

CBMS215

Microbiology

S2 Day 2013

Chemistry and Biomolecular Sciences

Contents

General Information	2	
Learning Outcomes	2	
Assessment Tasks	3	
Delivery and Resources	7	
Unit Schedule	9	
Policies and Procedures	9	
Graduate Capabilities	10	
Feedback	15	
Special consideration requests including no		
n-attendance and extensions	15	

Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

General Information

Unit convenor and teaching staff Unit Convenor Maria Lategan maria.lategan@mq.edu.au Contact via maria.lategan@mq.edu.au

Credit points 3

Prerequisites (BIOL115 and CBMS101 or HSC Chemistry Band 4) or admission to GCertBiotech

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 of the microbial world and its diversity, requirements for life, reproduction,

processes, adaptations, interactions and applications. Laboratory scientific reports and the microbial minute will reveal your overall understanding.

Design and conduct a microbiology scientific experiment. Assessment 3 on Water

Analysis will demonstrate your skills and abilities to fulfil this outcome.

Source microbiology literature to support scientific reports.Writing of scientific laboratory reports will demonstrate this outcome.

Communicate scientific information relevant to microbiology. Your skill in this outcome is demonstrated by a series of short seminars and the final examination

Understand the importance of bacteriological media and its application. Laboratory reports and the final examination will reveal your understanding of this outcome.

Interpret laboratory microscopy and cultures from various environments. Laboratory reports and final examination are used to assess this skill.

Have a general understanding of the application of microbiology in medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food

Name	Weighting	Due
Assignment 1-Scientific report	7%	3/9/13 and 4/9/13
Mid-semester test	13%	6/9/13
Assignment 2	10%	17and 18/9/13
Assignment 3	25%	29 and 30/10/13
Final Examination	45%	University Examination Period

Assessment Tasks

Assignment 1-Scientific report

Due: 3/9/13 and 4/9/13

Weighting: 7%

A concise 2 page scientific report is required. *Please note the page limit. Penalties of 2 mark deduction per extra page will apply.*

- Describe of the microbial world and its diversity, requirements for life, reproduction, processes, adaptations, interactions and applications. Laboratory scientific reports and the microbial minute will reveal your overall understanding.
- Design and conduct a microbiology scientific experiment. Assessment 3 on Water Analysis will demonstrate your skills and abilities to fulfil this outcome.
- Source microbiology literature to support scientific reports.Writing of scientific laboratory reports will demonstrate this outcome.

- Communicate scientific information relevant to microbiology. Your skill in this outcome is demonstrated by a series of short seminars and the final examination
- Understand the importance of bacteriological media and its application. Laboratory reports and the final examination will reveal your understanding of this outcome.
- Interpret laboratory microscopy and cultures from various environments. Laboratory reports and final examination are used to assess this skill.

Mid-semester test

Due: 6/9/13 Weighting: 13%

The test will consist of multiple choice questions, short answers. The test will cover materials from lectures, tutorials and theory of practical.

On successful completion you will be able to:

- Describe of the microbial world and its diversity, requirements for life, reproduction, processes, adaptations, interactions and applications. Laboratory scientific reports and the microbial minute will reveal your overall understanding.
- Understand the importance of bacteriological media and its application. Laboratory reports and the final examination will reveal your understanding of this outcome.
- Have a general understanding of the application of microbiology in medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food

Assignment 2

Due: **17and 18/9/13** Weighting: **10%**

Working in groups (during class time) students are required to prepare a 3-minute seminar as well as each student is to submit a 2-page group scientific report on the results of the experimental work. *Penalties will apply for abstracts over 100 words (1 marks deduction per word over the limit) and reports over 3 pages long (2 marks per page over the limit).*

Due Date:

Seminar: 10th, 11th/9/13

Report: 17th, 18st/9/13

- Design and conduct a microbiology scientific experiment. Assessment 3 on Water Analysis will demonstrate your skills and abilities to fulfil this outcome.
- · Source microbiology literature to support scientific reports. Writing of scientific laboratory

reports will demonstrate this outcome.

- Communicate scientific information relevant to microbiology. Your skill in this outcome is demonstrated by a series of short seminars and the final examination
- Understand the importance of bacteriological media and its application. Laboratory reports and the final examination will reveal your understanding of this outcome.
- Have a general understanding of the application of microbiology in medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food

Assignment 3

Due: 29 and 30/10/13 Weighting: 25%

This exercise is a group assessment designed to allow you to develop and achieve the learning outcomes, graduate attributes and capabilities outlined in this unit guide. Each member of the group will receive the group mark except for the last assessable component of the project – the abstract.

Every week the group is to work together on the investigation, discuss, reflect and present, therefore progress through the assignment as a cooperative unit. A folder will be provided so that your project design, plan, results and outcomes are recorded. The majority of work required for the assignment is undertaken during class time over a period of 5 weeks. However, students often meet during out-of-class hours to further evaluate and discuss the project. During the course of the assignment each group is required to provide 2 progress Seminars (1-2 power point slides, 2 minutes).

Assessable components include: The group's understanding of the experiment, experimental results, project folder content, group cohesiveness, presentation skills and achieved project outcomes will be assessed (5%) at each assessable stage of the project and will contribute to the final assignment mark. Feedback on all aspects of your work including group cohesiveness, delivery, logical thinking, scientific approach, techniques, etc will be provided in order to allow for improvement in the next round of progress seminars.

A final seminar (5 minutes) by each group will summarise their research findings and conclusions. The final seminar is worth 10% of the total Assignment 3 mark.

In addition, each student is also to prepare, individually, a 200 - word limit abstract detailing their findings. *Penalties will apply (0.5 marks per word over the limit)*. This section will contribute 5% of the Assignment 3 mark.

- Describe of the microbial world and its diversity, requirements for life, reproduction, processes, adaptations, interactions and applications. Laboratory scientific reports and the microbial minute will reveal your overall understanding.
- · Design and conduct a microbiology scientific experiment. Assessment 3 on Water

Analysis will demonstrate your skills and abilities to fulfil this outcome.

- Source microbiology literature to support scientific reports.Writing of scientific laboratory reports will demonstrate this outcome.
- Communicate scientific information relevant to microbiology. Your skill in this outcome is demonstrated by a series of short seminars and the final examination
- Understand the importance of bacteriological media and its application. Laboratory reports and the final examination will reveal your understanding of this outcome.
- Interpret laboratory microscopy and cultures from various environments. Laboratory reports and final examination are used to assess this skill.
- Have a general understanding of the application of microbiology in medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food

Final Examination

Due: University Examination Period Weighting: 45%

The final exam will require for 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 nonprogrammable calculators may be taken into the examination (3 hours plus 10 minutes reading time).

- Describe of the microbial world and its diversity, requirements for life, reproduction, processes, adaptations, interactions and applications. Laboratory scientific reports and the microbial minute will reveal your overall understanding.
- Design and conduct a microbiology scientific experiment. Assessment 3 on Water Analysis will demonstrate your skills and abilities to fulfil this outcome.
- Communicate scientific information relevant to microbiology. Your skill in this outcome is demonstrated by a series of short seminars and the final examination
- Understand the importance of bacteriological media and its application. Laboratory reports and the final examination will reveal your understanding of this outcome.
- Interpret laboratory microscopy and cultures from various environments. Laboratory reports and final examination are used to assess this skill.
- Have a general understanding of the application of microbiology in medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food

Delivery and Resources

Classes

Lectures will be held on:

Monday	10 - 11 pm in E7B 100	
Friday	11-12 pm in E7B 100	

Tutorials will be held on: Friday 1 - 2 pm in W5C 220 for weeks 32-37 and E8A 150 for weeks 40-44.

Lectures begin on the 29th August 2013. Lectures graphics will be available in ilearn on the day before each lecture.

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

Laboratory classes

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

Students will need to register for <u>one</u> of the classes <u>only</u>.

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 together with a special consideration request which can be found at: www.mq.edu.au/policy/docs/special_consideration/policy.html and handed in to the Science Centre E7A as soon as possible.

Required and Recommended Texts and/or Materials

Recommended text:

Prescott, Harley, Klein, Microbiology, latest Edition. Author: Willey, McGraw-Hill, Boston, 2011 ISBN 0-07-255678-1

Brock Biology of Microorganisms 12th edition. M.T. Madigan, J. M. Martenko, P.V. Dunlap and D. P. Clark. Publisher: Pearson education Inc, San Francisco. ISBN:978-0321-53615-0

Required:

CBMS215 Microbiology Practical Manual - each laboratory session will be available on iLearn for download one week before the laboratory session.

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 tutorials
- 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 whilst developing the general skills in microbiology and perform satisfactorily in this unit.

Laboratory classes are designed to develop basic laboratory skills, general safety practices and critical and analytical thought. 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 (45%) and Practical (55%) component **MUST** be <u>completed satisfactorily</u>. The final mark for the Practical component (out of 55) will consist of the marks obtained from three assignments and the mid semester test.

Unit Schedule

Policies and Procedures

Macquarie University policies and procedures are accessible from <u>Policy Central</u>. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://www.mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://www.mq.edu.au/policy/docs/assessment/policy.html

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

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

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Special Consideration Policy http://www.mq.edu.au/policy/docs/special_consideration/policy.html

In addition, a number of other policies can be found in the <u>Learning and Teaching Category</u> of Policy Central.

Student Support

Macquarie University provides a range of Academic Student Support Services. Details of these services can be accessed at: http://students.mq.edu.au/support/

UniWISE provides:

- Online learning resources and academic skills workshops http://www.students.mq.edu.a
 u/support/learning_skills/
- Personal assistance with your learning & study related questions.
- The Learning Help Desk is located in the Library foyer (level 2).
- Online and on-campus orientation events run by Mentors@Macquarie.

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

Details of these services can be accessed at http://www.student.mq.edu.au/ses/.

IT Help

If you wish to receive IT help, we would be glad to assist you at http://informatics.mq.edu.au/hel

<u>р/</u>.

When using the university's IT, you must adhere to the <u>Acceptable Use Policy</u>. The policy applies to all who connect to the MQ network including students and it outlines what can be done.

Graduate Capabilities

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. Assessment 3 on Water Analysis will demonstrate your skills and abilities to fulfil this outcome.
- Source microbiology literature to support scientific reports.Writing of scientific laboratory reports will demonstrate this outcome.
- Communicate scientific information relevant to microbiology. Your skill in this outcome is demonstrated by a series of short seminars and the final examination
- Have a general understanding of the application of microbiology in medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food

Assessment tasks

- Assignment 1-Scientific report
- Assignment 2
- Assignment 3

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 of the microbial world and its diversity, requirements for life, reproduction, processes, adaptations, interactions and applications. Laboratory scientific reports and the microbial minute will reveal your overall understanding.
- Design and conduct a microbiology scientific experiment. Assessment 3 on Water Analysis will demonstrate your skills and abilities to fulfil this outcome.
- Communicate scientific information relevant to microbiology. Your skill in this outcome is demonstrated by a series of short seminars and the final examination
- Understand the importance of bacteriological media and its application. Laboratory reports and the final examination will reveal your understanding of this outcome.

Assessment tasks

- Assignment 1-Scientific report
- Mid-semester test
- Assignment 2
- Assignment 3
- 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. Assessment 3 on Water Analysis will demonstrate your skills and abilities to fulfil this outcome.
- Source microbiology literature to support scientific reports.Writing of scientific laboratory reports will demonstrate this outcome.
- Communicate scientific information relevant to microbiology. Your skill in this outcome is demonstrated by a series of short seminars and the final examination
- Interpret laboratory microscopy and cultures from various environments. Laboratory reports and final examination are used to assess this skill.

Assessment tasks

• Assignment 1-Scientific report

- Mid-semester test
- Assignment 2
- Assignment 3
- 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. Assessment 3 on Water Analysis will demonstrate your skills and abilities to fulfil this outcome.
- Source microbiology literature to support scientific reports.Writing of scientific laboratory reports will demonstrate this outcome.
- Communicate scientific information relevant to microbiology. Your skill in this outcome is demonstrated by a series of short seminars and the final examination
- Interpret laboratory microscopy and cultures from various environments. Laboratory reports and final examination are used to assess this skill.
- Have a general understanding of the application of microbiology in medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food

Assessment tasks

- Assignment 1-Scientific report
- Assignment 2
- Assignment 3
- Final Examination

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

· Source microbiology literature to support scientific reports.Writing of scientific laboratory

reports will demonstrate this outcome.

- Communicate scientific information relevant to microbiology. Your skill in this outcome is demonstrated by a series of short seminars and the final examination
- Interpret laboratory microscopy and cultures from various environments. Laboratory reports and final examination are used to assess this skill.
- Have a general understanding of the application of microbiology in medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food

Assessment tasks

- Assignment 1-Scientific report
- Assignment 3

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

- Design and conduct a microbiology scientific experiment. Assessment 3 on Water Analysis will demonstrate your skills and abilities to fulfil this outcome.
- Source microbiology literature to support scientific reports.Writing of scientific laboratory reports will demonstrate this outcome.
- Communicate scientific information relevant to microbiology. Your skill in this outcome is demonstrated by a series of short seminars and the final examination

Assessment tasks

- Assignment 1-Scientific report
- Mid-semester test
- Assignment 2
- Assignment 3
- 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. Assessment 3 on Water Analysis will demonstrate your skills and abilities to fulfil this outcome.
- Communicate scientific information relevant to microbiology. Your skill in this outcome is demonstrated by a series of short seminars and the final examination
- Interpret laboratory microscopy and cultures from various environments. Laboratory reports and final examination are used to assess this skill.

Assessment tasks

- Assignment 1-Scientific report
- Assignment 2
- Assignment 3

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. Assessment 3 on Water Analysis will demonstrate your skills and abilities to fulfil this outcome.
- Communicate scientific information relevant to microbiology. Your skill in this outcome is demonstrated by a series of short seminars and the final examination
- Have a general understanding of the application of microbiology in medicine, industry, in biogeochemical cycling, in terrestrial, aquatic systems and in food

Assessment tasks

- Assignment 1-Scientific report
- Assignment 2
- Assignment 3

Feedback

We are always open to suggestions for improving the content and delivery of the unit. We are very grateful to past students who have provided feedback and comments on what they would like to see in this unit in order to improve learning experiences. The improvements as a result of their comments have benefited many students. Please provide any feedback to Dr. Josie Lategan or Mrs E Mardones.

Special consideration requests including nonattendance 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 request that may be found at www.mq.edu.au/policy/docs/special_consideration/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

 \cdot was of at least three (3) consecutive days duration within a study period and/ orprevented 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. The form required to submit for a request for special consideration can be found at www.registrar.mq.edu.au/Forms/APScons.pdf. This form should be submitted 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 fill in a special consideration form and provide formal documentary evidence to the Science Centre E7A as soon as possible.

<u>Students MUST contact Dr. Josie Lategan immediately</u> to make alternative arrangements if a laboratory session or an assessment task has been missed. <u>Contact can be by email</u> <u>or phone</u>. The intensive nature of laboratory sessions and assessments over a period of

weeks means that non-attendance can significantly impact on your progress. Please be aware that should you miss an assessment task for whatever reason and you <u>do not</u> <u>contact</u> the convenor, an alternative assessment <u>might</u> be available. However please note that this will be <u>at the discretion of the convenor</u>. Should the convenor decide to provide an alternative assessment, please note that a 24 hour notification email (any day) of a date to attend the alternative assessment/supplementary exam will be issued. If students do not attend the designated alternative assessment, no further alternative assessments will be available.

Extensions and penalties

10% of the mark allocated for the assignment <u>will be deducted per day</u> for any work submitted late.

The deadlines for assignments are not negotiable. 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 <u>before the due date</u> unless this is absolutely impossible.

All applications for extensions of deadlines must be submitted to the subject convenor.