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>By Appointment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fatemeh Karimi</td>
<td><a href="mailto:fatemeh.karimi@unsw.edu.au">fatemeh.karimi@unsw.edu.au</a></td>
<td>By Appointment</td>
<td></td>
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School Contact Information

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

**Credit Points 4**

**Summary of the Course**

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 enough 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. The prerequisites are satisfactory completion of Thesis A and Thesis B.

**Course Aims**

The Biomedical Engineering Research Thesis or Masters’ Project aims to analyse or solve biomedical problems by applying engineering techniques. Problems to be addressed relate to basic or applied biomedical research or development of medical devices, processes or software. The Research Thesis is obligatory for all students of the dual (formerly concurrent) Bachelor of Engineering/Master of Biomedical Engineering program, and is undertaken in years 4 and 5 of the degree.

**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. To solve biomedical problems by applying 1-5.

**Teaching Strategies**

**Learning and teaching activities**

The student will rely on developing an independent and collaborative learning approach. Research questions are often open-ended and highly specialised, so the student will learn most by one-to-one mentoring provided by the supervisor and their research team.

You will learn most of your skills from PhDs and Post Docs in your lab. We encourage you to attend lab meetings to get and know lab personnel.

**Expectations of students**

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

The aim of Thesis C is to finalise your research results and disseminate them in both an oral and written manner. This is the final key part of being a successful researcher. To that end, the assessment tasks provide students with a realistic experience of being a researcher.

There are 3 assessment tasks for Thesis C.

- TC1: Written report (65%)
- TC2: Conference Presentations (10%)
- TC3: Participation (5%)

Assessment Tasks

<table>
<thead>
<tr>
<th>Assessment task</th>
<th>Weight</th>
<th>Due Date</th>
<th>Student Learning Outcomes Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thesis Final Report</td>
<td>65%</td>
<td>Monday Week 11</td>
<td>1, 2, 3, 4, 5, 6</td>
</tr>
<tr>
<td>Conference Presentation</td>
<td>10%</td>
<td>Week 10</td>
<td></td>
</tr>
<tr>
<td>Participation</td>
<td>5%</td>
<td>After submission of final thesis report.</td>
<td>1, 2, 3, 4, 6</td>
</tr>
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</table>

Assessment Details

Assessment 1: Thesis Final Report

Start date: Not Applicable

Length: 50 pages (not including pictures, references or appendices)

Details:

TC1: Written report (65%)

1. Literature review/background and putting the results in context (20%)
2. Execution of the research project, quality of analysis, discussion of results (50%)
3. Conclusions and value added (20%)
4. Document presentation (10%)

Additional details:

The thesis content will be assessed according to the stated thesis aims which may be a) experimental or simulation based b) design or c) critical reviews. The assessment weightings are shown below. Please note that these are only assessment criteria. The thesis structure outline is entirely up to you as long as you clearly address the following:
1. Introduction, background and aims

This will include i) the biomedical problems you are addressing and their relevance ii) past work addressing this problem and other relevant background information and iii) hypothesis and/or aims for this project.

2. Methodology

a) Experimental or simulation based projects

Detail the methods and techniques you used. Provide enough information so that others may replicate your methods. Explain how the methods were used to generate the data in this thesis. Provide statistical methods if they were used to analyse data. Briefly explain how the methods address the hypotheses or aims of this project.

b) Design projects

Detail the software, instrumentation and manufacturing methods that were used to create the design. Provide a specification for the devices or software, as well as the intended methods for testing how well the design meets the specification. Provide statistical methods if they were used to analyse design performance.

c) Critical reviews

Outline the methodology that was used to critically review the field of research e.g., databases, interviews, patent searches

Note: Sections 1 and 2 apply to both Interim Report and to Final Report.

3. Research Outcomes

a) Experimental or simulation based projects

Provide a summary of your results including statistical analysis. Clearly explain how your results were obtained using experimental methods. You will also need to submit the raw data to your supervisors (lab books, data files, etc). Note that you can submit additional data files (200MB limit)

b) Design projects

Provide designs as well as experimental or simulated data that tests how well the design meets specification. Provide a summary of your results including statistical analysis. Clearly explain how your results were obtained using experimental methods. You will also need to submit the raw data to your supervisors (lab books, data files, etc.). Note that you can submit additional data files (200MB limit)

c) Critical Reviews

Provide an in depth critical analysis of the field. The review will need to be an up to date and comprehensive analysis of all of the literature.

Note: This section applies to final report, and to the interim report only if some preliminary work has been completed.
4. Discussion and Conclusions

a) Experimental or simulation based projects:

Critically evaluate the methods and results of your thesis. This includes comparing your results to those obtained in the literature. Interpret your data using statistical inference or simulation validation methods, discussing how well your research addresses stated aims and hypotheses and recommend future studies. Also comment on the novelty and utility of your research and its outcomes.

b) Design projects

Critically evaluate your design making reference to the design specification and measurement of performance. Compare your design with competing technologies. Where appropriate, note how well your devices or software has complied with industry standards, for example what testing would be required for registration by TGA or FDA. Also recommend future design improvements. Comment on the novelty and utility or your design. Is it worth patenting?

c) Critical reviews

Summarise the field making reference to gaps in knowledge that may be addressed by future research and development.

Note: This section applies only to final report.

5. References and Overall Presentation

Marks will be deducted for typographical errors, incorrectly labelled graphs, poor thesis structure, incorrect referencing etc.

Note: This section applies to both Interim Report and to Final Report.

Turnitin setting: This is not a Turnitin assignment

Assessment 2: Conference Presentation

Start date: Not Applicable

Length: 6 minutes

Details:

TC2: Conference Presentations (10%)

1. Students are required to present a short 6-7 minute conference presentation at the end of term. This is a good opportunity to present your work to senior academics and to industry.
2. Your assessors and supervisors will ask you questions on your presentation that you must answer.
3. Success in this assessment will involve both a clear and cohesive presentation and an ability to explain your research to engineers who are not necessarily in your field of study.
Turnitin setting: This is not a Turnitin assignment

Assessment 3: Participation

Start date: Not Applicable

Length: Online Survey

Details:

The participation assessment will be completed by your supervisor at the end of your thesis submission. This participation mark includes the following components:

1. Completion of Project Exit Form
2. Initiative and Engagement
   1. Intellectual contribution
3. Sustained activity throughout the term
   1. Attendance at lab meetings
4. Diligence and competence in performing the task
   1. Amount of work and engagement with problem
   2. Risk assessments complete (when relevant)
   3. Other project-specific evidence (e.g. lab book completion)
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.
8.

Procedure if you fail Thesis A, B or C


Fail in Thesis B (seminar mark – 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 based projects
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.

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
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 2020 will be held on Monday 11th January – Friday 15th January (inclusive) should you be required to sit one.

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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.