



# CBMS615

## Microbiology

S2 Day 2017

*Dept of Chemistry & Biomolecular Sciences*

### Contents

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<u>General Information</u>	2
<u>Learning Outcomes</u>	2
<u>Assessment Tasks</u>	3
<u>Delivery and Resources</u>	6
<u>Policies and Procedures</u>	8
<u>Graduate Capabilities</u>	10
<u>Special consideration requests including no n-attendance and extensions</u>	15

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#### **Disclaimer**

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## General Information

Unit convenor and teaching staff

Unit convenor

Anwar Sunna

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E8C207

Practical coordinator

Angela Sun

[angela.sun@mq.edu.au](mailto:angela.sun@mq.edu.au)

E8A301

Credit points

4

Prerequisites

Admission to MLabQAMgt or MRadiopharmSc or MBiotech or MBiotechMCom or MSc

Corequisites

Co-badged status

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. Lecture topics include the history of microbiology, microbial cell structure and function, microbial genetics and biodiversity, microbial growth, and a variety of topics in applied environmental and industrial microbiology. The hands-on laboratory sessions provide the students with essential skills and techniques used in 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:

Describe the microbial world and its diversity, requirements for life, reproduction, adaptations, interactions and applications.

Demonstrate appropriate laboratory skills and techniques to be able to work confidently and safely in a general microbiology laboratory setting.

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

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

Record microbiological experimental data, interpret and communicate this appropriately.

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

## Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Pre-lab work &amp; Laboratory book</u>	10%	No	Ongoing
<u>Practical Skills</u>	10%	No	Ongoing
<u>Short literature review</u>	5%	No	week 4
<u>Mid-Semester Examination</u>	10%	No	7/9/17
<u>Scientific Report</u>	20%	No	6-9/11/17
<u>Final Examination</u>	45%	No	University Examination Period

### Pre-lab work & Laboratory book

Due: **Ongoing**

Weighting: **10%**

There is designated Pre-Lab work for practicals. In some weeks this involves a small amount of research regarding a technique to be used, then answering a short set of questions (answers require roughly 1 page or less). In other weeks this will be a flowchart of all the experiments that are planned for the practical session. The aim of these activities is to ensure you are familiar with the planned activities before each practical session to ensure practicals run smoothly, to time and you get the most out of them. You will be expected to keep an up-to-date, dedicated A4 Laboratory Book, which will include detailed write-ups of all experiments carried out in prior weeks, plus answers to discussion questions. A rubric outlining what is expected regarding both Pre-lab work and Laboratory Book upkeep will be provided in the Laboratory manual, which will be available on iLearn.

This will contribute to 10% of your overall course mark .

On successful completion you will be able to:

- Describe the microbial world and its diversity, requirements for life, reproduction, adaptations, interactions and applications.
- Demonstrate appropriate laboratory skills and techniques to be able to work confidently and safely in a general microbiology laboratory setting.
- Design and conduct independent scientific research in the area of general microbiology.
- Search for and use recognised sources of scientific information to extend knowledge within the discipline.
- Record microbiological experimental data, interpret and communicate this appropriately.
- Apply central concepts to discuss aspects of medical, industrial and environmental microbiology from the level of molecules through to ecosystems.

## Practical Skills

Due: **Ongoing**

Weighting: **10%**

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 10% of your overall course mark.

On successful completion you will be able to:

- Demonstrate appropriate laboratory skills and techniques to be able to work confidently and safely in a general microbiology laboratory setting.
- Design and conduct independent scientific research in the area of general microbiology.
- Apply central concepts to discuss aspects of medical, industrial and environmental microbiology from the level of molecules through to ecosystems.

## Short literature review

Due: **week 4**

Weighting: **5%**

You must choose two microorganisms to research and write a short report about. One microorganism should be chosen which you consider 'worrying' and a second which is 'weird and wonderful'. For each you must source peer-reviewed scientific literature to write 1-2 paragraphs about the worrying/interesting characteristics of the organism. You must ensure your work is properly referenced and provide a reference list. An example report detailing the required format, reference style and including an example reference list, will be provided on the unit iLearn site.

On successful completion you will be able to:

- Describe the microbial world and its diversity, requirements for life, reproduction, adaptations, interactions and applications.
- Demonstrate appropriate laboratory skills and techniques to be able to work confidently and safely in a general microbiology laboratory setting.
- Search for and use recognised sources of scientific information to extend knowledge within the discipline.

## Mid-Semester Examination

Due: **7/9/17**

Weighting: **10%**

A multiple choice mid-semester test will be held during class time on 7/9/17( 2-3pm). The test will cover material (lectures and practicals) from Week 1 to 5 only. You will need to take a calculator into the examination. Only non programmable calculators may be taken into the examination.

On successful completion you will be able to:

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- Design and conduct independent scientific research in the area of general microbiology.
- Apply central concepts to discuss aspects of medical, industrial and environmental microbiology from the level of molecules through to ecosystems.

## Scientific Report

Due: **6-9/11/17**

Weighting: **20%**

This exercise is an introduction to conducting and managing an independent research project. Students will work in groups, determined in consultation with demonstrators. 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 are empowered to own the research work and therefore are responsible and accountable for the design, performance and achievements resulting from the research.

This research task will constitute Practicals 7-11, over which the group is to work together on the investigation, discussion and reflection of results. Groups will put together a short presentation (1-2 power point slides, 2-3 minutes) in Practical 7, to allow us to provide feedback on your research plan. Each group member should keep a record of the project design, plan, results and outcomes in their laboratory book. An independent 4 page scientific report, based on your research findings, is to be submitted by each student between 6-9/11/17 (depending on your session day), which will be worth 20% of your final mark. A rubric outlining what is expected regarding final report structure and required format will be provided in the Laboratory manual, which will be available on iLearn. *Penalties will apply for work over the page limit and late submission.*

On successful completion you will be able to:

- Describe the microbial world and its diversity, requirements for life, reproduction, adaptations, interactions and applications.
- Demonstrate appropriate laboratory skills and techniques to be able to work confidently and safely in a general microbiology laboratory setting.
- Design and conduct independent scientific research in the area of general microbiology.
- Search for and use recognised sources of scientific information to extend knowledge within the discipline.
- Record microbiological experimental data, interpret and communicate this appropriately.
- Apply central concepts to discuss aspects of medical, industrial and environmental microbiology from the level of molecules through to ecosystems.

## 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. The exam will consist of multiple-choice questions, short and long answer questions. You will need to take a calculator into the examination. Only non programmable calculators may be taken into the examination (3 hours plus 10 minutes reading time).

On successful completion you will be able to:

- Describe the microbial world and its diversity, requirements for life, reproduction, adaptations, interactions and applications.
- Design and conduct independent scientific research in the area of general microbiology.
- Apply central concepts to discuss aspects of medical, industrial and environmental microbiology from the level of molecules through to ecosystems.

## Delivery and Resources

### Classes

Lectures will be held on:

Monday	10-11 am in Y3A T1 Theatre
Thursday	2-3 pm in Y3A T1 Theatre

Lectures begin on the 31 July 2017. Lectures graphics will be available in iLearn on the day before each lecture.

CBMS615 Microbiology Web Site: <http://ilearn.mq.edu.au/>

## Laboratory classes

Monday	2-6 pm	E8A 150 Science Lab
Tuesday	9-1 pm	E8A 150 Science Lab
Tuesday	2-6 pm	E8A 150 Science Lab
Wednesday	2-6 pm	E8A 150 Science Lab
Thursday	9-1 pm	E8A 150 Science Lab

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

Practicals start the first week of the semester (31 July 2017.). **Bring a lab coat and A4 notebook (60+ pages) to your first lab session.**

**Please note that practical classes are a compulsory component for this course with medical certificates being required should a student be absent due to illness.** These should be submitted online together with a disruption to studies request, which can be found at:  
[http://mq.edu.au/policy/docs/disruption\\_studies/policy.html](http://mq.edu.au/policy/docs/disruption_studies/policy.html).

## Required and Recommended Texts and/or Materials

### Prescribed text:

**Brock Biology of Microorganisms Global Edition + Mastering Microbiology** 14th edition. Madigan, Madigan, Martinko, Stahl, Clark, Buckley. Publisher: Pearson Australia. ISBN: 9781488607646

Please purchase and set up your personal account with Pearson Mastering Microbiology. This software comes packaged with your textbook if you purchase it from the Co-op bookshop or can be purchased independently (Instructions for independent purchase and set up will be provided on the CBMS215 iLearn page). This resource will be used to set weekly interactive activities and quizzes for you to complete each week.

**CBMS615 Microbiology 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 1.

## 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 CBMS615 Microbiology ilearn site is: <http://ilearn.mq.edu.au/>

You will be asked for a username and password. Your username is your student MQID. Your MQID 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**

CBMS615 is a 3-credit point, half year unit and will require an average of 9 hours of work per week (contact hours plus self study time).

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, weekly quizzes, 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 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 microbiology, but are also fundamental to modern molecular biology and 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](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy [http://mq.edu.au/policy/docs/academic\\_honesty/policy.html](http://mq.edu.au/policy/docs/academic_honesty/policy.html)

Assessment Policy [http://mq.edu.au/policy/docs/assessment/policy\\_2016.html](http://mq.edu.au/policy/docs/assessment/policy_2016.html)

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Complaint Management Procedure for Students and Members of the Public [http://www.mq.edu.au/policy/docs/complaint\\_management/procedure.html](http://www.mq.edu.au/policy/docs/complaint_management/procedure.html)

Disruption to Studies Policy (in effect until Dec 4th, 2017): [http://www.mq.edu.au/policy/docs/disruption\\_studies/policy.html](http://www.mq.edu.au/policy/docs/disruption_studies/policy.html)



Special Consideration Policy (in effect from Dec 4th, 2017): <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of Policy Central.

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: [https://students.mq.edu.au/support/student\\_conduct/](https://students.mq.edu.au/support/student_conduct/)

## Results

Results shown in *iLearn*, 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](http://ask.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](http://mq.edu.au/learningskills)) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

## 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](http://ask.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/](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.

## Graduate Capabilities

### Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

#### Learning outcomes

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

#### Assessment tasks

- Pre-lab work & Laboratory book
- Practical Skills
- Mid-Semester Examination
- Scientific Report
- Final Examination

### Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

#### Learning outcomes

- Demonstrate appropriate laboratory skills and techniques to be able to work confidently and safely in a general microbiology laboratory setting.
- Design and conduct independent scientific research in the area of general microbiology.
- Search for and use recognised sources of scientific information to extend knowledge

within the discipline.

- Record microbiological experimental data, interpret and communicate this appropriately.
- Apply central concepts to discuss aspects of medical, industrial and environmental microbiology from the level of molecules through to ecosystems.

## **Assessment tasks**

- Pre-lab work & Laboratory book
- Practical Skills
- Mid-Semester Examination
- Scientific Report
- Final Examination

## **Commitment to Continuous Learning**

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

### **Learning outcome**

- Describe the microbial world and its diversity, requirements for life, reproduction, adaptations, interactions and applications.

## **Assessment tasks**

- Pre-lab work & Laboratory book
- Practical Skills
- Scientific Report
- Final Examination

## **Discipline Specific Knowledge and Skills**

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

## Learning outcomes

- Describe the microbial world and its diversity, requirements for life, reproduction, adaptations, interactions and applications.
- Demonstrate appropriate laboratory skills and techniques to be able to work confidently and safely in a general microbiology laboratory setting.
- Design and conduct independent scientific research in the area of general microbiology.
- Apply central concepts to discuss aspects of medical, industrial and environmental microbiology from the level of molecules through to ecosystems.

## Assessment tasks

- Pre-lab work & Laboratory book
- Practical Skills
- Short literature review
- Mid-Semester Examination
- Scientific Report
- Final Examination

## Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

## Learning outcomes

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

## Assessment tasks

- Pre-lab work & Laboratory book
- Short literature review

- Mid-Semester Examination
- Scientific Report
- Final Examination

## Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

### Learning outcomes

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

### Assessment tasks

- Pre-lab work & Laboratory book
- Practical Skills
- Short literature review
- Mid-Semester Examination
- Scientific Report
- Final Examination

## Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

## Learning outcomes

- Describe the microbial world and its diversity, requirements for life, reproduction, adaptations, interactions and applications.
- Demonstrate appropriate laboratory skills and techniques to be able to work confidently and safely in a general microbiology laboratory setting.
- Design and conduct independent scientific research in the area of general microbiology.
- Search for and use recognised sources of scientific information to extend knowledge within the discipline.
- Record microbiological experimental data, interpret and communicate this appropriately.

## Assessment tasks

- Pre-lab work & Laboratory book
- Short literature review
- Mid-Semester Examination
- Scientific Report
- Final Examination

## Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

## Learning outcomes

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

## Assessment tasks

- Pre-lab work & Laboratory book
- Mid-Semester Examination
- Scientific Report
- Final Examination

## Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

### Learning outcomes

- Demonstrate appropriate laboratory skills and techniques to be able to work confidently and safely in a general microbiology laboratory setting.
- Design and conduct independent scientific research in the area of general microbiology.
- Apply central concepts to discuss aspects of medical, industrial and environmental microbiology from the level of molecules through to ecosystems.

### Assessment tasks

- Pre-lab work & Laboratory book
- Practical Skills
- Mid-Semester Examination
- Scientific Report
- Final Examination

## Special consideration requests including non-attendance and extensions

The University is committed to equity and fairness in all aspects of its learning and teaching. In stating this commitment, the University recognises that there may be circumstances where a student is prevented by unavoidable disruption from performing in accordance with their ability. The University has a policy on special consideration requests (now disruption to studies) that may be found at [http://mq.edu.au/policy/docs/disruption\\_studies/policy.html](http://mq.edu.au/policy/docs/disruption_studies/policy.html). The University recognises that at times an event or set of circumstances may occur that:

- could not have reasonably been anticipated, avoided or guarded against by the student AND
- was beyond the student's control AND
- caused substantial disruption to the student's capacity for effective study and/or completion of required work AND
- substantially interfered with the otherwise satisfactory fulfilment of a unit or program requirements AND
- was of at least three (3) consecutive days duration within a study period and/or prevented completion of a formal examination.

This policy is instituted to support students who experience serious and unavoidable disruption such that they do not reach their usual demonstrated performance level. If this does occur please access this form and follow directions for submitting a disruption to studies notification as soon as possible to allow due consideration.

**Non-Attendance:** Students unable to attend a laboratory session, assessment task or the final exam due to illness or other extenuating circumstances must submit online the relevant documentation together with a disruption to studies request, which can be found at: [http://mq.edu.au/policy/docs/disruption\\_studies/policy.html](http://mq.edu.au/policy/docs/disruption_studies/policy.html).

Students MUST contact Dr. Angela Sun (angela.sun@mq.edu.au) immediately to make alternative arrangements if a laboratory session or an assessment task has been missed. Contact can be by email or phone. The intensive nature of laboratory sessions and assessments over a period of weeks means that non-attendance can significantly impact on your progress, can impact on your ability to complete the assignments and also impacts on your laboratory partner/group.

### **Extensions and penalties**

*10% of the mark allocated for the assignment will be deducted per day for any work submitted late.*

Only medical certificates and/or other appropriate supporting documents outlining other serious, extenuating circumstances will be considered when submitting an assignment after the due date. All applications for special consideration or extension must be sought *before the due date* unless this is absolutely impossible.

All applications for extensions of deadlines must be submitted to the Dr. Angela Sun (angela.sun@mq.edu.au)