MOLS7611

Molecular and Medical Biotechnology

Session 2, Special circumstances, North Ryde 2021

Archive (Pre-2022) - Department of Molecular Sciences

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Session 2 Learning and Teaching Update

The decision has been made to conduct study online for the remainder of Session 2 for all units WITHOUT mandatory on-campus learning activities. Exams for Session 2 will also be online where possible to do so.

This is due to the extension of the lockdown orders and to provide certainty around arrangements for the remainder of Session 2. We hope to return to campus beyond Session 2 as soon as it is safe and appropriate to do so.

Some classes/teaching activities cannot be moved online and must be taught on campus. You should already know if you are in one of these classes/teaching activities and your unit convenor will provide you with more information via iLearn. If you want to confirm, see the list of units with mandatory on-campus classes/teaching activities.

Visit the MQ COVID-19 information page for more detail.

General Information

Unit convenor and teaching staff
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Credit points
10

Prerequisites
Admission to MRes

Corequisites

Co-badged status
MOLS8611 - Molecular and Medical Biotechnology

Unit description
The unit explores particular areas of contemporary molecular and medical biotechnology building on students' existing knowledge and importantly, 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 complex biotechnology topics 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.

Assessment Tasks

Name	Weighting	Hurdle	Due
Report 1	15%	No	10/09/21
The Great Debate	5%	No	18/10/21
Final Examination	40%	No	End of S2
Hot topic essay	10%	No	31/08/21
Report 2	8%	No	08/10/21
Report 3	12%	No	29/10/21
Primer crafting task	5%	No	27/09/21
Continuing assessment	5%	No	Weekly

Report 1

Assessment Type [1]: Lab report
Indicative Time on Task [2]: 15 hours
Due: **10/09/21**
Weighting: **15%**

The written report on Practical 1 work 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:

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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.

The Great Debate

Assessment Type [1]: Debate
Indicative Time on Task [2]: 5 hours
Due: **18/10/21**
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 complex biotechnology topics in writing and orally and practice the ability to form opinions on the safety and ethics issues related to gene editing in our society.

Final Examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 14 hours
Due: **End of S2**
Weighting: **40%**

The final examination will be 3 hours plus 10 min reading time. The examination will cover all sections of the unit including lecture material, tutorials and practicals and consists of short answers, case studies, 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.
- 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 complex biotechnology topics in writing and orally and practice the ability to form opinions on the safety and ethics issues related to gene editing in our society.

Hot topic essay

Assessment Type [1]: Essay
Indicative Time on Task [2]: 10 hours
Due: **31/08/21**
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 complex biotechnology topics 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: **08/10/21**
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.

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 complex biotechnology topics 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 3

Assessment Type [1]: Lab report
Indicative Time on Task [2]: 10 hours
Due: **29/10/21**
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.

Primer crafting task

Assessment Type [1]: Design Task
Indicative Time on Task [2]: 6 hours
Due: **27/09/21**
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 complex biotechnology topics 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.

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 complex biotechnology topics 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.

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[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

Technology Used Access to the Internet is necessary for efficient communication and research. General use computers are provided by the University, but it would be advantageous to have your own computer/laptop with internet access. All calculations during practicals can be carried out using a smart phone. It is also recommended that you will take pictures from the cultivation plates etc to be included in the prac report. Do not use gloves when handling the phone. Laboratory reports can be produced using standard Microsoft Office software.

Required Materials and/or Recommended Readings Biotechnology draws from different disciplines and technologies. The recommended textbooks will give you a good general introduction to (Thieman and Palladino) or deeper knowledge on (Clark and Pazdernik) these areas and provide further reading as well as useful websites for more in depth studies. The books also provide good questions at the end of each chapter to test your learning.

Textbooks: William J. Thieman and Michael A. Palladino (2019): Introduction to Biotechnology, 4rd edition. Pearson Benjamin-Cummings Publishing Company, San Francisco CA. David P. Clark and Nanette J. Pazdernik (2016): Biotechnology, 2nd edition. Elsevier, China.

Your main source of information will be the lecture slides/notes. Please note that while the books provide an anchor for the studies, plenty of additional and examinable information will be provided in the lectures. Almost every issue of the mainstream biotechnology journals will contain scientific papers related to the lecture material. Journals such as 'Biotechnology' and 'Trends in Biotechnology' are subscribed by the MQ Library and a good amount of the relevant journals are accessible through electronic databases such as PubMed (http://www.ncbi.nlm.nih.gov/pubmed/). Please take some time to browse through the journals for papers that you find interesting. Getting familiar with the format in which scientific papers are presented will be of great help in your own report writing.

Unit Website The official MOLS7611 website is: ilearn.mq.edu.au

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (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
- Grade Appeal Policy
- Complaint Management 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). 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) 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

Student Support

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

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- Getting help with your assignment
- Workshops
- StudyWise
- 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

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

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
12/07/2021	Specified assessment due dates as per requested