



MOLS8611

Molecular and Medical Biotechnology

Session 2, In person-scheduled-weekday, North Ryde 2026

School of Natural Sciences

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General Information

Unit convenor and teaching staff

Unit Convenor

Garry Myers

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Contact via email

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Credit points

10

Prerequisites

Admission to GradDipRes or GradCertRes or (BMOL6401 and Admission to GradDipBiotech or MBiotech)

Corequisites

Co-badged status

Unit description

This unit is composed of lectures, a significant hands-on practical component, student debate, workshops, assignments and reports. We will explore areas of contemporary molecular and medical biotechnology by building on students' existing knowledge and showing how science is translated to applications in health, industry and the environment. Lecture topics range from the production of recombinant biomolecules in various cell factories and their industrial and medical applications to nanobiotechnology and stem cells. Instrumentation and technology supporting biotechnology will be introduced and discussed. Visiting lecturers from various academic disciplines will lead discussion on their areas of expertise. The unit also has a significant hands-on practical component with workshop and assignment tasks.

Learning in this unit enhances student understanding of global challenges identified by the United Nations Sustainable Development Goals ([UNSDGs](#)) Good Health and Well Being; Quality Education; Industry, Innovation and Infrastructure

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: Demonstrate an understanding of key concepts of biotechnology, its interdisciplinary nature and impact on modern society.

ULO2: Demonstrate good practical laboratory skills involving the use of contemporary experimental techniques in biotechnology including microbial culture, and production and characterisation of recombinant glycoproteins of therapeutic value.

ULO3: Relate information published in the scientific literature to practical research questions in biotechnology

ULO4: Explain and interpret results from the laboratory experiments carried out during the practicals reflecting published literature and relevant technical and theoretical concepts.

ULO5: Critique and communicate a complex biotechnology topic in writing and orally and practice the ability to form opinions on the safety and ethics issues related to gene editing in our society.

ULO6: Engage in curiosity-driven learning activities and critically evaluate the work of others.

General Assessment Information

Requirements to Pass this Unit

To pass this unit you must achieve a total mark equal to or greater than 50%.

Please note that regular participation and engagement with lecture and practical activities is highly recommended, since it will be difficult to pass the unit without obtaining marks from assessments based on these activities.

Engagement and participation

We strongly encourage all students to actively participate in all learning activities. Regular engagement is crucial for your success in this unit, as these activities provide opportunities to deepen your understanding of the material, collaborate with peers, and receive valuable feedback from instructors, to assist in completing the unit assessments.

Regular engagement in laboratory classes is particularly important, as many experiments run across a number of weeks and multiple missed classes can make it difficult to develop fundamental skills and obtain sensible results. Please be aware that due to the specific culturing requirements of the microorganisms used, it is generally not possible to offer make-up activities for sessions missed.

Late Assessment Submission Penalty

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark of the task) will be applied for each day your lab report is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. The submission time for all uploaded assessments is 11:55 pm. A 1-hour grace period will be provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, please apply for [Special Consideration](#). For example, if the assignment is worth 8 marks (of the entire unit) and your submission is late by 19 hours (or 23 hours 59 minutes 59 seconds), 0.4 marks (5% of 8 marks) will be deducted. If your submission is late by 24 hours (or 47 hours 59 minutes 59 seconds), 0.8 marks (10% of 8 marks) will be deducted, and so on.

Assessments where Late Submissions will be accepted

- Great Debate – NO, unless Special Consideration is Granted
- Lab Report – YES, Standard Late Penalty applies
- Final exam - NO, unless Special Consideration is Granted

1. Assessment Release

Great Debate: To be released no later than 7th August.

Practical Report: To be released no later than 20th August.

Special Consideration

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through <https://connect.mq.edu.au>.

Assessment Tasks

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
The Great Debate	15%	No	In week 8, Mon 14th Sep, during the practical class	Individual and Group	No	Observed
Practical Report	40%	No	05/10/2026	Individual	Yes	Open

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
Final Exam	45%	No	University Examination Period	Individual	No	Observed

The Great Debate

Assessment Type ¹: Presentation task

Indicative Time on Task ²: 15 hours

Due: **In week 8, Mon 14th Sep, during the practical class**

Weighting: **15%**

Groupwork/Individual: Individual and Group

Short extension ³: No

AI Approach: Observed

The students will be divided into groups who will be given a topic in the area of biotechnology which they either have to defend or oppose.

On successful completion you will be able to:

- Demonstrate an understanding of key concepts of biotechnology, its interdisciplinary nature and impact on modern society.
- Explain and interpret results from the laboratory experiments carried out during the practicals reflecting published literature and relevant technical and theoretical concepts.
- Critique and communicate a complex biotechnology topic in writing and orally and practice the ability to form opinions on the safety and ethics issues related to gene editing in our society.
- Engage in curiosity-driven learning activities and critically evaluate the work of others.

Practical Report

Assessment Type ¹: Written Submission

Indicative Time on Task ²: 35 hours

Due: **05/10/2026**

Weighting: **40%**

Groupwork/Individual: Individual

Short extension ³: Yes

AI Approach: Open

The Lab Report is based on the experiments conducted in Practical class.

On successful completion you will be able to:

- Demonstrate an understanding of key concepts of biotechnology, its interdisciplinary nature and impact on modern society.

- Demonstrate good practical laboratory skills involving the use of contemporary experimental techniques in biotechnology including microbial culture, and production and characterisation of recombinant glycoproteins of therapeutic value.
- Relate information published in the scientific literature to practical research questions in biotechnology
- Explain and interpret results from the laboratory experiments carried out during the practicals reflecting published literature and relevant technical and theoretical concepts.
- Critique and communicate a complex biotechnology topic in writing and orally and practice the ability to form opinions on the safety and ethics issues related to gene editing in our society.
- Engage in curiosity-driven learning activities and critically evaluate the work of others.

Final Exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 30 hours

Due: **University Examination Period**

Weighting: **45%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

You will undertake a final examination during the formal examination period.

On successful completion you will be able to:

- Demonstrate an understanding of key concepts of biotechnology, its interdisciplinary nature and impact on modern society.
- Relate information published in the scientific literature to practical research questions in biotechnology
- Explain and interpret results from the laboratory experiments carried out during the practicals reflecting published literature and relevant technical and theoretical concepts.
- Critique and communicate a complex biotechnology topic in writing and orally and practice the ability to form opinions on the safety and ethics issues related to gene editing in our society.

¹ If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment

- [Academic Success](#) for academic skills support.

² Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation.

³ An automatic short extension is available for some assessments. Apply through the [Service Connect Portal](#).

Delivery and Resources

Week 1 Classes

Classes begin in week 1 – the link for online activities is available on iLearn.

Online safety and skills workshop takes place on Monday week 1 – please join zoom at 2pm sharp.

Lectures begin **MONDAY week 1**.

There are no lab-based practicals in week 1. Please make sure you have your own lab coat prior to week 2 when practical laboratory classes commence.

Methods of Communication

We will communicate with you via your university email and through announcements on iLearn. Queries to the convenor can either be placed on the iLearn discussion board or sent to the unit convenor via the contact email on iLearn.

Lectures

The expectation is that you will engage with lecture material and carry out the additional readings and/or viewing of associated material which is provided with certain lectures.

Participation in lectures during the scheduled time is highly recommended. Many lectures are delivered by academic and industry experts who are giving up their time to talk with you. These sessions will give you an opportunity to ask questions and participation is highly encouraged.

Looking over lecture slides is not a suitable substitute to participation. Students tend to perform poorly if they do not engage with lectures throughout the term and this will also impact your ability to prepare for and understand material in practical sessions.

Practicals and workshops

Both the lab-based practical classes and online workshop are designed to develop molecular laboratory skills, safety practices and critical and analytical thought. In order to be able to work safely and effectively in the practical classes, please make sure to read through laboratory notes prior to each practical session commencing, to familiarise yourself with planned work and ensure you are aware of biosafety considerations for the coming class.

Self-Study

The unit expectation is that you will spend time outside formal instruction reviewing notes taken in class, reading assigned materials (textbook sections and other referenced papers or articles) and exploring other sources of information on molecular biotechnology.

Required and Recommended Texts and Materials

You will be expected to bring a lab coat, closed shoes and lab notebook to each practical and to regularly refer to practical manual notes in class (either hardcopy or electronic). Laboratory Practical notes, outlining planned activities for laboratory sessions will be available on iLearn for download prior to the session, to enable you to prepare for the scheduled classes.

Unit Schedule

Week	Date	Lecture	Topic (Mon 9 am -11 am, zoom)	Speaker	Practical Activity (Mon 2-6 PM)
1	27-Jul	1	Unit Overview	Prof Garry Myers	Lab Skills and Safety Workshop: (online iLearn activity)
		2	Introduction to Biotechnology	Prof Garry Myers	
2	3-Aug	3	Toolbox for Biotechnology	Dr Vaheesan Rajabal	Module 1 Practical 1: Plasmid construction and DNA extraction
		4	Advances in Genetic Engineering, CRISPR and omics technologies	Dr Vaheesan Rajabal	
3	10-Aug	5	Synthetic Biology	Dr Nicholas Yang	Module 1 Practical 2: Bacterial transformation
		6	Synthetic Yeast Chromosomes	Dr Paige Erpf	
4	17-Aug	7	Glycobiology-the basics	A/Prof Morten Thaysen-Andersen	Module 1 Practical 3: Rapid Characterisation of DNAs cloned in prokaryote vectors (colony PCR)
		8	Glycobiotechnology	A/Prof Morten Thaysen-Andersen	
5	24-Aug	9	Glycoengineering basics	Dr Edward Moh	Module 1 Practical 4: Expression of cloned Genes (Using IPTG-Inducible Promoters)
		10	Glycoengineering Immunoglobins	Dr Edward Moh	

6	31-Aug	11	Protein Engineering	Prof Anwar Sunna	
		12	Protein Secretion and Quality Control	Dr Bhumika Shah	
7	7-Sep	13	Product Oriented Biotechnology	Dr Brad Walsh, CEO Minomic	<i>Prep for Debate</i>
		14	Entrepreneurship in Biotechnology	Prof Nicki Packer	
8	14-Sep	15	Microscopy- the Basics	Dr Zahra Kabir	Great Debate (in-class)
		16	Advanced microscopy and applications in biotechnology	Dr Zahra KAbir	
Mid-Sem Break 19th Sep - 4th Oct					
					Prac report Due 4th Oct
Week	Date	Lecture	Topic (Mon 9 am -11 am, zoom)	Speaker	Practical Activity (Mon PM)
9	Public Holiday	17	Microbial Cell Factories	Dr Estefania Giannini (pre-recorded)	Public Holiday
	Public Holiday	18	Mammalian Cell Cultures and Transgenic Animals	A/Prof Marco Monash (pre-recorded)	
10	12-Oct	19	Insect Synthetic Biology	Dr Kate Tepper	Module 2 Practical 1: Glycomics
		20	Biotechnology for Drug development	A/Prof Amy Cain	
11	19-Oct	21	Biopharmaceuticals	A/Prof Albet Lee (pre-recorded)	Module 2 Practical 2: Glycomics
		22	Medical Biotechnology	A/Prof Albert Lee (pre-recorded)	
12	26-Oct	23	Industrial Biotechnology	Dr Edward Archer	
		24	Plant Biotechnology	Dr Farhad Masoomi-Aladizgeh (pre-recorded)	

13	2-Nov	25	Environmental Biotechnology	Prof Garry Myers	
		26	Course Summary and Q&A	Prof Garry Myers	

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies \(https://students.mq.edu.au/support/study/policies\)](https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au) and use the [search tool](#).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit connect.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing an](#)

[d maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

Academic Success

[Academic Success](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Ask a Study Coach](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via the [Service Connect Portal](#), or contact [Service Connect](#).

IT Help

For help with University computer systems and technology, visit <https://students.mq.edu.au/support/technology/service-desk>.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

Changes from Previous Offering

We value student feedback to be able to continually improve the way we offer our units. As such we encourage students to provide constructive feedback via student surveys, to the teaching staff directly, or via the FSE Student Experience & Feedback link in the iLearn page.

Student feedback from the previous offering of this unit was very positive overall, with students pleased with the clarity around assessment requirements and the level of support from teaching staff. As such, no change to the delivery of the unit is planned, however we will continue to strive to improve the level of support and the level of student engagement.

Unit information based on version 2026.02 of the [Handbook](#)