



## UNSW Course Outline

# BIOM9021 Masters Project (Half Time) - 2024

Published on the 12 May 2024

## General Course Information

Course Code : BIOM9021

Year : 2024

Term : Term 2

Teaching Period : T2

Is a multi-term course? : No

Faculty : Faculty of Engineering

Academic Unit : Graduate School of Biomedical Engineering

Delivery Mode : Research

Delivery Format : Standard

Delivery Location : Kensington

Campus : Sydney

Study Level : Postgraduate, Undergraduate

Units of Credit : 6

### Useful Links

[Handbook Class Timetable](#)

## Course Details & Outcomes

### Course Description

The biomedical engineering masters project allows coursework masters students to experience research training either within the school or with collaborating institutions such as hospitals and CSIRO. These projects offer a distinctive chance for you to merge the engineering principles

you've acquired throughout your prior years of study, and apply these principles to address unresolved engineering challenges in the realm of human health. Projects are selected by the student in consultation with a supervisor conducting research in an area of interest to the student. If the research topic selected is external to the School/University, the student must arrange for an internal GSBmE co-supervisor/assessor.

BIOM9021 is the second half of the 12 UOC research project. BIOM9020 is the first half. Enrolment in these courses allows a student to undertake the equivalent of BIOM9914 Masters Project over two terms. Projects are assessed on the basis of a scientific manuscript (70%) in the format of a research paper ready for submission to a refereed journal or conference proceeding. A poster presentation (10%) is also required. The final grade of the thesis will be the weighted average of your assessments from BIOM9020 (20%) and BIOM9021 (70% for manuscript +10% for poster presentation). You will receive the same grade for both courses upon completion of BIOM9021.

## Course Aims

The aim of BIOM9021 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.

The biomedical engineering masters project aim to provide an opportunity for postgraduate coursework students to bring together engineering principles learned over their previous years of study and apply these principles to solve critical 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 interim report (BIOM9020), scientific manuscript (BIOM9021), and conference/industry night poster presentations (BIOM9021).

# Course Learning Outcomes

Course Learning Outcomes
CL01 : Develop a design or a process or investigate a hypothesis following industry and professional engineering standards.
CL02 : Critically reflect on a specialist body of knowledge related to their thesis topic.
CL03 : Apply scientific and engineering methods to solve an engineering problem.
CL04 : Analyse data objectively using quantitative and mathematical methods.
CL05 : Demonstrate oral and written communication in professional and lay domains.
CL06 : To solve biomedical problems by applying 1-5.

Course Learning Outcomes	Assessment Item
CL01 : Develop a design or a process or investigate a hypothesis following industry and professional engineering standards.	
CL02 : Critically reflect on a specialist body of knowledge related to their thesis topic.	
CL03 : Apply scientific and engineering methods to solve an engineering problem.	
CL04 : Analyse data objectively using quantitative and mathematical methods.	
CL05 : Demonstrate oral and written communication in professional and lay domains.	
CL06 : To solve biomedical problems by applying 1-5.	

## 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

Attend Research Skills Workshops:

- Week 3 - Research Statistics
- Week 7 - Scientific Communication

Week 8 Present your poster as part of the Week 8 Biomedical Engineering Showcase

# Assessments

## Assessment Structure

Assessment Item	Weight	Relevant Dates
Conference Poster Presentation Assessment Format: Individual	10%	
Scientific manuscript Assessment Format: Individual	70%	

## Assessment Details

### Conference Poster Presentation

#### Assessment Overview

Your conference poster presentation (10%) will be marked by the people who attend your time slot at GSBME's projects showcase event (Week 8) so it is important you aim the poster presentation to be eye catching and interesting to a general educated audience and avoid overly technical language and fine print.

#### Conference Poster Presentation (10%)

Make a high impact A1 poster, stand next to it physically, give a short and engaging 3-minute presentation and then provide answers during a quick-fire 2-minute Q & A session. Presentation time is strictly controlled so be precise and to the point. All text should be readable by the group of markers who will be standing in 2-meters back from the poster.

- Students will present their poster in Week 8 as part of the Biomedical Engineering Projects Showcase event.
- This is a great opportunity to present your work to senior academics and industry partners.
- The target audience for this presentation are researcher and engineers who are not necessarily familiar with your field of expertise, so you will need to provide a background context.
- The audience knows the research process and will have some general engineering knowledge but may not be experts in your area so avoid highly technical jargon.
- Your challenge is to present the significance of your research problem as well as your key results that show whether you have met your aim or proved/disproved your hypothesis.
- You have 3-minutes so should focus on one or two key aspect only. You will not have time to cover everything. Narrow the focus of your presentation scope and do not speak faster than normal to try and fit more content in.
- The audience will then ask questions on your presentation that you must answer for 2-minutes.
- Minimise text. All text and figures should be readable from a distance of 2-meters.

- Success in this assessment will involve both a clear and cohesive presentation and an ability to concisely explain your research to engineers who are not necessarily in your field of study.

### **Assessment criteria**

Your conference poster presentation will be marked by the people who attend poster session at the Biomedical Engineering Projects Showcase event in Week 8 using online-forms. It is therefore important you aim the poster presentation to be eye catching and interesting to a general educated audience and avoid overly technical language and fine print. The poster marking rubric will be available on the Moodle and Teams classroom pages. The poster presentation duration of 3-minutes minutes and 2-minute Q & A session must be strictly adhered to.

### **Editing assistance**

For both thesis and poster editing, 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/yyyy], 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 (copying work and then passing it off as your own work) and subject to the standard penalties, which may include 00FL, suspension and exclusion. \*\*\***

### **Assessment Length**

Poster Presentation - Make a poster, stand next to it physically to answer any questions about it.

### **Submission notes**

Submit via the link on Microsoft Teams or Moodle prior to presenting

### **Assessment information**

Conference poster presentations are part of the Biomedical Engineering Projects Showcase Event in Week 8 and a great opportunity to showcase your capstone project to other students, academics and future employers.

## **Scientific manuscript**

### **Assessment Overview**

BIOM9021 Scientific manuscript (70%)

The objective of this report is to summarise the results of your thesis journey in a format suitable publication in a scientific report. The report highlights the problem you're trying to solve, your project aims, justification of aims and methods with a literature review, the methods used to solve the problem, the results of your experiments, and a discussion of those results in context. This document will be in the format of a research paper for publication in a scientific journal or refereed conference papers (to be published in full in the proceedings). These papers are concise, whilst ensuring enough information to replicate the work is provided, and so as the 1st author you need to be selective with which information to include. It is essential for you to discuss with your supervisors to determine the scope and nature of the journal or conference proceedings before you start drafting the manuscript.

Your scientific manuscript for BIOM9021 will be assessed by (i) your supervisor and (ii) and independent assessor. Your scientific manuscript mark will be the average these two assessors.

In case the difference between your two assessors is greater than 10 marks the convenor will moderate. The final grade will be the weighted average of your assessments from BIOM9020 (20%) and BIOM9021 (70%+10%). You will receive the same grade for both courses upon completion of BIOM9021.

BIOM9021 Manuscripts must include the following:

- **Title Page**

**Title:** The title should contain no more than 150 characters (including spaces) and clearly indicate the subject matter of the paper.

**Names:** Student's Name, Supervisors' Names

**Key Words:** Three to Five key words should be provided.

**Word Count:** The word count excluding the abstract, tables, figure legends, statement of contribution, acknowledgements, references and supplementary data. **Minimal word count: 5000 words**

- **Abstract**

An abstract of up to 250 words should follow the title page. The abstract should provide the background for the study, experimental approach, major findings and conclusions. It should be understandable without reference to the rest of the paper. References must not be cited.

- **Introduction**

The introduction should give a clear account of the background for the study, and the research objective or hypothesis tested should be stated. Introductions should be written in a "funnel" style: It begins with the general, global problem that is to be addressed. Usually this is the disease or ailment that your research may eventually impact with the final paragraph revealing the aim of the research and your hypotheses and outlining the contents of the report. The information in literature review presented in BIOM9020 internal report may be used in this section to provide a comprehensive summary of the advancements and progress made in the field.

- **Methods**

The methods must be described in enough detail to allow the experiments to be interpreted and repeated by an experienced investigator. Give references to established methods, provide

references and brief descriptions for methods that have been published but are not well known. If human subjects or tissues are used, the UNSW HREC or HREA project number must be cited.

- **Results**

Present your results in logical sequence in the text, tables, graphs and illustrations. The description of the experimental results should be succinct, but in enough detail to allow the experiments to be analysed and interpreted by the reader. Where group data is presented a statistical analysis should be included.

- **Discussion and Conclusion**

Explore possible mechanisms or explanations for the findings of your study, compare and contrast your results with those from other relevant studies, state the limitations of the study, and explore the implications of the findings for future research. Do not repeat in detail data or other material given in the Introduction or the Results sections. Finally, provide a one paragraph conclusion to your research. This is not a copy of the abstract, rather it is a succinct summation of your results and whether your hypotheses were proven or disproven, with a short explanation why.

- **Acknowledgements**

The author should acknowledge those who have provided funds, reagents, technical guidance and/or training and scientific advice.

- **Statement of Contribution**

The statement of contribution should specifically identify the components of research undertaken by the student. Work done by others must be limited to steps that would enable the student to undertake their project, not the project themselves. The supervisor must approve the statement of contribution before submission. Seek advice from your supervisor if you are unsure about this.

- **References**

Refer to your supervisor for an appropriate referencing style, as these are usually journal and discipline specific. As a guide, many engineering reports using IEEE Numbered or Harvard. Whichever style you use, ensure that it is consistent throughout.

- **Supplementary Data (optional)**

Material needed for an in-depth evaluation of the work, but which does not fit well in manuscript



format should be included as Supplementary Data. Must summarised and referred to in the main text.

- **Tables, Figures and Legends:**

Each table or figure must be cited in the text and then integrated at an appropriate position within the text. All Tables and figures should be self-explanatory and readable (8-pt font minimum) with necessary descriptions provided in a legend that explains the figure/table in enough detail. Each figure also needs a title, labelled axes with units specified. All symbols and abbreviations should be explained within the legend.

It is crucial that all tables and figures, along with their corresponding legends, are comprehensible even without referring to the accompanying text. This ensures that readers can grasp the key information and context solely by examining these visual elements.

- **Formatting and Technical Instructions**

Text should be times roman, 12-point font, with 1.5 line spacing throughout the manuscript. Margin should be 2 cm on all sides.

#### **Assessment Length**

5000 words (+10%) excluding the abstract, acknowledgements and references, tables, figures, legends, in-text citations, supplementary data.

#### **Submission notes**

Please submit using the form on Microsoft Teams or link on Moodle

## **General Assessment Information**

Your scientific manuscript for BIOM9021 will be assessed by (i) your supervisor and (ii) an independent assessor. Your scientific manuscript mark will be the average of these two assessors. In case the difference between your two assessors is greater than 10 marks the convenor will moderate. Your conference poster presentation will be marked by the people who attend your time slot at GSBME's projects showcase event (Week 8) so it is important you aim the poster presentation to be eye catching and interesting to a general educated audience and avoid overly technical language and fine print. The final grade will be the weighted average of your assessments from BIOM9020 (20%) and BIOM9021 (80%). You will receive the same grade for both courses upon completion of BIOM9021. Use of Generative Artificial Intelligence (AI) and editing assistance in thesis projects

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 your thesis project and thinking about how to make use of generative AI tools you should strive to create an original masterpiece 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/yyyy], 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 (copying work and then passing it off as your own work) and subject to the standard penalties, which may include 00FL, suspension and exclusion. \*\*\*

## Grading Basis

### Standard

# Course Schedule

Teaching Week/Module	Activity Type	Content
Week 3 : 10 June - 16 June	Workshop	Week 3 - Research Statistics
Week 7 : 8 July - 14 July	Workshop	Week 7 - Scientific Communication
Week 8 : 15 July - 21 July	Presentation	Week 8 - Present your poster as part of the Week 8 Biomedical Engineering Showcase
Week 10 : 29 July - 4 August	Assessment	Final Report by Monday Week 11 (11:59 PM)

## Attendance Requirements

There is no official class time for this course. 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 still ensure your enrolment and registration is up to date. Your supervisor will guide you through the thesis research project.

## 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

Students have three options.

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

### 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.

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

The Scientific Report writing guidelines were adapted from Nature Biomedical Engineering (<https://www.nature.com/natbiomedeng/info/final-submission>) and the Uniform Requirements for Manuscripts Submitted to Biomedical Journals, the British Journal of Pharmacology, the Journal of Anatomy, the Journal of Pathology and the Journal of Physiology.

### Other resources:

- Thesis writing for Engineering and Science students: <https://student.unsw.edu.au/honours->

[thesis-writing-engineering-and-science-students](#)

- How to write a hypothesis <https://theiteducation.com/research-hypothesis-examples-howto-write-hypothesis/>
- Shaw M. Writing good software engineering research papers. Proc - Int Conf Softw Eng. 2003. p. 726–36.

Smart thinking (<https://www.student.unsw.edu.au/smarthinking>)

Smarthinking is an online writing support platform officially sanctioned by UNSW. Students can submit drafts of their writing to a Smarthinking tutor or connect to a Smarthinking tutor in a real-time session and receive comprehensive feedback on a variety of writing areas. For all enquiries, please contact [Smarthinking@unsw.edu.au](mailto:Smarthinking@unsw.edu.au).

## Course Evaluation and Development

## Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Tianruo Guo		Samuels Building 515	Moodle/TEAMS Thesis Channel	by appointment	No	Yes
	Matthew Brodie		Samuels Building 515	Moodle/TEAMS Thesis Channel	by appointment	No	No

## 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 / Submit rule, which means that if you sit an exam or submit a piece of assessment, 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 policies. 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.

*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](http://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](http://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](https://unsw.to/webforms).