UNSW Course Outline

BIOM4951 Research Thesis A - 2024

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General Course Information

Course Code : BIOM4951
Year : 2024
Term : Term 3
Teaching Period : T3
Is a multi-term course? : No
Faculty : Faculty of Engineering
Academic Unit : Graduate School of Biomedical Engineering
Delivery Mode : In Person
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Undergraduate
Units of Credit : 4

<u>Useful Links</u>

<u>Handbook</u> <u>Class Timetable</u>

Course Details & Outcomes

Course Description

Seen as the highlight of study at UNSW, Biomedical Engineering Thesis Projects provide a
unique opportunity for you to bring together the engineering principles learned over
your previous years of study and apply these principles to develop innovative solutions to

unsolved engineering problems related to human health. This could include the development of a specific design prototype, process and/or the investigation of a scientific hypothesis.

Thesis projects are complex, open-ended problems that allow room for your creativity, and the acquisition, analysis and interpretation of results. There will be multiple possible solutions or conclusions at the outset and sufficient complexity to require a degree of project planning. Thesis Projects are completed over three terms under the course codes BIOM4951, BIOM4952 and BIOM4953. While the project may develop as you explore new gaps in the scientific and engineering knowledge the overarching research themes and supervisor are retained across terms.

In Week 7 of each term eligible students should receive an email inviting them to view the Biomedical Engineering Projects database and select their project preferences. You should then identify potential projects and discuss these projects with potential supervisors prior to commencing this course. If you have not received a communication by Week 8 about project selection, then please reach out to the course coordinator for access to the Biomedical Engineering Projects database.

BIOM4951 is the first step of this exciting capstone project opportunity and potentially your future career in research and development.

Course Aims

Biomedical Engineering Thesis Projects aim to provide opportunities for students to bring together engineering principles learned over their previous years of study and apply these principles to solve important problems in engineering related to human health. Thesis projects aim provide an opportunity to conduct research and develop the students' ability to work within a research and development environment. Thesis projects must include 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. Thesis projects aim to improve the student's ability to formulate problems in engineering terms, manage an engineering project and find solutions by applying engineering methods. Thesis projects aim to up-skill the student's ability to communicate technical content effectively to a wide audience through the completion of written reports, oral seminars and conference/industry night poster presentations.

Relationship to Other Courses

Thesis Projects are completed over three terms under the course codes BIOM4951, BIOM4952 and BIOM4953. BIOM4951 is the first step of this exciting capstone project opportunity and potentially your future career in research and development.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Develop a design or a process or investigate a hypothesis following industry and professional engineering standards.
CLO2 : Critically reflect on a specialist body of knowledge related to their thesis topic.
CLO3 : Apply scientific and engineering methods to solve an engineering problem.
CLO4 : Analyse data objectively using quantitative and mathematical methods.
CLO5 : Demonstrate oral and written communication in professional and lay domains.
CLO6 : Solve a biomedical engineering problem by applying CLOs 1-5.

Course Learning Outcomes	Assessment Item
CLO1 : Develop a design or a process or investigate a hypothesis following industry and professional engineering standards.	• Interim Report and Literature Review
CLO2 : Critically reflect on a specialist body of knowledge related to their thesis topic.	• Interim Report and Literature Review
CLO3 : Apply scientific and engineering methods to solve an engineering problem.	• Interim Report and Literature Review
CLO4 : Analyse data objectively using quantitative and mathematical methods.	• Interim Report and Literature Review
CLO5 : Demonstrate oral and written communication in professional and lay domains.	• Interim Report and Literature Review
CLO6 : Solve a biomedical engineering problem by applying CLOs 1-5.	• Interim Report and Literature Review

Learning and Teaching Technologies

Moodle - Learning Management System | Microsoft Teams

Other Professional Outcomes

https://www.unsw.edu.au/engineering/student-life/student-resources/program-design

Additional Course Information

IMPORTANT INFORMATION

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

Attend Research Skills Workshops:

- Week 2 - Scientific Literature Reviews
- Week 3 - Biomedical Laboratory Inductions
- Week 4 - Research Integrity, Data Management and Ethics

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Interim Report and Literature Review Assessment Format: Individual	10%	Due Date: Week 11: 18 November - 24 November

Assessment Details

Interim Report and Literature Review

Assessment Overview

Assessment Stages:

- BIOM4951 Thesis A: Interim Report (10%)
- BIOM4952 Thesis B: Progress Seminar and Reflection (10%)
- BIOM4953 Thesis C: Final report (65%), Participation (5%), Conference Poster Presentation (10%)

BIOM4951 Thesis A Assessment Objectives

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.

For students intending to undertake Thesis B and C simultaneously in the second term, Thesis A should be of sufficient quality and depth to demonstrate the capacity of the student to complete Thesis B & C concurrently and you must have your supervisors approval first, which will depend on your Thesis A results and the complexity of your project.

Overview

The Interim Report and Literature Review is designed to ensure that you have planned your research project. It includes a review of the current literature and similar available technologies or solutions. It is designed to ensure that you have picked up enough background knowledge to ensure that you are conducting a novel and significant research project and have identified all the skills required to complete your project. As a guide, the total number of pages in your document should be between 15 and 30 pages and you should cite between 15 and 30 scientific papers, other articles, related technology or other existing works in the area. Your supervisor may have additional requirements, so please check with them first and ask for their guidance. The Interim Report and Literature Review is marked by your project supervisor.

Interim Report Structure

This is a general structure, please check with your supervisor as they may have specific requirements based on your project. Indicative length 15-30 pages total

- Abstract
- Table of Contents
- Introduction (max 1 page)
- Aims
- Background
- Literature Review
- Hypotheses (if applicable)
- Research Plan
- Methodology
- Timeline
- Project Dependent Preparations

Interim Report Details

1. Literature review or equivalent (50%)

- What is the problem to be solved, and its significance?
- Must Include:
    - Brief background to project
    - Summary of literature relevant to project
    - Hypotheses (and/or gaps identified the knowledge)
    - Problem Statement (informed by gaps in the literature)
    - Hypothesis and aims

Indicative length of this component is 10-15 pages,

2. Project planning (20%)

- How will the student answer the research question in the given time using their available resources?
- Must include:
    - Proposed Solution/Experimental Methodology
    - Detailed Thesis timeline – for next two terms
    - Justification of time allocation for each task
    - Available resources identified
    - Required training and upskilling identified

3. Project Dependent Preparations (20%)

- Can the student achieve the aims in the timeline? What progress has been made already?
- Preparations will be project specific, but may include:
    - Evidence of training on specific equipment
    - Evidence of some up-skilling in new software/methods
    - Preliminary results
    - Preliminary sketches
    - Components/parts ordered
    - Detailed budget of parts to be ordered
    - Risk Assessment

4. Document presentation (10%)

- Report layout (including 12pt font and normal boarders)
- English skills – spelling, grammar
- Data presentation (if applicable)
- Clarity of writing – Goldilocks style (convey meaning within page recommendations)
- Citations consistent and correctly formatted.

Use of Generative Artificial Intelligence (AI) and editing assistance in thesis projects

Editing assistance

For Biomedical Engineering Thesis projects, you may use standard editing and referencing software, (e.g. Microsoft Office suite, Grammarly, EndNote, etc). This does not need to be cited. You are also encouraged to use the UNSW approved online writing support platform Smart Thinking service, https://www.student.unsw.edu.au/smarthinking

Generative AI

As this assessment task involves some planning or creative processes, you are permitted to use software to assist you in the generation of initial ideas. However, you must develop or edit those ideas to such a significant extent that what is submitted is your own work, i.e. only occasional AI generated words or phrases may form part of your final submission. It is a good idea to keep copies of the initial prompts to show your lecturer if there is any uncertainty about the originality of your work. Use of generative AI must be cited. When writing you thesis project and thinking about how to make use generative AI tools you should strive to create an original master piece by drawing together the available information from a wide range of sources. It is expected that the final submission will be demonstrably greater than the sum of the contributing parts. You should also consider the new 2023 marking rubric whereby projects that do not demonstrate original contributions from the student or appear to rely heavily on generative AI or other tools will be marked in the lower bands for each category. User of generative AI must be cited as follows:

* To cite: OpenAI (Year Accessed). ChatGPT. "Copy of text used to generate the output", [date generated dd/mm/yyy], OpenAI. https://openai.com/models/chatgpt/

Please note that the outputs from these tools are not always accurate, appropriate, nor properly referenced. You should ensure that you have moderated and critically evaluated the outputs from generative AI tools and only use occasionally AI generated words or phrases in your submissions.

*** If the outputs of generative AI such as ChatGPT form a part of your submission and they are not cited or include complete sentences or paragraphs, it will be regarded as serious academic misconduct similar to plagiarism (coping work and then passing it of as your own work) and subject to the standard penalties, which may include 00FL, suspension and exclusion. ***

Course Learning Outcomes

- CLO1 : Develop a design or a process or investigate a hypothesis following industry and professional engineering standards.

- CLO2 : Critically reflect on a specialist body of knowledge related to their thesis topic.
- CLO3 : Apply scientific and engineering methods to solve an engineering problem.
- CLO4 : Analyse data objectively using quantitative and mathematical methods.
- CLO5 : Demonstrate oral and written communication in professional and lay domains.
- CLO6 : Solve a biomedical engineering problem by applying CLOs 1-5.

Assessment Length

15-30 pages

Submission notes

Submission link will open in Moodle once Smarthinking hurdle is passed

Assessment information
Assignment submission Turnitin type

This is not a Turnitin assignment

Hurdle rules

Submit a draft report to Smarthinking for feedback

Generative AI Permission Level

Assistance with Attribution

This assessment requires you to write/create a first iteration of your submission yourself. You are then permitted to use generative AI tools, software or services to improve your submission in the ways set out below.

Any output of generative AI tools, software or services that is used within your assessment must be attributed with full referencing.

If outputs of generative AI tools, software or services form part of your submission and are not appropriately attributed, your Convenor will determine whether the omission is significant. If so, you may be asked to explain your submission. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.

For more information on Generative AI and permitted use please see here.

The use of AI tools in this assessment item must first be approved by the individual thesis supervisor. If AI tools are used, they must be properly cited throughout the text and their uses specifically detailed in an appendix. The use of AI without proper acknowledgement would be considered plagiarism and a zero mark would be awarded. To fairly assess student capability, given similarly ranked submissions from different students, higher marks would be awarded to the assessment items that demonstrate greater independent thought from the student including

for example minimal AI assistance.

General Assessment Information

<u>Grading Basis</u>

Standard

<u>Requirements to pass course</u>

A pass grade of 50% is required to progress to BIOM4952 Thesis B

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 0 : 2 September - 8 September	Blended	• If you have an Industry Partner in mind, contact the course coordinator at the earliest possible date to ensure all legal paper work can be completed before starting. • Before the end of the previous term discuss search the Biomedical Engineering Thesis Projects database and discuss projects with possible supervisors. • At the latest, by Week 12 of the previous term make your project selection using the Biomedical Engineering Thesis Projects online form. • By Week 0, reach out to your confirmed supervisor and set up a weekly meeting schedule with your supervisor.
Week 1 : 9 September - 15 September	Other	Meet with your supervisor.
Week 2 : 16 September - 22 September	Workshop	Introduction to Scientific Literature Reviews
Week 3 : 23 September - 29 September	Workshop	Biomedical Laboratory Inductions
Week 4 : 30 September - 6 October	Workshop	Research Integreity, Data Management and Ethics
Week 10 : 11 November - 17 November	Activity	Upload Smarthinking Feedback to Moodle by Monday Week 10 (11:59 PM)
Week 11 : 18 November - 24 November	Assessment	Submit Final Interim Report using Microsoft Forms by Monday Week 11 (11:59 PM)

Attendance Requirements

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

General Schedule Information

You must still Enroll and Register your classes on myUNSW - otherwise you'll have your enrolment removed from your transcript.

Course 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.):

Discuss the possibility of an extension with your supervisor first. 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. Request must be lodged by Week 6 of term. Panel decision will be made by end of week 7. The decision will be made by a panel – consisting of the HoS (or their nominee), Thesis Coordinator, and 1 other person. Students should be alerted to the fact that this is not guaranteed, and thus should not rely on getting an extension. 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.

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).

– 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:

Identify an industry supervisor and share with them these guidelines. Identify a GSBmE Academic who can be your academic supervisor. Complete this Industry thesis permission form and make sure your industry supervisor AND your academic supervisor have signed the form. 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

Course Evaluation and Development

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

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Tianruo Guo		Samuels 515	Moodle/ TEAMS Thesis channel	Weekdays by appointment	No	No
	Matthew Brodie		Samuels 515	Moodle/ TEAMS Thesis channel	Drop in help Wednesday 09:30 to 11:30, Samuels 515c	No	Yes

Other Useful Information
Academic Information

I. Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to, or within 3 working days of, submitting an assessment or sitting an exam.

Please note that UNSW has a Fit to Sit rule, which means that if you sit an exam, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's Special Consideration page.

II. Administrative matters and links

All students are expected to read and be familiar with UNSW guidelines and polices. In particular, students should be familiar with the following:

- Attendance
- UNSW Email Address
- Special Consideration
- Exams
- Approved Calculators
- Academic Honesty and Plagiarism
- Equitable Learning Services

III. Equity and diversity

Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equitable Learning Services. Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.

IV. Professional Outcomes and Program Design

Students are able to review the relevant professional outcomes and program designs for their streams by going to the following link: https://www.unsw.edu.au/engineering/student-life/student-resources/program-design.

Note: This course outline sets out the description of classes at the date the Course Outline is published. The nature of classes may change during the Term after the Course Outline is published. Moodle or your primary learning management system (LMS) should be consulted for the up-to-date class descriptions. If there is any inconsistency in the description of activities between the University timetable and the Course Outline/Moodle/LMS, the description in the Course Outline/Moodle/LMS applies.

Academic Honesty and Plagiarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.*

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism, visit: student.unsw.edu.au/plagiarism. The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis or contract cheating) even suspension from the university. The Student Misconduct Procedures are available here:

www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Submission of Assessment Tasks

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of five percent (5%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day. This is for all assessments where a penalty applies.

Work submitted after five days (120 hours) will not be accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These will be clearly indicated in the course outline, and such assessments will receive a mark of zero if not completed by the specified date. Examples include:

- Weekly online tests or laboratory work worth a small proportion of the subject mark;
- Exams, peer feedback and team evaluation surveys;
- Online quizzes where answers are released to students on completion;
- Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date; and,
- Pass/Fail assessment tasks.

Faculty-specific Information

Engineering Student Support Services – The Nucleus - enrolment, progression checks, clash requests, course issues or program-related queries

Engineering Industrial Training – Industrial training questions

UNSW Study Abroad – study abroad student enquiries (for inbound students)

UNSW Exchange – student exchange enquiries (for inbound students)

UNSW Future Students – potential student enquiries e.g. admissions, fees, programs, credit transfer

Phone

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

(+61 2) 9385 3179 – UNSW Study Abroad and UNSW Exchange (for inbound students)

School Contact Information

Student Services can be contacted via unsw.to/webforms.