submit less than 4 templates, your grade will be capped at a 5.**

<sup>8</sup> Although the templates are due at the end of the course, you are strongly encouraged to submit at the end of each workshop which will finish 2-3 minutes early to allow you to do this.

## 5 Confidentiality

If your thesis involves working in, or obtaining data from, a third party (e.g., industry), a legal agreement may need to be signed. You will be advised of this by the third party or your advisor. If you are uncertain, please ask your advisor.

### 5.1 Legal agreements

Unless a confidentiality agreement is in place, theses will be uploaded and made available in the UQ Library Collection.

Therefore, if you are undertaking an industry-based thesis, you should check with your industry advisor to see if there are any confidentiality requirements for the research project. Note that academics not involved in the project will examine the thesis and this will need to be recognised and acknowledged by the industry partner. Please contact the School Office ([studentenquiries@mechmining.uq.edu.au](mailto:studentenquiries@mechmining.uq.edu.au)) for further information about the legal agreement.

If your industry advisor wishes to make any changes to the standard agreement or, if another confidentiality agreement is proposed, this will be passed to the UQ Legal Office by the School for negotiation. This can take one month or more. If your industry advisor wishes to take this route, the proposed agreement should be sent to the School Office ([studentenquiries@mechmining.uq.edu.au](mailto:studentenquiries@mechmining.uq.edu.au)) prior to commencement of the project. It is up to you to send the proposed agreement to the School office for processing.

If your thesis is to remain confidential for a period of time, include an accompanying [Confidentiality Submission Letter](#) in your final report. This letter is normally located in the report immediately after the title page and before the abstract.

### 5.2 Intellectual Property:

Any Intellectual Property that you create during the period of enrolment in the thesis course will be treated in accordance with [UQ Policies and Procedures Library \(PPL\) 4.10.13 Intellectual Property for Staff, Students and Visitors](#). The main clause is:

(20) The University does not assert ownership of IP created by students other than HDR candidates. However, it is acknowledged that some students (in particular honours students or postgraduate course work students with a research component) may collaborate with external entities on research projects. If there is potential for IP to be created, the University expects students to assign IP that the student may create to the University before project commencement. If the project does result in the creation of IP, students other than HDR candidates will be treated as HDR candidates per the Intellectual Property Procedures.

## Appendix A – Proposal: Examples and instructions

- Please use the template that can be found on Blackboard for your submission.
- **Instructions** and helpful directions in this example have been provided in *italics*.
- **Examples** of what might be included in the template have been indicated by back filling.

Name	
Student no.	
Course code	
Advisor	
Thesis title	

### 1. Introduction

#### 1.1 Background and context (approx 1 page)

*Use your own words but the section may be synthesised from discussions with your advisor and others, readings from the literature, and generative AI responses (insert in section 7.2).*

*The reader needs to be orientated to the area that you will be researching and understand the latest research outcomes so there should be references in this section.*

*Use tables and figures as necessary.*

#### 1.2 Definitions

*Use a bulleted list as per the example below to define any uncommon or ambiguous terms used in the document. You do not need to explain them when you use them in other sections.*

- HAWT: horizontal axis wind turbine
- Sustainability: Overarching term used to encompass environmental, economic, and social aspects required to meet “the needs of the present without compromising the ability of future generations to meet their own needs.” (United Nations, 1987)]
- VAWT: vertical axis wind turbine

#### 1.3 Knowledge gap (approx 1 paragraph)

*Explain the driver for this research (i.e., why is it necessary).*

*There is a knowledge gap in leveraging VAWTs for residential power generation. Despite notable obstacles such as lower efficiency compared with HAWTs, and potential noise and vibration impacts on homes and their occupants, VAWTs have a smaller footprint than HAWTs and can operate using variable wind directions and lower wind speeds. This research therefore seeks to investigate the design of a modular, plug-and-play VAWT system for use in Brisbane that is viable on a triple bottom line basis (i.e., environmentally, socially, and economically).*

## 2. Research questions and expected outcomes

Clearly specify the research questions to be answered by your research. These are similar to project goal(s), however, as this is a research project, they are more commonly framed as questions. Include sub-questions where necessary. Note that the questions are not what you are going to do, but what you aim to answer. This section should also include the expected research outcomes, which should be both useful and relevant.

Research question (RQ)	Sub-questions	Outcome(s)
RQ1. Are VAWTs viable for residential use in Brisbane?	a. What are the benefits of VAWTs over HAWTs at residential scale? b. What are the energy needs of Brisbane residents? c. Does Brisbane experience the necessary windspeeds? d. What defines viability?	<ul style="list-style-type: none"><li>• Brisbane residential power needs</li><li>• Comparison of VAWTs and HAWTs</li><li>• VAWT model</li><li>• Map of Brisbane windspeeds</li><li>• Viability evaluation criteria</li></ul>
RQ2. [Delete/ add rows as necessary]		<ul style="list-style-type: none"><li>•</li></ul>

## 3. Scope

Clearly identify the scope of your work. Ensure that it aligns with your research questions and matches the workload associated with the course credit units<sup>9</sup>.

In Scope	Out of Scope
<ul style="list-style-type: none"><li>• [Use list format.]</li><li>•</li></ul>	<ul style="list-style-type: none"><li>•</li></ul>

## 4. Proposed method(s)

Clearly identify how you are going to go about answering the research questions. This will be rough at this stage of the course, as you will flesh out and refine the method in your first semester.

Research question	Activities required to answer research question
RQ1	a. Critically review published VAWT and HAWT applications at residential scale; establish comparison criteria; develop design criteria for optimum use of VAWTs; use Matlab to develop basic VAWT model  b. ...
RQ2	[Delete/ add rows as necessary.]

<sup>9</sup> ENGG4600/01 and ENGG7341/ENGG42 = 10 h/week. ENGG7340/ENGG7381/ENGG7382 = 20 h/week.

## 5. Timeline

### 5.1 Research management (Use a new line for each activity.)

Draft a list of logically ordered tasks with milestones that clearly relates to the aims of the research and the proposed method. It should be clear how you will spend the time commensurate with the course credit units<sup>10</sup>.

Research Task/ Milestone	Sub-tasks	Timing (start-end)
Lab induction	<ul style="list-style-type: none"><li>Organise time with advisor</li><li>Attend training</li></ul>	Week 1 Week 2
Milestone: Proposal	<ul style="list-style-type: none"><li>Attend week 2 workshop</li><li>Complete template in draft</li><li>Discuss with advisor</li><li>Finalise</li><li>Submit</li></ul>	Thursday Week 2 Week 2/3 Week 3 Week 4 Thursday Week 4
	<ul style="list-style-type: none"><li></li></ul>	

### 5.2 Other considerations

Activity/ Course etc.	Timing (start-end)
ENGGxxxx Quiz (study)	Week 7
ENGGxxxx Exam (study)	Swot vac
Mandy's 21 <sup>st</sup> weekend	17-21 April

### 5.3 ENGG7340 ONLY (Gantt chart)

Use a Gantt chart to provide a well justified, comprehensive list of logically ordered tasks with logical milestones – each clearly relating to the research questions. Progress should be articulated in relation to the plan. Each task should be assigned expected resource requirements (if any) and durations. It should be clear how you will spend the time commensurate with the course credit units (i.e., 20 h/week).

Ensure the Gantt chart is legible. Change page layout to landscape if necessary.

<sup>10</sup> ENGG4600/01 and ENGG7341/ENGG42 = 10 h/week. ENGG7340/ENGG7381/ENGG7382 = 20 h/week.

## 6. Risks

See 'Research proposal example Tyson' on Blackboard for an example.

### 6.1 ENGG4600/01, ENGG7341/42, ENGG7381/82 ONLY (Adapted from Phillips, 2016)

Task/ activity	Potential hazard	Area of effect	Proposed mitigation
Project risks (i.e., risks associated with time, budget, quality)			
Time management	Project runs over time	Inability to meet report deadlines, course grade	Update Gantt chart weekly, reduce scope if necessary
Technical risks (i.e., risks with usage of tools/ methods)			
Workplace Health and Safety (WHS) risks (i.e., risks of harm to people/ equipment)			
[Delete/ add rows as necessary.]			

### 6.2 ENGG7340 ONLY

All risks to the project (e.g., Project, Technical and WHS) must be identified and mitigating strategies proposed. Use a risk matrix approach per standard engineering practice. WHS risk assessments, where required, must be uploaded to the UQ risk management system ([UQ Safe - Risk](#)) and approved by your advisor.

## 7. Generative AI details

### 7.1 Plan for use of generative AI (Adapted from Anthropic, 2024)

Refer to the questions in Workshop 2 template to help answer the questions in the table. Dot point answers are acceptable.

Research integrity and attribution  How will you maintain transparency and academic integrity	How will the use of AI tools be documented?	
	How will AI assistance be cited and acknowledged?	
	How will academic integrity be maintained?	

Quality control processes  <i>Think about your verification and oversight approach</i>	How will AI-generated content be fact-checked and verified?	
	When should human expertise override AI suggestions?	
Ethical considerations  <i>Are there ethical implications of AI use in your research</i>	How will sensitive research data be handled?	
	How will privacy and confidentiality be ensured?	
	How will you mitigate potential biases in AI systems?	
Practical implementation  <i>Think carefully about specific application of AI</i>	How will AI be used in project initiation and planning?	
	How will AI be used in reviewing literature?	
	How will AI be used in research design?	
	How will AI be used in data analysis?	
	How will AI be used in documentation; consider both text and images?	

## 7.2 Generative AI use for Proposal

*Include all generative AI prompts and outputs.*

Report section	Tool	Prompt	Output [If available, a link to the conversation can be used but that conversation must not be deleted.]	Verification/ Refinement
7.1	Claude 3.5	What sorts of things should students include in a management plan for the use of generative AI across the research course?	<p>Let me help you create a framework for students to develop a comprehensive AI management plan for research. This is an excellent exercise in both understanding AI capabilities and responsible research practices.</p> <p>Here are key areas the students should address in their management plans:</p> <ul style="list-style-type: none"> <li>Research Integrity and Attribution</li> <li>- How they'll document when and where AI tools were used in their research process</li> <li>- Their strategy for citing or</li> </ul>	<p>Reviewed against UQ's research integrity guidelines and policies on AI use. Output refined by:</p> <ol style="list-style-type: none"> <li>1. Reorganising categories to match workflow</li> <li>2. Adding specific questions to make more actionable</li> <li>3. Removing items not relevant</li> </ol>

		<p>acknowledging AI assistance in academic work</p> <ul style="list-style-type: none"> <li>- Guidelines for maintaining academic integrity while using AI tools</li> </ul> <p>Quality Control Processes</p> <ul style="list-style-type: none"> <li>- Methods for fact-checking and verifying AI-generated content</li> <li>- Procedures for detecting potential AI hallucinations or inaccuracies</li> <li>- Standards for when human expertise should override AI suggestions</li> </ul> <p>Ethical Considerations</p> <ul style="list-style-type: none"> <li>- Guidelines for handling sensitive research data with AI tools</li> <li>- Protocols for ensuring privacy and confidentiality</li> <li>- Consideration of potential biases in AI systems and how to mitigate them</li> </ul> <p>Practical Implementation</p> <ul style="list-style-type: none"> <li>- Which specific research tasks are appropriate/inappropriate for AI assistance]</li> <li>- Clear boundaries for AI use in different research stages (literature review, data analysis, writing)</li> <li>- Documentation requirements for AI prompts and outputs</li> </ul> <p>Would you like me to elaborate on any of these areas? I can also suggest specific scenarios students could analyze to apply these principles.</p>	4. Expanding the implementation section to include tasks relevant to engineering design
		<i>Delete/ add rows as necessary.</i>	

## 8. References

*The proposal must demonstrate appropriate referencing<sup>11</sup> and contain a correctly formatted reference list.*

Anthropic (2024). Claude 3.5 Sonnet, <https://claudeAI.chat>

Phillips, T (2016). Vision guided robotic refuelling of haul trucks: Phase two, Client report

United Nations (1987). Report of the World Commission on Environment and Development: Our Common Future, <http://www.un-documents.net/our-common-future.pdf>, p39

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<sup>11</sup> APA referencing style is commonly used (<https://guides.library.uq.edu.au/referencing/apa7>). However, check with your supervisor to see if they have a preferred style. The UQ Library guide is here: <https://guides.library.uq.edu.au/referencing>.

## Appendix B – Interim report: Examples and instructions

- Please use the template that can be found on Blackboard for your submission.
- **Instructions** and helpful directions for each section have been provided in *italics*.
- **Examples** of what might be included in the template are indicated by back filling.

Name	
Student no.	
Course code	
Advisor	
Thesis title	

### Executive Summary (Abstract) (approx 1 page)

A summary of the entire document, containing approximately 1 paragraph on each item from the report. Consider using subheadings that help with structure (e.g., Background, Research questions, Method, Preliminary Results etc.).

### 1. Introduction (approx 1.5-2 pages)

Use your own subheadings (e.g., 1.1 Background, 1.2 Research Questions).

The introduction should provide a clear definition of the topic and relevance, intended coverage (scope) and research questions. Definitions could be interwoven. Your initiative around problem identification should be demonstrated.

This section may include updated and refined sections of your proposal (i.e., Introduction, Research questions and expected outcomes, and Scope). There is no need to reference your writing from the proposal but work from others, including generative AI, will continue to need to be referenced.

### 2. Literature review (1-3 chapters with subsections as necessary)

Use your own chapter headings (e.g., 2. Vertical Axis Wind Turbines).

These chapters should present a critical literature review relevant to your research that underpins research direction. Your literature review should demonstrate mastery of the material through:

- a systematic search and review of peer-reviewed publications;
- analysis of key theories and methodological approaches;
- identification of research gaps and contradictions in the field;
- synthesis of multiple viewpoints and findings; and
- critical evaluation of research quality, limitations, and relevance.

When incorporating AI-assisted research:

1. Document your initial research questions and search terms before using AI tools.
2. Compare AI-generated summaries with direct reading of source materials.
3. Use AI to identify potential patterns or connections but verify these through your own analysis.
4. Clearly distinguish between:
  - a. Direct findings from literature

- b. AI-suggested connections or patterns
- c. Your own synthesis and critical analysis

The final review should:

- present a coherent narrative that builds your argument;
- show clear progression from existing knowledge to your research questions;
- demonstrate how different sources and methods (traditional and AI-assisted) contribute to your understanding; and
- provide evidence-based justification for your research focus.

### **3. Method (approx 2-4 pages)**

This section should contain a refined method for the completion of the research project; it is expected that this builds on what was presented in your proposal. You are encouraged to use diagrams to show how the various parts of your research fit together and thus provide your reader with an overview of your research.

The section should include the following if relevant:

- a critical comparison of research approaches in your field,
- justification for the selected method, and
- an analysis of the limitations of the method including errors due to instrumentation, assumptions etc.

### **4. Preliminary results (approx 2-4 pages)**

It is important that you demonstrate that the research has commenced. This might be refining a method for data collection, collection of data that will underpin a model that you will develop, or it might be the initial calibration of a piece of equipment.

### **5. Research plan**

#### **5.1 Project management**

[ENGG7340: Update the Gantt chart from your Proposal to show progress/ refinement.]

Use a Gantt chart to provide a well justified, comprehensive list of logically ordered tasks with logical milestones – each clearly relating to the research questions. Progress should be articulated in relation to the plan. Each task should be assigned expected resource requirements (if any) and durations. The proposal should demonstrate analysis capabilities, creativity and self-reliance. It should be clear how you will spend the time commensurate with the course credit units<sup>12</sup>.

Ensure the Gantt chart is legible. Change page layout to landscape if necessary.

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<sup>12</sup> ENGG4600/01 and ENGG7341/ENGG42 = 10 h/week. ENGG7340/ENGG7381/ENGG7382 = 20 h/week.

## 5.2 Proposed thesis table of contents

Chapter	Subsection
1. Introduction	1.1 Background 1.2 Research questions and aims 1.3 Impact and relevance 1.4 Contents of report
	Add rows as necessary.

## 5.3 Risk management

[ENGG7340: Not required.]

All risks (not just WHS) to the project/schedule must be identified and mitigating strategies proposed. Use a risk matrix approach per standard engineering practice. WHS risk assessments, where required, must be uploaded to the UQ risk management system ([UQ Safe - Risk](#)) and approved by your advisor.

## 6. AI-assistance strategies

### 6.1 Plan for use of generative AI

NOTE: The dot points below are basic in nature and would attract a grade of 3-4/5. More research-specific detail would be required to attract full marks for this section.

Literature search strategy	Search terms used	Vertical axis wind turbines Renewable residential power supply SE Qld wind patterns Efficiency Scalability
	AI prompts used to situate generative AI	Act as an experienced mechanical engineering researcher in the field of vertical axis wind turbines
	Filtering and selection criteria	<ul style="list-style-type: none"> <li>• Relevance: VAWTs/ SEQ residential needs</li> <li>• Currency: last 5 years and seminal work</li> <li>• Verification: technical specs for VAWTs</li> <li>• Scientific merit: established engineering principles and empirical evidence</li> <li>• Source quality: peer-reviewed journals</li> </ul>
AI-generated summaries	Fact-checking and verification process	<ul style="list-style-type: none"> <li>• Cross referenced all numbers and specs</li> <li>• Checked all references not hallucinated</li> <li>• Sense check re. fundamental science</li> </ul>
	Areas requiring human expertise	<ul style="list-style-type: none"> <li>• Safety/ risk areas</li> <li>• Interpretation of BOM data</li> <li>• Criteria for evaluation of VAWT viability</li> <li>• Design criteria/ assumptions for real world</li> <li>• Method selection given time and resource availability</li> </ul>
Synthesis	Integration process	<ul style="list-style-type: none"> <li>• Created concept map for research: VAWTs,</li> </ul>

process		<ul style="list-style-type: none"> <li>residential renewables, viability criteria</li> <li>Used gen AI to start off each area, then followed up with reading papers to verify claims and deepen my understanding</li> <li>Consulted with advisor re. findings</li> <li>Developed chapters through critical selection/synthesis from all sources</li> </ul>
	Outputs challenged	<ul style="list-style-type: none"> <li>Suggestions that did not follow fundamental principles</li> <li>Paper summaries that were not quite correct</li> <li>A framework that was missing contextual factors (i.e., SE Qld)</li> </ul>
	Your decision making	<ul style="list-style-type: none"> <li>Journal paper and advisor guidance prioritised</li> <li>Partial selection of suggested viability criteria/supplemented with those I developed</li> </ul>

## 6.2 Generative AI use for the Interim Report

*Include all generative AI prompts and outputs.*

Report section	Tool	Prompt	Output	Verification/Refinement
			<i>Delete/ add rows as necessary.</i>	

## 7. Conclusions and Recommendations

### References

*The Interim Report must contain a correctly formatted reference list.*