



# CBMS215

## Microbiology

S2 Day 2015

*Dept of Chemistry & Biomolecular Sciences*

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#### **Disclaimer**

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## General Information

Unit convenor and teaching staff

Unit Convenor

Sasha Tetu

[sasha.tetu@mq.edu.au](mailto:sasha.tetu@mq.edu.au)

Contact via [sasha.tetu@mq.edu.au](mailto:sasha.tetu@mq.edu.au)

E8C208

In Office: Monday 1-5pm, Otherwise via email (Workdays Mon-Thur)

Credit points

3

Prerequisites

12cp including BIOL115 and (CBMS101 or HSC Chemistry Band 4)

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, processes, adaptations, interactions and applications.

Design and conduct a microbiology scientific experiment.

Source microbiology literature to support scientific reports.

Communicate scientific information relevant to microbiology.

Understand the importance of bacteriological media and its application.

Interpret laboratory microscopy and cultures from various environments.

Apply fundamental concepts and developed knowledge in microbiology to discuss aspects of medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food.

## Assessment Tasks

Name	Weighting	Due
<u>Pre-Lab tasks</u>	5%	Ongoing
<u>Practical Participation</u>	10%	TBA
<u>Assignment 1-Scientific report</u>	10%	9-10/9/15
<u>Assignment 2</u>	25%	2/11/15
<u>Final Examination</u>	50%	University Examination Period

### Pre-Lab tasks

Due: **Ongoing**

Weighting: **5%**

There is designated Pre-Lab work for practicals 2-11. In some weeks this involves a small amount of research regarding a technique to be used, then answering a short set of questions- I expect answers to take only ~1 pg. 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. We will check your Pre-Lab work every week and record your efforts as complete (you have made a decent attempt) or incomplete. This will contribute to 5% of your overall course mark (0.5% for each completed task).

On successful completion you will be able to:

- Describe the microbial world and its diversity, requirements for life, reproduction, processes, adaptations, interactions and applications.
- Design and conduct a microbiology scientific experiment.
- Source microbiology literature to support scientific reports.
- Communicate scientific information relevant to microbiology.

- Apply fundamental concepts and developed knowledge in microbiology to discuss aspects of medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food.

## Practical Participation

Due: **TBA**

Weighting: **10%**

We will pick 5 weeks during the semester to mark you on your Lab book and class participation, you will get a mark out of 2 for each of these weeks. For full marks (2/2) you need to be present and punctual for the start of the practical, prepared for the class (Lab notes printed and read), complete all work with skill and accuracy, organise your time effectively, work well with others in any group work, contribute to any class discussions, have an up-to-date lab book and observe all safety rules.

On successful completion you will be able to:

- Apply fundamental concepts and developed knowledge in microbiology to discuss aspects of medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food.

## Assignment 1-Scientific report

Due: **9-10/9/15**

Weighting: **10%**

A concise 2 page scientific report, based on exercises undertaken in practicals 3-6 (isolating bacteria from lettuce). *Please note the page limit. Penalties of 2 mark deduction per extra page will apply.* Details of report structure and required format will be provided in practical sessions and in the practical manual. Your due date will be your practical session date in week 7.

On successful completion you will be able to:

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- Design and conduct a microbiology scientific experiment.
- Source microbiology literature to support scientific reports.
- Communicate scientific information relevant to microbiology.
- Understand the importance of bacteriological media and its application.
- Interpret laboratory microscopy and cultures from various environments.
- Apply fundamental concepts and developed knowledge in microbiology to discuss aspects of medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food.

## Assignment 2

Due: **2/11/15**

Weighting: **25%**

This exercise is an introduction to conducting and managing an independent research project. Students to 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 8-11, over which the group is to work together on the investigation, discussion, reflection and presentation of results. You will be expected to record the project design, plan, results and outcomes as a group, then independently write a scientific report based on this research. Each group is also required to provide a short progress seminar (1-2 power point slides, 2-3 minutes) in Practical 9, to allow us to provide feedback on your research plan. A final seminar (5 minutes) by each group in Practical 12 will summarise research findings and conclusions and will be worth 5% of the marks attributed to this assessment task. Details of the final report structure and required format will be provided in practical sessions and in the practical manual. *Penalties will again apply for work over the page limit.*

On successful completion you will be able to:

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- Design and conduct a microbiology scientific experiment.
- Source microbiology literature to support scientific reports.
- Communicate scientific information relevant to microbiology.
- Understand the importance of bacteriological media and its application.
- Interpret laboratory microscopy and cultures from various environments.
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## Final Examination

Due: **University Examination Period**

Weighting: **50%**

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, processes, adaptations, interactions and applications.
- Design and conduct a microbiology scientific experiment.
- Communicate scientific information relevant to microbiology.
- Understand the importance of bacteriological media and its application.
- Interpret laboratory microscopy and cultures from various environments.
- Apply fundamental concepts and developed knowledge in microbiology to discuss aspects of medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food.

## Delivery and Resources

### Classes

Lectures will be held on:

Monday	12-1 pm in E7B T3 Theatre
Wednesday	11-12 pm in E7B T4 Theatre

Rather than running late Friday afternoon tutorials as scheduled (very poorly attended in the past), I will set weekly interactive activities and quizzes through the mastering microbiology software which comes packaged with your textbook for you to complete each week.

Lectures begin on the 27th July 2015. Lectures graphics will be available in ilearn on the day before each lecture.

Microbiology Web Site: <https://learn.mq.edu.au/>

### Laboratory classes

Wednesday	2-6 pm	E8A 150
Thursday	9-1 pm	E8A 150
Thursday	2-6 pm	E8A 150

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

Practicals start the first week of the semester (29th July 2013). **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** 14<sup>th</sup> edition. Madigan, Martenko, Stahl, Clark, Buckley. Publisher: Pearson education Inc, San Francisco. ISBN:9781486025442

### Required:

**CBMS215 Microbiology Practical Manual** - each laboratory session will be available on iLearn for download one week before the laboratory session, please make sure you bring this to class. Please note you must also bring a lab coat, closed shoes and lab notebook 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 CBMS215 Microbiology ilearn site is: <http://learn.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

CBMS215 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
- Attend all sessions, with laboratory classes being compulsory
- Demonstrate reasonable competence in the assignments and weekly quizzes
- Perform satisfactorily in both the practical component and the 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.

## Assessment in this Unit

For passing this Unit, the Theory (50%) and Practical (50%) component **MUST** be completed satisfactorily.

## Unit Schedule

## 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.html>

Grading Policy <http://mq.edu.au/policy/docs/grading/policy.html>

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

Grievance Management Policy [http://mq.edu.au/policy/docs/grievance\\_management/policy.html](http://mq.edu.au/policy/docs/grievance_management/policy.html)

Disruption to Studies Policy [http://www.mq.edu.au/policy/docs/disruption\\_studies/policy.html](http://www.mq.edu.au/policy/docs/disruption_studies/policy.html) *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

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://informatics.mq.edu.au/help/>.

When using the University's IT, you must adhere to the [Acceptable Use 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

- Design and conduct a microbiology scientific experiment.
- Source microbiology literature to support scientific reports.
- Communicate scientific information relevant to microbiology.
- Interpret laboratory microscopy and cultures from various environments.
- Apply fundamental concepts and developed knowledge in microbiology to discuss

aspects of medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food.

## **Assessment tasks**

- Assignment 1-Scientific report
- Assignment 2

## **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**

- Design and conduct a microbiology scientific experiment.
- Source microbiology literature to support scientific reports.
- Communicate scientific information relevant to microbiology.
- Apply fundamental concepts and developed knowledge in microbiology to discuss aspects of medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food.

## **Assessment tasks**

- Practical Participation
- Assignment 1-Scientific report
- Assignment 2

## **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, processes, adaptations, interactions and applications.

## Assessment task

- Practical Participation

## 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, processes, adaptations, interactions and applications.
- Design and conduct a microbiology scientific experiment.
- Communicate scientific information relevant to microbiology.
- Understand the importance of bacteriological media and its application.
- Apply fundamental concepts and developed knowledge in microbiology to discuss aspects of medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food.

## Assessment tasks

- Pre-Lab tasks
- Practical Participation
- Assignment 1-Scientific report
- Assignment 2
- 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

- Design and conduct a microbiology scientific experiment.
- Source microbiology literature to support scientific reports.
- Communicate scientific information relevant to microbiology.
- Interpret laboratory microscopy and cultures from various environments.
- Apply fundamental concepts and developed knowledge in microbiology to discuss aspects of medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food.

## Assessment tasks

- Pre-Lab tasks
- Practical Participation
- Assignment 1-Scientific report
- Assignment 2
- 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

- Design and conduct a microbiology scientific experiment.
- Source microbiology literature to support scientific reports.
- Communicate scientific information relevant to microbiology.
- Interpret laboratory microscopy and cultures from various environments.
- Apply fundamental concepts and developed knowledge in microbiology to discuss aspects of medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food.

## Assessment tasks

- Pre-Lab tasks
- Practical Participation
- Assignment 1-Scientific report
- Assignment 2

- 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, processes, adaptations, interactions and applications.
- Design and conduct a microbiology scientific experiment.
- Source microbiology literature to support scientific reports.
- Communicate scientific information relevant to microbiology.

### Assessment tasks

- Pre-Lab tasks
- Practical Participation
- Assignment 1-Scientific report
- Assignment 2
- 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

- Design and conduct a microbiology scientific experiment.
- Communicate scientific information relevant to microbiology.
- Interpret laboratory microscopy and cultures from various environments.

### Assessment tasks

- Practical Participation

- Assignment 1-Scientific report
- Assignment 2

## 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

- Design and conduct a microbiology scientific experiment.
- Communicate scientific information relevant to microbiology.
- Apply fundamental concepts and developed knowledge in microbiology to discuss aspects of medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food.

### Assessment tasks

- Assignment 1-Scientific report
- Assignment 2

## Changes from Previous Offering

We are excited to offer a revised and updated CBMS215 in 2015, please be aware that there are a number of changes to the lecture, practical and assessment schedules from last year.

## Feedback

As this is the first year I have been the unit convenor for this course, which has been significantly revised since last year, I will be actively seeking feedback throughout the semester. I am most open to suggestions for improving the content and delivery of the unit. Please provide any feedback to Dr. Sasha Tetu, Mrs E Mardones or your practical demonstrator. I will also endeavor to provide opportunities for anonymous feedback/suggestions/comments during semester in both lecture and practical time slots.

## 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 fulfillment 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. Sasha Tetu 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 subject convenor.