



MOLS8611

Molecular and Medical Biotechnology

Session 2, In person-scheduled-weekday, North Ryde 2024

School of Natural Sciences

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General Information

Unit convenor and teaching staff

Lindsay Parker

lindsay.parker@mq.edu.au

Credit points

10

Prerequisites

(Admission to MBioBus or GradDipBiotech or MBiotech or MRadiopharmSc or MSc or MScInnovationChemBiomolecularSc) and (BMOL6401 or CBMS622) or (BMOL6431 or CBMS335)

Corequisites

Co-badged status

MOLS7611

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.

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: This unit is assessed as outlined below. You must achieve a total mark equal to or greater than 50% to pass the unit.

Late Assessment Submission: 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 a written assessment 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**. If no day is specified it is 11:55 pm on Friday. A 1-hour grace period will be provided to students who experience a technical problem.

Postponement of the Great Debate requires an approved [Special Consideration](#).

Assessments where Late Submissions will be accepted with standard late penalties: all written assignments

Assessments where Late Submissions will NOT be accepted: the Great Debate

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://ask.mq.edu.au/>

Continuing assessment

Assessment Type ¹: Quiz/Test Indicative Time on Task ²: 12 hours Due: **Weekly**

Weighting: **5%**

Continuing assessment involves providing a brief answer to a weekly question appearing on iLearn each week.

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

Primer crafting task

Assessment Type **1**: Design Task Indicative Time on Task **2**: 6 hours Due: **Week 3**

Weighting: **5%**

You will learn how to turn a peptide sequence to a DNA sequence and design oligonucleotide primers for various purposes in the laboratory such as “catching” a gene and DNA sequencing. Marks and feedback will be provided via iLearn within 2 weeks from the date of submission.

On successful completion you will be able to:

- 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.
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The Great Debate

Assessment Type **1**: Debate Indicative Time on Task **2**: 5 hours Due: **Week 7**

Weighting: **15%**

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.
- 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.

Report 1

Assessment Type ¹: Lab report Indicative Time on Task ²: 15 hours Due: **Week 8**

Weighting: **23%**

Written report on Practical Module 1.

The written report on Practical Module 1 will introduce students to report writing and provide feedback on the skills and style in report writing and extracting relevant information from various paper and electronic sources. Marks and feedback will be provided via iLearn within 4 weeks from the date of submission.

On successful completion you will be able to:

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- 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
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Report 2

Assessment Type ¹: Lab report Indicative Time on Task ²: 10 hours Due: **Week 13**

Weighting: **12%**

Written report on Practical Module 2.

Students are expected to take into account the feedback from Report 1 to improve their

performance in Report 2 and produce an executive summary linking together Practical Modules 1 and 2, as part of the report. Marks and feedback will be provided via iLearn within 2 weeks from the date of submission.

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.

Final Examination

Assessment Type ¹: Examination Indicative Time on Task ²: 14 hours

Due: TBC - Final Examination timetable

Weighting: **40%**

The final examination will be 3 hours plus 10 min reading time. The examination will cover all sections of the unit including workshops and practicals and consists of short answers, problem solving tasks and essay questions.

On successful completion you will be able to:

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- 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
- the [Writing Centre](#) 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

Assessment Tasks

Name	Weighting	Hurdle	Due
Continuing assessment	5%	No	Weekly
Primer crafting task	5%	No	Week 3
The Great Debate	15%	No	Week 7
Practical Module 1 Report	23%	No	Week 8
Practical Module 2	12%	No	Week 13
Final Examination	40%	No	Exam Period

Continuing assessment

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 12 hours

Due: **Weekly**

Weighting: **5%**

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Primer crafting task

Assessment Type ¹: Design Task

Indicative Time on Task ²: 6 hours

Due: **Week 3**

Weighting: **5%**

You will learn how to turn a peptide sequence to a DNA sequence and design oligonucleotide primers for various purposes in the laboratory such as “catching” a gene and DNA sequencing.

On successful completion you will be able to:

- 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.
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The Great Debate

Assessment Type ¹: Debate

Indicative Time on Task ²: 15 hours

Due: **Week 7**

Weighting: **15%**

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 Module 1 Report

Assessment Type ¹: Lab report

Indicative Time on Task ²: 23 hours

Due: **Week 8**

Weighting: **23%**

Practical Module 1 Report is based on the experiments conducted in Practical Module 1.

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.

Practical Module 2

Assessment Type ¹: Lab report

Indicative Time on Task ²: 10 hours

Due: **Week 13**

Weighting: **12%**

Written report is based on the experiments conducted in Practical Module 2.

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.

Final Examination

Assessment Type ¹: Examination

Indicative Time on Task ²: 14 hours

Due: **Exam Period**

Weighting: **40%**

The final exam will cover all sections of the unit including lecture material, workshops and practicals and consists of short answers, problem solving tasks and essay questions.

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
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practicals reflecting published literature and relevant technical and theoretical concepts.

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

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- the [Writing Centre](#) 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

Delivery and Resources

Methods of Communication

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

iLearn Website

As a student enrolled in this unit, you will engage in a range of online and face-to-face learning activities, including lectures, online modules and practicals. All details can be found on the iLearn site for this unit

Technology Used

Active participation in the learning activities throughout the unit will require students to have access to a tablet, laptop or similar device. Students who do not own their own laptop computer may borrow one from the university library.

COVID Information

For the latest information on the University's response to COVID-19, please refer to the Coronavirus infection page on the Macquarie website: <https://www.mq.edu.au/about/coronavirus-faqs>. Remember to check this page regularly in case the information and requirements change during semester. If there are any changes to this unit in relation to COVID, these will be communicated via iLearn

Week 1 Classes

On Monday of Week 1 you are expected to complete an online iLearn learning module "Practical 1: Welcome to the Lab". You will not attend the lab in person on this week but are expected to have completed review of all iLearn materials covering laboratory etiquette, rules, and safety guidelines. Practical will be held in person from Week 2 onwards.

Lectures will be held in an online format on Tuesday of each week from 6:30-8:30pm. You are expected to attend these lectures live online via the link provided to you on iLearn unless otherwise notified in advance.

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 ask.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 and 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/>

The Writing Centre

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

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [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 [AskMQ](#), or contact [Service Connect](#).

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

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 but indicated there may be too many assessment tasks. As such, no change to the content of the unit is planned, however, the unit will have a consolidated report task in 2024 and one less assessable task overall.

Unit lectures will be held in an online format this year that will allow students more flexibility to watch and interact live or asynchronously.

Unit information based on version 2024.04 of the [Handbook](#)