



CBMS615

Microbiology

S2 Day 2016

Dept of Chemistry & Biomolecular Sciences

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Disclaimer

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General Information

Unit convenor and teaching staff

Lecturer, course convenor

Sasha Tetu

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Anwar Sunna

anwar.sunna@mq.edu.au

Credit points

4

Prerequisites

Admission to MLabQAMgt or MRadiopharmSc or MBiotech or MBiotechMCom

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, conduct and interpret microbiology scientific experiments.

Source microbiology literature to support scientific reports and communicate scientific information.

Interpret, critically review and summarize scientific literature relating to microorganisms

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

Assessment Tasks

Name	Weighting	Due
<u>Pre-Lab tasks</u>	10%	Ongoing
<u>Lab Book & Class Participation</u>	10%	ongoing
<u>Short literature review</u>	5%	Week 4
<u>Assignment 1-Scientific Poster</u>	10%	Week 7 (12/9/2016)
<u>Assignment 2-Scientific Report</u>	20%	Scientific Report (7/11/16)
<u>Final Examination</u>	45%	University Examination Period

Pre-Lab tasks

Due: **Ongoing**

Weighting: **10%**

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 (answers require roughly 1-2 pages). 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. This will contribute to 10% of your overall course mark (1.0% 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, conduct and interpret microbiology scientific experiments.
- Source microbiology literature to support scientific reports and communicate scientific information.
- Apply fundamental concepts and developed knowledge to discuss aspects of

microbiology in medicine, industry, ecology and biogeochemical cycling, in terrestrial and aquatic systems.

Lab Book & Class Participation

Due: **ongoing**

Weighting: **10%**

You will be expected to keep an up-to-date, dedicated Laboratory Book, which will include detailed write-ups of all experiments carried out in prior weeks, plus answers to discussion questions. We will pick 5 weeks at random during the semester to mark you on your Laboratory Book and Class Participation, you will get a mark out of 2 for each of these weeks. A rubric outlining what is expected regarding both Class Participation and Laboratory Book upkeep will be provided in the Laboratory manual, which will be available on iLearn.

On successful completion you will be able to:

- Design, conduct and interpret microbiology scientific experiments.
- Apply fundamental concepts and developed knowledge to discuss aspects of microbiology in medicine, industry, ecology and biogeochemical cycling, in terrestrial and aquatic systems.

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 in the style of the ISME Journal. An example report detailing the required format 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, processes, adaptations, interactions and applications.
- Source microbiology literature to support scientific reports and communicate scientific information.
- Interpret, critically review and summarize scientific literature relating to microorganisms

Assignment 1-Scientific Poster

Due: **Week 7 (12/9/2016)**

Weighting: **10%**

A single A3 page individual scientific poster, based on exercises undertaken in practicals 3-6 (isolating bacteria from lettuce). Details of poster 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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Assignment 2-Scientific Report

Due: **Scientific Report (7/11/16)**

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 8-12, 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 9, 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 on 7/11/16, which will be worth 20% of your final mark. Details of the final report structure and required format will be provided in practical sessions and in the practical manual. *Penalties will apply for work over the page limit.*

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- Design, conduct and interpret microbiology scientific experiments.

- Source microbiology literature to support scientific reports and communicate scientific information.
- Interpret, critically review and summarize scientific literature relating to microorganisms
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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).

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

Classes

Lectures will be held on:

Monday	12-1 pm in W5A T2 Theatre
Wednesday	11-12 pm in E7B T5 Theatre

Lectures begin on the 1st August 2016. Lectures graphics will be available in iLearn on the day before each lecture.

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

Laboratory classes

Monday	2-6 pm	E8A 150 Science Lab
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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 (1st August 2016.). **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.

Required and Recommended Texts and/or Materials

Prescribed text:

Brock Biology of Microorganisms Global Edition + Mastering Microbiology 14th edition. Madigan, Martenko, Stahl, Clark, Buckley. Publisher: Pearson education Inc, San Francisco. ISBN:9781486025442

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.

CBMS215 Microbiology Practical Manual - each laboratory session will be available on iLearn for download one week before the laboratory session, 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 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.
- Actively engage in the practical component of the course.
- Complete the assignments, weekly quizzes 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

New Assessment Policy in effect from Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy_2016.html. For more information visit http://students.mq.edu.au/events/2016/07/19/new_assessment_policy_in_place_from_session_2/

Assessment Policy prior to Session 2 2016 <http://mq.edu.au/policy/docs/assessment/policy.html>

Grading Policy prior to Session 2 2016 <http://mq.edu.au/policy/docs/grading/policy.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

Disruption to Studies Policy 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/

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.

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 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

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.

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, conduct and interpret microbiology scientific experiments.
- Source microbiology literature to support scientific reports and communicate scientific information.
- Apply fundamental concepts and developed knowledge to discuss aspects of microbiology in medicine, industry, ecology and biogeochemical cycling, in terrestrial and aquatic systems.

Assessment tasks

- Pre-Lab tasks
- Lab Book & Class Participation
- Assignment 1-Scientific Poster
- Assignment 2-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

- Design, conduct and interpret microbiology scientific experiments.

- Source microbiology literature to support scientific reports and communicate scientific information.
- Apply fundamental concepts and developed knowledge to discuss aspects of microbiology in medicine, industry, ecology and biogeochemical cycling, in terrestrial and aquatic systems.

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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 tasks

- Pre-Lab tasks
- Assignment 1-Scientific Poster
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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, conduct and interpret microbiology scientific experiments.
- Source microbiology literature to support scientific reports and communicate scientific information.
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Assessment tasks

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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, conduct and interpret microbiology scientific experiments.
- Source microbiology literature to support scientific reports and communicate scientific information.
- Interpret, critically review and summarize scientific literature relating to microorganisms
- Apply fundamental concepts and developed knowledge to discuss aspects of microbiology in medicine, industry, ecology and biogeochemical cycling, in terrestrial and aquatic systems.

Assessment tasks

- Pre-Lab tasks

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- Short literature review
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- Assignment 2-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

- Design, conduct and interpret microbiology scientific experiments.
- Source microbiology literature to support scientific reports and communicate scientific information.
- Interpret, critically review and summarize scientific literature relating to microorganisms
- Apply fundamental concepts and developed knowledge to discuss aspects of microbiology in medicine, industry, ecology and biogeochemical cycling, in terrestrial and aquatic systems.

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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, conduct and interpret microbiology scientific experiments.
- Source microbiology literature to support scientific reports and communicate scientific information.
- Interpret, critically review and summarize scientific literature relating to microorganisms

Assessment tasks

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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 outcome

- Design, conduct and interpret microbiology scientific experiments.

Assessment tasks

- Pre-Lab tasks
- Assignment 1-Scientific Poster
- Assignment 2-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

- Design, conduct and interpret microbiology scientific experiments.
- Apply fundamental concepts and developed knowledge to discuss aspects of microbiology in medicine, industry, ecology and biogeochemical cycling, in terrestrial and aquatic systems.

Assessment tasks

- Pre-Lab tasks
- Lab Book & Class Participation
- Assignment 1-Scientific Poster
- Assignment 2-Scientific Report
- Final Examination

Changes from Previous Offering

CBMS215 practical sessions will be led by Dr Anwar Sunna in 2016

Feedback

We will be actively seeking feedback throughout the semester. We are most open to suggestions for improving the content and delivery of the unit and practical. Please provide any feedback to Dr. Sasha Tetu, Dr. Anwar Sunna, Mrs Elsa Mardones or your practical demonstrators. We 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. 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.

Students MUST contact Dr. Anwar Sunna 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.