BIOM4951

Research Thesis A

Term 3, 2021
Course Overview

Staff Contact Details

Convenors

<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
<th>Availability</th>
<th>Location</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michael Stevens</td>
<td><a href="mailto:thesis.biomedeng@unsw.edu.au">thesis.biomedeng@unsw.edu.au</a></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Administrators

<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
<th>Availability</th>
<th>Location</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatemeh Karimi</td>
<td><a href="mailto:fatemeh.karimi@unsw.edu.au">fatemeh.karimi@unsw.edu.au</a></td>
<td></td>
<td></td>
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</tbody>
</table>

School Contact Information

Student Services can be contacted via unsw.to/webforms.
**Course Details**

**Units of Credit 4**

**Summary of the Course**

The thesis provides an opportunity for you to bring together engineering principles learned over your previous years of study and apply these principles to innovatively solve problems such as the development of a specific design, process and/or the investigation of a hypothesis. Thesis projects are complex, open-ended problems that allow room for your creativity, and the acquisition, analysis and interpretation of results. There are multiple possible solutions or conclusions at the outset and sufficient complexity to require a degree of project planning. The thesis requires you to formulate problems in scientific or engineering terms, manage an technical project and find solutions by applying scientific and engineering methods. You will also develop your ability to work in a research and development environment. You must identify a supervisor and project prior to enrolling in this course.

**Course Aims**

The thesis provides an opportunity for the student to bring together engineering principles learned over their previous years of study and apply these principles to innovatively solve problems such as the development of a specific design, process and/or the investigation of a hypothesis. Thesis projects must be complex, open-ended problems that allow room for student creativity, and the acquisition, analysis and interpretation of results. There must be multiple possible solutions or conclusions at the outset and sufficient complexity to require a degree of project planning from the student. The thesis requires the student to formulate problems in engineering terms, manage an engineering project and find solutions by applying engineering methods. Students also develop their ability to work in a research and development environment.

**Course Learning Outcomes**

1. Develop a design or a process or investigate a hypothesis following industry and professional engineering standards.
2. Critically reflect on a specialist body of knowledge related to their thesis topic.
3. Apply scientific and engineering methods to solve an engineering problem.
4. Analyse data objectively using quantitative and mathematical methods.
5. Demonstrate oral and written communication in professional and lay domains.
6. Solve biomedical problems by applying CLOs 1-5.

**Teaching Strategies**

The course is taught as an individual research project, to develop a level of research skills and autonomy.

**Additional Course Information**

There is no official class time for this course. You must still ensure your enrolment and registration is up to date in your enrolment. Your face-to-face time needs to be organised with your supervisor, as you are expected to meet them at least once per week.

You must have selected a project before Week 0 of term. If you haven't done so already, please contact...
the course coordinator.

**Expectations of Students**

- *Meet your supervisor regularly*
- *Complete all the assessments on time*
## Assessment

<table>
<thead>
<tr>
<th>Assessment task</th>
<th>Weight</th>
<th>Due Date</th>
<th>Course Learning Outcomes Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Interim Report</td>
<td>10%</td>
<td>22/11/2021 11:59 PM</td>
<td>1, 2, 3, 4, 5, 6</td>
</tr>
</tbody>
</table>

### Assessment 1: Interim Report

**Submission notes:** You must submit a draft of your Literature Review to Smarthinking, then submit your Smarthinking feedback to Moodle, prior to submission of your Interim Report

**Due date:** 22/11/2021 11:59 PM

In thesis, there are three different assessment stages.

Thesis A: Interim Report (10%), Supervisor Checklist (SA/UN)

Thesis B: Progress Seminar and Reflection (10%)

Thesis C: Final report (65%), Participation (5%), Conference Presentation (10%)

**Your objectives in Thesis A are**

1. To build your knowledge base on your specific research topic.
2. Use that knowledge base to inform your specific project aims and methodology.
3. Complete preliminary work towards meeting the specific project aims.

To assess this, there are two assessment tasks for Thesis A.

**Interim report (10%)**

**Note:** For students intending to undertake Thesis B and C simultaneously in the second term (4+8 model), the Project Plan (Thesis A deliverable) should be of sufficient quality and depth to demonstrate capacity for the student to complete B & C concurrently.

**Progress Checklist by Supervisor (SA/UN)**

1. Feasibility of completion using 4+8 model - this only applies to students who wish to complete Thesis A, B and C over two terms.

This is not a Turnitin assignment

### Assessment criteria

**BIOM4951 Research Thesis A Interim Report Rubric**
<table>
<thead>
<tr>
<th>Assessment Attributes</th>
<th>Levels of Attainment</th>
<th>Excellent</th>
<th>Good</th>
<th>Adequate</th>
<th>Deficient</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outstanding</strong></td>
<td>Project Context (5%)</td>
<td>Demonstrates a nuanced understanding of the factors influencing the project. The significance of the topic is established within both the discipline and broader industrial-societal context, showing novel insight into how the topic affects a range stakeholders.</td>
<td>The student demonstrates a good understanding of the relevant factors driving their project. They establish the significance of their topic within both the discipline and broader industrial societal context.</td>
<td>The student demonstrates a solid understanding of some relevant factors driving their project. They establish the significance of their topic within a discipline or industrial/societal context.</td>
<td>The student has done a poor job of explaining the context and background to the reader.</td>
</tr>
<tr>
<td><strong>Literature Review (50%)</strong></td>
<td>Literature Review and identification of gaps in the literature (40%)</td>
<td>In addition to meeting the quality at the previous band – “Solid, and linked” – the student has made a critical assessment of the literature in the context of their research project to a depth and breadth that would not normally be expected at this level.</td>
<td>The most significant areas of literature relevant to the proposed work have been reviewed and the student has clearly identified one or more knowledge gaps. The student will use these gaps as a basis for future work.</td>
<td>The literature reviewed is sufficient to inform the proposed research, although it is likely that further review will be required as the work progresses. What distinguishes work at this level from work at higher levels is the presence of gaps that are crucial for the development of the proposed research.</td>
<td>Deficient work may be characterised by a number of features, including inappropriate reliance on sources not peer reviewed (such as the internet), not reviewing what should be reviewed, and a lack of critical understanding of the literature relevant to the proposed work.</td>
</tr>
<tr>
<td>Problem Statement, project aims and hypotheses (5%)</td>
<td>The aims stated are clear, focused and achievable, defining an innovative scope for the thesis project. Any hypotheses proposed are specific and clearly testable by the proposed methodology.</td>
<td>The aims stated are clear, focused and achievable within the scope of the thesis project. Any hypotheses proposed are specific and clearly addressed by the proposed methodology.</td>
<td>The aims stated are clear and focused. Any hypotheses proposed are specific and related to the proposed methodology.</td>
<td>The aims stated are clear but general. Any hypotheses proposed are related to the proposed methodology.</td>
<td>The aims are unclear or inappropriate. Any hypotheses proposed unlikely to be answered by the proposed methodology.</td>
</tr>
</tbody>
</table>

breadth that is of the quality that could be anticipated to be seen in a journal review paper have shown that they understand the conceptual relationships between reviewed works and between reviewed works and the student’s research project. i.e., the student makes intellectual connections between the different parts of the review and puts their work in context quality work, is the student showing that they understand the conceptual relationships between the different reviewed works. next level up is quantity: an adequate review of the literature sketches enough that the reader can see what the picture is about, but neglects significant aspects. i.e., are there significant holes in this review? the core of the literature in a particular area, or not reviewing any recent work (within, for example, the last 5 years although this will depend somewhat on the field)
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<thead>
<tr>
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<tr>
<td><strong>Project Planning (20%)</strong></td>
<td><strong>Outstanding</strong></td>
</tr>
<tr>
<td>Proposed Solution/Met hodology, resource and training requirements (10%)</td>
<td>The research plan explains a logical, discrete set milestones &amp; project component s (design, methodology, analysis and data management). A rigorous, literature-informed case is made for methods to be employed. All key resources, training and permitting identified and documented as appendices.</td>
</tr>
<tr>
<td><strong>Excellent</strong></td>
<td>The research plan outlines a set of the milestones and project component s. The plan is clearly informed by the literature. Some key resources, training &amp;/or permitting required have been identified and documented as appendices.</td>
</tr>
<tr>
<td><strong>Good</strong></td>
<td>The research plan includes some detail in terms of methodology, work to be completed and outcomes delivered. There is limited justification from the literature. The plan shows some understanding of the resources, training &amp;/or permitting required.</td>
</tr>
<tr>
<td><strong>Adequate</strong></td>
<td>There is enough of a plan to believe that the research project is feasible, however it lacks detail and justification from the literature. Little consideration is given to what will be required to make the project happen.</td>
</tr>
<tr>
<td><strong>Deficient</strong></td>
<td>The research plan is not present or does not have sufficient detail to demonstrate what the project would deliver. Alternatively, the proposed project may be insufficient for the body of work expected of a thesis project.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thesis timeline and project management (10%)</th>
<th>The timeline is realistic and robust, with all key resources, training and permitting documented (as appendices). Good consideration of project management.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outstanding</strong></td>
<td>The timeline is realistic and may exhibit a multistrand approach. Enough detail to believe the research project is feasible.</td>
</tr>
<tr>
<td><strong>Excellent</strong></td>
<td>The timeline is realistic, but many follow a linear approach. Enough detail to believe the research project is feasible.</td>
</tr>
<tr>
<td><strong>Good</strong></td>
<td>The proposed timeline is not detailed &amp;/or consists of generic activities with little explanation of what they are intended to do.</td>
</tr>
<tr>
<td><strong>Adequate</strong></td>
<td>The timeline is not present or does not demonstrate how the student would successfully complete a thesis project. Little</td>
</tr>
</tbody>
</table>
The plan includes some provision for project variations and contingencies. The plan includes some provision for project variations and contingencies. achieve. attempt has been made to describe how the project would be managed.

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<td>Outstandi ng</td>
<td>Excellent</td>
</tr>
<tr>
<td>Project-Dependent Preparations (20%)</td>
<td>All the project-dependent essential skills are identified. The student has not only acquired all the skills but also done additional (project specific) work e.g. preliminary or trial experiments, some designs etc</td>
</tr>
</tbody>
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</table>
Communication Skills
(10%)

Document follows a clear and logical structure indicated using headings and other conventions. The report is very easy to read: well-written, with good spelling and grammar, and appropriate language style. Text spacing aids readability. All aspects of formatting are consistent throughout the document. Graphical and tabular presentation of data is appropriate, clear, consistent and economical.

References in text match reference list (and vice versa) and are cited properly.

Document makes good use of headings, subheadings and other stylistic conventions to indicate document structure. The report is reasonably easy to read: writing is clear enough, with good spelling and grammar, and reasonable choice of language style. Graphical elements (figures, tables, etc.) are labelled, largely formatted consistently and cited correctly. References in text match reference list (and vice versa) and are cited properly.

Document makes some use of headings and other stylistic conventions to indicate document structure. The report is not at a professional level but does make use of headings and subheadings to indicate document structure. The report is may be difficult to read: writing is just ok, broad idea comes across; spelling and grammar have some flaws, not quite appropriate language style. Although figures and tables are labelled, the formatting is unclear and/or inconsistent to the extent that the reader can lose track of the context when reading. References in text match reference list (and vice versa) and are cited properly.

Document is not at a professional level but does make use of headings and subheadings to indicate document structure. The report is may be difficult to read: writing is just ok, broad idea comes across; spelling and grammar have some flaws, not quite appropriate language style. Although figures and tables are labelled, the formatting is unclear and/or inconsistent to the extent that the reader can lose track of the context when reading. References in text match reference list (and vice versa) and are cited properly.

Document is poorly structured, does not cohere or shows a lack of understanding of the purpose of its sections. Much effort is required to read and understand the report: writing is poor, many mistakes with spelling and grammar, and possibly inappropriate language style (e.g. too informal). Presentation is poor to the extent that it impedes reading of the document. Examples include inconsistent formatting, and unlabelled figures or tables. References are either not cited or cited inconsistently.
Hurdle requirement

You must submit your literature review component of your interim report via SmartThinking. Details will be provided during term.

Additional details

You must submit a draft of your Literature Review to Smarthinking, then submit your Smarthinking feedback to Moodle, prior to submission of your Interim Report.

Required elements of the Interim Report.

1. Literature review or equivalent (50%)
   1. What is the problem to be solved, and its significance?
   2. Must include
      1. Brief background to project
      2. Summary of literature relevant to project
      3. Identification of “gaps” in the literature
      4. Problem Statement (informed by gaps in the literature)
      5. Hypothesis and aims
   3. Indicative length is 10-15 pages,

2. Project planning (20%)
   1. How will the student answer the research question in the given time using their available resources?
   2. Must include
      1. Proposed Solution/Experimental Methodology
      2. Detailed Thesis timeline – for next two terms
         1. Justification of time allocation for each task
      3. Available resources identified
      4. Required training and upskilling identified

3. Project Dependent Preparations (20%)
   1. Can the student achieve the aims in the timeline? What progress has been made already?
   2. Project specific, but may include
      1. Evidence of training on specific equipment
      2. Evidence of some upskilling in new software/methods
      3. Preliminary results
      4. Preliminary sketches
      5. Components/parts ordered
      6. Detailed budget of parts to be ordered
      7. Risk Assessment

4. Document presentation (10%)
   1. Report layout
   2. English skills – spelling, grammar
3. Data presentation (if applicable)
4. Clarity of writing
5. Citations consistent and correctly formatted
Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

Course Schedule

View class timetable

Timetable

<table>
<thead>
<tr>
<th>Date</th>
<th>Type</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 2: 20 September - 24 September</td>
<td>Online Activity</td>
<td>Make sure you have been allocated a project and have emailed your supervisor to set up weekly meetings.</td>
</tr>
<tr>
<td>Week 4: 4 October - 8 October</td>
<td>Online Activity</td>
<td>Complete the Check-in Questionnaire, available on Teams, by Monday Week 4 11:59pm</td>
</tr>
<tr>
<td>Week 7: 25 October - 29 October</td>
<td>Homework</td>
<td>Please complete the Week 7 Check-in survey by Friday Week 7</td>
</tr>
<tr>
<td>Week 10: 15 November - 19 November</td>
<td>Assessment</td>
<td>Upload Smarthinking Feedback to Moodle by Monday Week 10 9pm</td>
</tr>
<tr>
<td>Study Week: 20 November - 25 November</td>
<td>Assessment</td>
<td>Upload Interim Report by Monday Week 11 11:59 pm</td>
</tr>
</tbody>
</table>
Resources

Prescribed Resources

Resources will be made available to help students guide them in their journey for Thesis A.

Extensions

You can apply for special consideration when illness or other circumstances interfere with your assessment performance.

Other applications for extension of submission of thesis reports (e.g. equipment breakdown, etc.):

1. Discuss the possibility of an extension with your supervisor first.
2. Requests can then be lodged by the student here http://tinyurl.com/yy2jzpyv The supervisor will then receive an email asking them to approve, before it is escalated to the decision panel.
3. Request must be lodged by Week 6 of term.
4. Panel decision will be made by end of week 7.
5. The decision will be made by a panel – consisting of the HoS (or their nominee), Thesis Coordinator, and 1 other person.
6. Students should be alerted to the fact that this is not guaranteed, and thus should not rely on getting an extension.
7. Typically, extensions are granted UP TO 3 weeks. The length of the extension needs to be requested and justified by the supervisor. Panel will decide the length of time granted.

Procedure if you fail Thesis A, B or C

Fail in Thesis A (interim report mark < 50%) – must re-enrol in Thesis A again.

Fail in Thesis B (seminar mark < 50%) – must re-enrol in Thesis B again

Fail in Thesis C – Students have three options.

1. re-enrol for Thesis A, B and C again, new project and supervisor
2. re-enrol for Thesis C again, same project - needs consent of an appropriate supervisor & student
3. Student does further work, re-submits thesis after a max of 6 weeks. Course mark capped at 50%. If still not satisfactory, then needs to re-enrol.

This last option is only available if the original mark was ≥40, OR if the student is in their last semester before graduation (regardless of the original mark).

Fail in Thesis B & C (when taken simultaneously) – Students must re-enrol in Thesis B again, and cannot concurrently enrol in C. They can then take Thesis C when Thesis B has been satisfactorily completed.

Industry Theses

We encourage students to seek partnerships with industry, so students can have a co-supervisor from
industry. However, if confidentiality is required, a confidential disclosure agreement (CDA) is obligatory. The agreement will protect the intellectual property rights of the industry partner, UNSW and the student. Students or academics are not authorised to sign confidential disclosure agreements on behalf of UNSW and are advised to talk to the course coordinator and UNSW legal office to arrange for drafting and signing of the confidential disclosure or research agreement.

To complete an industry-based thesis, you must complete the following steps:

1. Identify an industry supervisor and share with them these guidelines.
2. Identify a GSBmE Academic who can be your academic supervisor.
3. Complete this Industry thesis permission form and make sure your industry supervisor AND your academic supervisor have signed the form.
4. Upload the signed form here (you may need to log in with your zID@ad.unsw.edu.au and zPass).

**Late Procedure**

In all cases, applications for late submission can be applied for BEFORE the due date. This is at the discretion of the thesis coordinator but should only be granted in exceptional circumstances. As per normal, students can also apply through myUNSW for special consideration.

For Thesis A, B or C, 5 marks will be deducted off the thesis for every day late. Penalty applies until the marks for the course decrease to 50, and further lateness does not result in failure of the course, but might be a failure of the thesis (weekends count as days).

**Additional Support for Students**

- The Current Students Gateway: https://student.unsw.edu.au/
- Academic Skills and Support: https://student.unsw.edu.au/academic-skills
- Student Wellbeing, Health and Safety: https://student.unsw.edu.au/wellbeing
- Disability Support Services: https://student.unsw.edu.au/disability-services
- UNSW IT Service Centre: https://www.it.unsw.edu.au/students/index.html

**Recommended Resources**

Not available

**Course Evaluation and Development**

Students will be given an opportunity to provide feedback via informal surveys throughout the term.
Submission of Assessment Tasks

Laboratory reports and major assignments will require a Non Plagiarism Declaration Cover Sheet.

Late submissions will be penalised 10% of the mark for each calendar day late. If you foresee a problem in meeting the nominated submission date please contact the Course Convenor to make an appointment to discuss your situation as soon as possible.
Academic Honesty and Plagiarism

PLAGIARISM
Beware! An assignment that includes plagiarised material will receive a 0% Fail, and students who plagiarise may fail the course. Students who plagiarise will have their names entered on a plagiarism register and will be liable to disciplinary action, including exclusion from enrolment.

It is expected that all students must at all times submit their own work for assessment. Submitting the work or ideas of someone else without clearly acknowledging the source of borrowed material or ideas is plagiarism.

All assessments which you hand in must have a Non Plagiarism Declaration Cover Sheet. This is for both individual and group work. Attach it to your assignment before submitting it to the Course Coordinator or at the School Office.

Plagiarism is the use of another person’s work or ideas as if they were your own. When it is necessary or desirable to use other people’s material you should adequately acknowledge whose words or ideas they are and where you found them (giving the complete reference details, including page number(s)). The Learning Centre provides further information on what constitutes Plagiarism at:
https://student.unsw.edu.au/plagiarism
Academic Information

COURSE EVALUATION AND DEVELOPMENT
Student feedback has helped to shape and develop this course, including feedback obtained from on-line evaluations as part of UNSW’s myExperience process. You are highly encouraged to complete such an on-line evaluation toward the end of Term. Feedback and suggestions provided will be important in improving the course for future students.

DATES TO NOTE
Refer to MyUNSW for Important Dates, available at:
https://my.unsw.edu.au/student/resources/KeyDates.html

ACADEMIC ADVICE
For information about:
• Notes on assessments and plagiarism,
• Special Considerations,
• School Student Ethics Officer, and
• BESS

refer to the School website available at
http://www.engineering.unsw.edu.au/biomedical-engineering/

Supplementary Examinations:
Supplementary Examinations for Term 3 2021 will be held on Monday 10th January – Friday 14th January (inclusive) should you be required to sit one.

Image Credit
Synergies in Sound 2016

CRICOS
CRICOS Provider Code: 00098G

Acknowledgement of Country
We acknowledge the Bedegal people who are the traditional custodians of the lands on which UNSW Kensington campus is located.