BMOL6401

Microbiology and Molecular Biology

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

School of Natural Sciences

Contents

General Information

Unit convenor and teaching staff
Unit convenor
Anwar Sunna
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Contact via Contact via email
14EaR202
Monday to Friday - by appointment

Practical coordinator
Angela Sun
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Contact via Contact via email
14EaR301
Wednesday and Thursday - by appointment

Credit points
10

Prerequisites
Admission to GradDipBiotech or GradCertLabAQMgt or GradDipLabAQMgt or MBiotech or MBioBus or MLabAQMgt or MRadiopharmSc or MSc or MScInnovChemBioSc

Corequisites

Co-badged status
BMOL2401

Unit description
Microbiology is the study of microorganisms and underpins many other areas of contemporary sciences such as medicine and biotechnology. This unit introduces the role of microorganisms in natural environments and disease and the ways they have been employed for practical benefits across the life sciences and industry. This unit will also provide students with insights into the molecular processes of the living cell, and help students understand the central concepts of molecular biology. Lectures will introduce students to the world of microbes, covering their cell structure and function, genetics and biodiversity, growth, and relevance to medicine, environmental and industrial processes. The hands-on laboratory sessions provide the students with essential skills and techniques used in general and molecular microbiology and demonstrate principles taught in the lectures. This unit will be excellent for students majoring in biomolecular sciences, biology, environmental sciences and medical sciences.

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: Apply molecular and microbiological concepts to discuss aspects of medical, industrial and environmental microbiology from the level of molecules through to ecosystems.

ULO2: Apply appropriate laboratory skills and techniques to be able to work confidently and safely in a molecular or general microbiology laboratory setting.

ULO3: Design and conduct independent scientific research in the area of molecular and general microbiology.

ULO4: Search for and use recognised sources of scientific information to extend knowledge within the discipline.

ULO5: Record molecular biology and microbiological experimental data, interpret and communicate this appropriately

General Assessment Information

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. Submission time for all written assessments is set at 11:55 pm. A 1-hour grace period is 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, students need to submit an application for Special Consideration.

In this unit, late submissions will be accepted for the Scientific Report, which is a written tasks with a specified due date.

Pre-lab assessments

Due: **Ongoing** Weighting: **10%**

Continuous Pre-lab assessments will be conducted throughout the semester on iLearn. The assessment will cover the practical materials of the week. You will have a set amount of time (30 min) to complete this online task. This activity will be available from the start of the semester (so

you will have plenty of time to work on it), and deadline for submission is 1 hour prior to your lab session. You are encouraged to work on the pre-lab questions in the lab manual first before attempting the online assessment to avoid going over the time limit (30 min) This is a single attempt activity (no multiple attempts). If you miss the practical session but submitted the assessment on time, no mark will be given to the assessment unless your special consideration is approved. This will contribute to 10% of your overall course mark.

Practical Skills

Due: **Ongoing** Weighting: **5%**

You will be tested for two practical skills essential for Microbiology. You will have enough time to learn and practice these techniques during the laboratory sessions before being tested. This will contribute to 5% of your overall course mark.

Participation

Due: **Ongoing** Weighting: **0%**

Short questions of the days lecture content will take place during lecture session.

Mid-Semester Examination

Due: **9/9/2022** Weighting: **20%**

A multiple choice mid-semester test will be held during class time on 9/9/2022 (10-11am). The test will cover material (lectures and practicals) from Week 1 to 6 only (lecture 1-12). You will need to take a calculator into the examination. Only non-programmable calculators may be taken into the examination. This will contribute to 20% of your overall course mark.

Scientific Report

Due: **6/11/2022** Weighting: **20%**

This exercise is an introduction to conducting and managing an independent research project. Students will work in pairs. This assignment is designed to allow you to develop and achieve the learning outcomes, graduate attributes and capabilities outlined in this unit guide. Thus groups/ pairs are empowered to own their research work and therefore are responsible and accountable for the design, performance and achievements resulting from the research.

This research task will be an ongoing exercise over which the group is to work together on the investigation, discussion and reflection of results. Towards the end of the practical sessions period each lab group will make a prediction of the identity of the selected unknown organism and the rationale behind their decision, and present their prediction in front of the class. Each presentation (Power Point) should take no longer than 3 minutes. After each presentation, the audience will be given an opportunity to ask questions or make suggestions to the presenters.

An **independently** written 4-page scientific report, based on your research findings, is to be submitted by each student on 6 Nov no later than 11:55 pm.

A rubric outlining what is expected regarding final report structure and a style guide is provided in the Laboratory Manual, which will be available on iLearn. The assignment should be uploaded

onto iLearn as a pdf file – this is to avoid formatting discrepancies that may occur from using different word processors. This assignment will contribute to 20% of your overall course mark. *Penalties will apply for work over the page limit and late submission.*

Final Examination

Due: **University Examination Period** Weighting: **45%**

The final exam will require students to apply terminology and concepts learnt in the lecture and practical components to answer a variety of questions of a critical thinking nature. You will need to take a calculator into the examination. Only non-programmable calculators may be taken into the examination.

Assessment Tasks

Name	Weighting	Hurdle	Due
Practical attendance	0%	Yes	Ongoing
Pre-lab assessments	10%	No	Ongoing
Practical Skill Test	5%	No	Ongoing
Participation	0%	No	Ongoing
Mid-Semester Test	20%	No	9/9/2022
Scientific Report	20%	No	6/11/2022
Final Examination	45%	No	University Examination Period

Practical attendance

Assessment Type [1]: Participatory task
Indicative Time on Task [2]: 0 hours
Due: **Ongoing**
Weighting: **0%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

You are expected to attend and participate in at least 80% of the practical laboratory classes to pass this unit. This is a hurdle requirement.

On successful completion you will be able to:

- Apply appropriate laboratory skills and techniques to be able to work confidently and

safely in a molecular or general microbiology laboratory setting.
- Design and conduct independent scientific research in the area of molecular and general microbiology.
- Search for and use recognised sources of scientific information to extend knowledge within the discipline.
- Record molecular biology and microbiological experimental data, interpret and communicate this appropriately

Pre-lab assessments

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 6 hours
Due: **Ongoing**
Weighting: **10%**

Continuous Pre-lab assessments will be conducted throughout the semester on iLearn.

On successful completion you will be able to:
- Apply molecular and microbiological concepts to discuss aspects of medical, industrial and environmental microbiology from the level of molecules through to ecosystems.
- Apply appropriate laboratory skills and techniques to be able to work confidently and safely in a molecular or general microbiology laboratory setting.
- Design and conduct independent scientific research in the area of molecular and general microbiology.
- Search for and use recognised sources of scientific information to extend knowledge within the discipline.
- Record molecular biology and microbiological experimental data, interpret and communicate this appropriately

Practical Skill Test

Assessment Type [1]: Demonstration
Indicative Time on Task [2]: 4 hours
Due: **Ongoing**
Weighting: **5%**

You will be tested for practical skills essential for Microbiology during the laboratory sessions

On successful completion you will be able to:

- Apply appropriate laboratory skills and techniques to be able to work confidently and safely in a molecular or general microbiology laboratory setting.
- Design and conduct independent scientific research in the area of molecular and general microbiology.

Participation

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 2 hours
Due: **Ongoing**
Weighting: **0%**

Short quizzes of the days lecture content will take place during lecture session.

On successful completion you will be able to:

- Apply molecular and microbiological concepts to discuss aspects of medical, industrial and environmental microbiology from the level of molecules through to ecosystems.

Mid-Semester Test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 10 hours
Due: **9/9/2022**
Weighting: **20%**

Test will address specific understanding of topics presented within the unit.

On successful completion you will be able to:

- Apply molecular and microbiological concepts to discuss aspects of medical, industrial and environmental microbiology from the level of molecules through to ecosystems.

Scientific Report

Assessment Type [1]: Lab report
Indicative Time on Task [2]: 24 hours
Due: **6/11/2022**
Weighting: **20%**

Final scientific report based on the findings of your ongoing laboratory research project

On successful completion you will be able to:

- Apply molecular and microbiological concepts to discuss aspects of medical, industrial and environmental microbiology from the level of molecules through to ecosystems.
- Apply appropriate laboratory skills and techniques to be able to work confidently and safely in a molecular or general microbiology laboratory setting.
- Design and conduct independent scientific research in the area of molecular and general microbiology.
- Search for and use recognised sources of scientific information to extend knowledge within the discipline.
- Record molecular biology and microbiological experimental data, interpret and communicate this appropriately

Final Examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 26 hours
Due: **University Examination Period**
Weighting: **45%**

The final exam will require students to apply terminology and concepts learnt in the lecture and practical components to answer a variety of questions of a critical thinking nature. The exam will assess your overall understanding of the subject.

On successful completion you will be able to:

- Apply molecular and microbiological concepts to discuss aspects of medical, industrial and environmental microbiology from the level of molecules through to ecosystems.
- Search for and use recognised sources of scientific information to extend knowledge within the discipline.
- Record molecular biology and microbiological experimental data, interpret and communicate this appropriately

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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

Classes

Lectures

Monday	11am-12pm – 14 Sir Christopher Ondaatje Ave - Mason Theatre
Friday	10-11am – 23 Wallys Walk - P.G. Price Theatre

Lectures begin on the 25 July 2022.

BMOL6401 Microbiology and Molecular Biology Web Site: http://ilearn.mq.edu.au/

Laboratory classes

Wednesday	**1-4 pm**	14 Eastern Rd - **130 and 150 Science Labs**
Thursday	**9-12 pm**	14 Eastern Rd - **130 and 150 Science Labs**
Thursday	**1-4 pm**	14 Eastern Rd - **130 and 150 Science Labs**

Students will need to register for one of the classes only.

Practical sessions start on the **second week** of the semester (first lab session on 3rd and 4th August 2022). **Bring a lab coat and A4 notebook (60+ pages) to your first lab session. Students won't be allowed to take part in the laboratory sessions without a lab coat. Students are encouraged to purchase and bring their own safety glasses to the laboratory sessions.**

Please note that practical classes are a hurdle and a main component for this course with an approved Special Consideration being required should a student be absent. Special Consideration applications should be submitted online via AskMQ. More information and how to apply for Special Consideration can be found at: https://students.mq.edu.au/study/assessment-exams/special-consideration.

Required and Recommended Texts and/or Materials

Recommended text book:

Brock Biology of Microorganisms, Global Edition 15th edition, 2018. Madigan, Bender,

Buckley, Sattley and Stahl. Publisher: Pearson Australia. ISBN: 9781292235103

BMOL6401 Microbiology and Molecular Biology Practical Manual - The full laboratory manual will be available on iLearn for download, you must bring a copy with you to your laboratory class and are expected to have read through all of the planned activities. Please note you must also bring a lab coat, closed shoes and A4 lab notebook (60+ pages) to each practical, beginning in Week 2. **Important, you won't be allowed in the laboratory without a lab coat!**

Technology Used and Required

You are expected to access the unit web site on a frequent basis and download PDF files provided. Please note information may also be sent by email to your student email account so please look at your email account on a frequent basis.

Unit Web Page

The URL of the BMOL6401 Microbiology and Molecular Biology iLearn site is: http://ilearn.mq.edu.au/

You will be asked for a username and password. Your username is your student MQ Id. Your MQ Id and password have been mailed to you by the University. If you have lost them go to the student portal: http://my.mq.edu.au.

You are expected to access the unit web site very frequently. This site contains important information including notes on ALL the topics to be covered.

Teaching and Learning Strategy

BMOL6401 is a 10-credit point, half year unit. The unit expectation is that you will:

- Read the recommended material and prepare for the laboratory classes.
- Actively engage in the practical component of the course.
- Complete the assignment, report, practical and assessments, mid-term exam and final exam.

If you prepare and attend all components of the unit and work consistently and continuously throughout the semester, you should be able to develop a strong understanding of the subject, develop key microbiology and molecular biology practical skills and perform satisfactorily in this unit.

Laboratory classes are designed to develop basic laboratory skills, general safety practices and critical and analytical thought – this will be very useful if you continue with molecular biology and microbiology, but are also fundamental to many other areas of science. In-lab and post-lab work are designed to allow you to appropriately record your experimental observations in a detailed and accurate manner and assess your understanding of the theory behind the experiments conducted and to use this understanding to solve related problems.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policie

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). 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

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.