



UNSW Course Outline

BIOM9333 Cellular and Tissue Engineering - 2024

Published on the 25 Aug 2024

General Course Information

Course Code : BIOM9333

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 : Postgraduate, Undergraduate

Units of Credit : 6

Useful Links

[Handbook Class Timetable](#)

Course Details & Outcomes

Course Description

This course outlines the concepts of cell-based products for the pharmaceutical and medical device industries. This course will cover the basis of how biologics (eg protein and carbohydrate drugs and antibodies) are produced by cells; recombinant technologies to produce biologics

from bacterial and mammalian systems; process design and optimisation for the production of biologics; case studies of commercial biologics; cell therapies; the principles of tissue engineering and regenerative medicine, including biomaterials, cells and growth factors, and the clinical application of these principles in various tissues.

Course Aims

The aim of this course is to develop an understanding of the principles of engineering cells and apply this knowledge to design processes to produce biologics for the pharmaceutical market or tissue engineered/regenerative medicine medical devices.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Describe the principles of cellular and tissue engineering/regenerative medicine.
CLO2 : Apply the principles of cellular and tissue engineering/regenerative medicine to theoretically develop processes for the production of medical devices containing cells and/or biologics.
CLO3 : Synthesise, compare and evaluate scientific literature, technical reports and presentations.
CLO4 : Communicate effectively in a professional environment through technical reports and presentations

Course Learning Outcomes	Assessment Item
CLO1 : Describe the principles of cellular and tissue engineering/regenerative medicine.	<ul style="list-style-type: none"> • Weekly Progress • Quizzes
CLO2 : Apply the principles of cellular and tissue engineering/regenerative medicine to theoretically develop processes for the production of medical devices containing cells and/or biologics.	<ul style="list-style-type: none"> • Tasks • Major Project • Weekly Progress • Quizzes
CLO3 : Synthesise, compare and evaluate scientific literature, technical reports and presentations.	<ul style="list-style-type: none"> • Tasks • Major Project • Quizzes
CLO4 : Communicate effectively in a professional environment through technical reports and presentations	<ul style="list-style-type: none"> • Tasks • Major Project • Quizzes

Learning and Teaching Technologies

Moodle - Learning Management System | Microsoft Teams

Additional Course Information

Lessons are completed in your own time while the workshops are held during class time to consolidate your understanding of the lessons, receive help to complete the activities and work on the team major project.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Weekly Progress Assessment Format: Individual	15%	Due Date: Refer to Moodle
Tasks Assessment Format: Individual	30%	Due Date: Refer to Moodle
Quizzes Assessment Format: Individual	30%	Due Date: Refer to Moodle
Major Project Assessment Format: Group	25%	Due Date: Refer to Moodle

Assessment Details

Weekly Progress

Assessment Overview

Checkpoint tasks (8) assess understanding and timely completion of weekly lesson and activity modules on Moodle. These take the form of 8 quizzes in Moodle (1 each week for 8 weeks) consisting of multiple choice questions with marks allocated to each question visible during the quiz.

Each quiz is expected to take approximately 10 minutes to complete.

Course Learning Outcomes

- CL01 : Describe the principles of cellular and tissue engineering/regenerative medicine.
- CL02 : Apply the principles of cellular and tissue engineering/regenerative medicine to theoretically develop processes for the production of medical devices containing cells and/or biologics.

Generative AI Permission Level

Not Applicable

Generative AI is not considered to be of assistance to you in completing this assessment. If you do use generative AI in completing this assessment, you should attribute its use.

For more information on Generative AI and permitted use please see [here](#).

Tasks

Assessment Overview

Individual tasks (3) covering each major course theme are aimed to provide an opportunity to apply the theory obtained from the lessons and activity modules. A marking guide is provided in the brief on Moodle for each task.

Each task is expected to take approximately 4 hours to complete.

Course Learning Outcomes

- CLO2 : Apply the principles of cellular and tissue engineering/regenerative medicine to theoretically develop processes for the production of medical devices containing cells and/or biologics.
- CLO3 : Synthesise, compare and evaluate scientific literature, technical reports and presentations.
- CLO4 : Communicate effectively in a professional environment through technical reports and presentations

Assessment information

Turnitin will be used in a component of the tasks within Assessment 2

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students can see Turnitin similarity reports.

Generative AI Permission Level

Simple Editing Assistance

In completing this assessment, you are permitted to use standard editing and referencing functions in the software you use to complete your assessment. These functions are described below. You must not use any functions that generate or paraphrase passages of text or other media, whether based on your own work or not.

If your Convenor has concerns that your submission contains passages of AI-generated text or media, you may be asked to account for your work. 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](#).

In the assignment tasks, Generative AI is encouraged for the purposes of developing your knowledge of concepts within BIOM9333 and for assistance with editing

Quizzes

Assessment Overview

Mid-term and final quizzes will comprise a combination of multiple choice and short answer questions in a centrally-run, open book format.

The allocated time to complete the quizzes is 30 minutes for the mid-term and 2 hours for the final.

Course Learning Outcomes

- CL01 : Describe the principles of cellular and tissue engineering/regenerative medicine.
- CL02 : Apply the principles of cellular and tissue engineering/regenerative medicine to theoretically develop processes for the production of medical devices containing cells and/or biologics.
- CL03 : Synthesise, compare and evaluate scientific literature, technical reports and presentations.
- CL04 : Communicate effectively in a professional environment through technical reports and presentations

Generative AI Permission Level

No Assistance

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.

For more information on Generative AI and permitted use please see [here](#).

Major Project

Assessment Overview

The major project is a group task which involves designing a regenerative medicine product that utilises a bioactive. This will be assessed in multiple parts: milestones (2), presentation, technical report, reflection (individual) and peer review (individual). The assessments are staged throughout the term to enable the application of knowledge and skills developed in the course to be applied to the major project. A marking guide is provided in the brief on Moodle for each task. The major project is expected to take approximately 20 hours to complete. Time is allocated in tutorials to facilitate group interaction for this project.

Course Learning Outcomes

- CL02 : Apply the principles of cellular and tissue engineering/regenerative medicine to theoretically develop processes for the production of medical devices containing cells and/or

biologics.

- CLO3 : Synthesise, compare and evaluate scientific literature, technical reports and presentations.
- CLO4 : Communicate effectively in a professional environment through technical reports and presentations

Assessment information

Turnitin will be used in a component of the Major Project submission

Assignment submission Turnitin type

This assignment is submitted through Turnitin and students can see Turnitin similarity reports.

Generative AI Permission Level

Simple Editing Assistance

In completing this assessment, you are permitted to use standard editing and referencing functions in the software you use to complete your assessment. These functions are described below. You must not use any functions that generate or paraphrase passages of text or other media, whether based on your own work or not.

If your Convenor has concerns that your submission contains passages of AI-generated text or media, you may be asked to account for your work. 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](#).

In the Major Project assessments, Generative AI is encouraged for the purposes of developing your knowledge of concepts within BIOM9333 and for assistance with editing

General Assessment Information

The assessments have been designed to measure your achievement of the learning outcomes.

Students who perform poorly in the weekly progress tasks are recommended to discuss progress with the Course Convenor during the term.

The final grade for this course will normally be based on the sum of the scores from each of the assessment tasks. The Course Convenor reserves the right to adjust the final scores by scaling if agreed by the Head of School.

Assessment marks and feedback will be available on Moodle as soon as they have been marked, which will usually be within 2 weeks of submission.

Grading Basis

Standard

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 9 September - 15 September	Topic	Principles of Tissue engineering and regenerative medicine (TERM) I
	Module	<ul style="list-style-type: none">• Lesson 1• Activity 1
	Workshop	<ul style="list-style-type: none">• Course Introduction• Consolidate Lesson 1• Activity 1• Q&A
	Assessment	<ul style="list-style-type: none">• Checkpoint 1 (individual task)
Week 2 : 16 September - 22 September	Topic	Principles of TERM II
	Module	<ul style="list-style-type: none">• Lesson 2• Activity 2
	Workshop	<ul style="list-style-type: none">• Consolidate Lesson 2• Activity 2• Biomaterials showcase• Q&A
	Assessment	<ul style="list-style-type: none">• Checkpoint 2 (individual task)
Week 3 : 23 September - 29 September	Topic	Principles of TERM III
	Module	<ul style="list-style-type: none">• Lesson 3• Activity 3
	Workshop	<ul style="list-style-type: none">• Consolidate Lesson 3• Activity 3• Q&A• Major Project Session I
	Assessment	<ul style="list-style-type: none">• Checkpoint 3 (individual task)• Assignment Task 1: TERM (individual task)• Major Project Milestone I (individual task)
Week 4 : 30 September - 6 October	Topic	Recombinant protein expression I
	Module	<ul style="list-style-type: none">• Lesson 4• Activity 4
	Workshop	<ul style="list-style-type: none">• Consolidate Lesson 4• Activity 4• Cells showcase• Q&A• Major Project Session II
	Assessment	<ul style="list-style-type: none">• Checkpoint 4 (individual task)
Week 5 : 7 October - 13 October	Topic	Recombinant protein expression II
	Module	<ul style="list-style-type: none">• Lesson 5• Activity 5
	Workshop	<ul style="list-style-type: none">• Consolidate Lesson 5• Activity 5• Q&A• Major Project Session III
	Assessment	<ul style="list-style-type: none">• Checkpoint 5 (individual task)• Mid-term Quiz (individual task)• Major Project Milestone II (team task)
Week 7 : 21 October - 27 October	Topic	Production of bioactives I
	Module	<ul style="list-style-type: none">• Lesson 6• Activity 6
	Workshop	<ul style="list-style-type: none">• Consolidate Lesson 6• Activity 6• Bioreactor showcase• Q&A
	Assessment	<ul style="list-style-type: none">• Checkpoint 6 (individual task)• Assignment Task 2: Recombinant Proteins (individual task)• Major Project Product Pitch (team task)

Week 8 : 28 October - 3 November	Topic	Production of bioactives II
	Module	<ul style="list-style-type: none"> • Lesson 7 • Activity 7
	Workshop	<ul style="list-style-type: none"> • Consolidate Lesson 7 • Activity 7 • Chromatography showcase • Q&A
	Assessment	<ul style="list-style-type: none"> • Checkpoint 7 (individual task) • Major Project Peer Review (individual task)
Week 9 : 4 November - 10 November	Workshop	<ul style="list-style-type: none"> • Activity 8 • Q&A
	Assessment	<ul style="list-style-type: none"> • Checkpoint 8 (individual task) • Assignment Task 3: Bioprocessing (individual task)
Week 10 : 11 November - 17 November	Workshop	<ul style="list-style-type: none"> • Course Q&A and revision
	Assessment	<ul style="list-style-type: none"> • Major Project Technical Report (team task) • Major Project Reflection (individual task)

Attendance Requirements

Students are encouraged to complete the relevant lesson prior to attending the in-person workshop each week.

Course Resources

Recommended Resources

- A short guide to writing about biology, global edition by Jan Pechenik.

Course Evaluation and Development

Student feedback has helped to continually shape and develop this course, including feedback obtained from on-line evaluations as part of UNSW's myExperience process.

The course underwent a major revision in 2020 with changes including reordering of the content delivered, revision to the course content and inclusion of major project sessions to assist with the timely and focused development of the major project. All course content is now designed for online access with instant feedback incorporated into all lessons and activities. Further developments in the last couple of years have included hands-on activities in some workshops and revision of the course content and assessments.

Previous students in the class provided feedback including 'Very interesting course and well organised', 'The activities were engaging, enjoyable, required critical thinking and were well integrated into the course' and that the 'interactive tutorial classes allowed for constructive feedback'.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Jonathan Yeow		Room 1004, E26		By appointment	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 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 convenor 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.