



MOLS8611

Molecular and Medical Biotechnology

Session 2, In person-scheduled-weekday, North Ryde 2022

School of Natural Sciences

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General Information

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Lecturer

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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 laboratory component, student debate, tutorials, 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 laboratory component with tutorials 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

Late Assessment Submission Penalty

Assessment submission dates for MOLS8611 are as indicated above and on iLearn.

The following late submission policy applies to all written assessments.

The Great Debate assessment must be delivered by attendance at the scheduled session unless Special Consideration is granted.

From 1 July 2022, Students enrolled in Session based units with written assessments will have the following university standard late penalty applied. Please see <https://students.mq.edu.au/study/assessment-exams/assessments> for more information.

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied 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.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Continuing assessment</u>	5%	No	Weekly
<u>Hot topic essay</u>	10%	No	29th August
<u>Report 1</u>	15%	No	12th September
<u>Report 2</u>	8%	No	19th September
<u>Primer crafting task</u>	5%	No	25th September
<u>The Great Debate</u>	5%	No	26th September
<u>Report 3</u>	12%	No	31st October
<u>Final Examination</u>	40%	No	TBC

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:

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- 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.

Hot topic essay

Assessment Type ¹: Essay

Indicative Time on Task ²: 10 hours

Due: **29th August**

Weighting: **10%**

This essay will be written in the “Times magazine style”, i.e. to a broader audience. Your task is to engage the reader and present your point of view.

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.

Report 1

Assessment Type ¹: Lab report

Indicative Time on Task ²: 15 hours

Due: **12th September**

Weighting: **15%**

The written report on Practical 1 will introduce students to report writing and provide early feedback on the skills and style in report writing and extracting relevant information from various paper and electronic sources.

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.
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Report 2

Assessment Type ¹: Lab report

Indicative Time on Task ²: 8 hours

Due: **19th September**

Weighting: **8%**

Report 2 is based on the experiments conducted in Practical 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 Practicals 1 and 2, as part of the report.

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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
- 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: **25th September**

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.
- 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.

The Great Debate

Assessment Type ¹: Debate

Indicative Time on Task ²: 5 hours

Due: **26th September**

Weighting: **5%**

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 3

Assessment Type ¹: Lab report

Indicative Time on Task ²: 10 hours

Due: **31st October**

Weighting: **12%**

Written report on Practical 3.

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**

Weighting: **40%**

The final examination will be 3 hours plus 10 min reading time. The examination will cover all sections of the unit including tutorials 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
- 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
- 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

This unit includes

- 26 lectures given by a range of experts in the field. You will learn significantly more if you attend in person rather than listen to a recording.
- Laboratory class in weeks 2-7, 10, and 11 (which culminate in 3 assessed laboratory reports)
- The Great Debate (which is assessed).
- A primer crafting task (which is assessed).
- 12 Weekly 50 word answers to a question available in iLearn which need to be submitted the day after the lectures (which are assessed).
- A final examination on all the above material.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.s.mq.edu.au\)](https://policies.s.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 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 since First Published

Date	Description
20/07/2022	Only added that the late submission policy as outlined applies to all written assessments but the Great Debate requires special consideration approval.