# MBIO19013 *Environmental Microbiology*
## Term 2 - 2020

Profile information current as at 05/05/2024 07:06 am



## General Information

### Overview
This unit builds upon the basic microbiological concepts learned in first year and applies them to an environmental context. In this unit you will learn about the various microbial groups and develop a sound understanding of their relevance and importance in both natural and industrial environments. This unit has a very applied and practical focus, covering both field and laboratory microbiological methods. You will learn and apply practical skills which also include employability skills in the area of microbiology.

### Details
Career Level: *Undergraduate*
Unit Level: *Level 2*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

### Pre-requisites or Co-requisites
Pre-requisite: BIOL11102 Life Science Laboratory
Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the Assessment Policy and Procedure (Higher Education Coursework).

### Offerings For Term 2 - 2020

- Mixed Mode
- Rockhampton

### Attendance Requirements
All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

### Residential Schools
This unit has a Compulsory Residential School for distance mode students and the details are:
Click here to see your Residential School Timetable.

### Website
This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.

## Class and Assessment Overview

### Recommended Student Time Commitment

Each 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

### Class Timetable

**Regional Campuses**
Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

**Metropolitan Campuses**
Adelaide, Brisbane, Melbourne, Perth, Sydney

### Assessment Overview

1. **Presentation and Written Assessment**
Weighting: 20%
2. **Practical and Written Assessment**
Weighting: 30%
3. **Online Test**
Weighting: 50%

### Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the University's Grades and Results Policy for more details of interim results and final grades.

## CQUniversity Policies

**All University policies are available on the CQUniversity Policy site.**
You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the CQUniversity Policy site.

## Previous Student Feedback

### Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

### Feedback from Self reflection and student comments

**Feedback**

Students generally happy with unit.

**Recommendation**

The unit will be undergoing a major redevelopment as part of the renewal of the science program. I will be keeping the parts that students are most happy with as much as possible.

## Unit Learning Outcomes

**On successful completion of this unit, you will be able to:**

1. Describe the relationships between form and function, genetics, and growth dynamics in the major microbial groups
2. Explain the fundamental principles of environmental microbiology
3. Discuss the role of microbial interactions with the environment and other organisms, including industrial applications
4. Discuss sampling, processing and analysis methods with respect to environmental microorganisms
5. Practice and demonstrate selected microbiological procedures in the laboratory in a safe and efficient manner
6. Interpret the results of laboratory experiments both individually and in groups.

## Alignment of Learning Outcomes, Assessment and Graduate Attributes

— N/A Level | ◦ Introductory Level | • Intermediate Level | • Graduate Level | ◦ Professional Level | ◦ Advanced Level

### Alignment of Assessment Tasks to Learning Outcomes

| Assessment Tasks | Learning Outcomes | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 1 - Presentation and Written Assessment - 20% | | • | • | | | |
| 2 - Practical and Written Assessment - 30% | | | | | • | • |
| 3 - Online Test - 50% | • | • | • | • | | |

### Alignment of Graduate Attributes to Learning Outcomes

| Graduate Attributes | Learning Outcomes | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 1 - Communication | • | • | • | • | | • |
| 2 - Problem Solving | | | | • | | • |

| Graduate Attributes | Learning Outcomes | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 3 - Critical Thinking | • | • | • | • | • | • |
| 4 - Information Literacy | | • | • | | | |
| 5 - Team Work | | | | | • | • |
| 6 - Information Technology Competence | | | | | | |
| 7 - Cross Cultural Competence | | | | | • | • |
| 8 - Ethical practice | | | | | | • |
| 9 - Social Innovation | | | • | | | |
| 10 - Aboriginal and Torres Strait Islander Cultures | | | | | | |

## Alignment of Assessment Tasks to Graduate Attributes

| Assessment Tasks | Graduate Attributes | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1 - Presentation and Written Assessment - 20% | • | | • | • | | | | | | |
| 2 - Practical and Written Assessment - 30% | • | • | • | • | • | | • | • | | |
| 3 - Online Test - 50% | • | • | | | | | | | | |

## Textbooks and Resources

### Textbooks

MBIO19013

**Prescribed**

**Environmental Microbiology**
Edition: 3rd (2014)
Authors: Pepper, Gerba and Gentry
Elsevier
Burlington , MA , USA
ISBN: 978-0-12-394626-3
Binding: Hardcover

**Additional Textbook Information**
If you prefer to study with a paper copy, they are available at the CQUni Bookshop here: http://bookshop.cqu.edu.au (search on the Unit code). eBooks are available at the publisher's website.

**View textbooks at the CQUniversity Bookshop**

### IT Resources

**You will need access to the following IT resources:**

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Web cam and microphone

## Referencing Style

All submissions for this unit must use the referencing style: Harvard (author-date)
For further information, see the Assessment Tasks.

## Teaching Contacts

**Sandrine Makiela** Unit Coordinator
s.makiela@cqu.edu.au

## Schedule

**Week 1 - 13 Jul 2020**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Microbial form and function | 1, 2 | |

**Week 2 - 20 Jul 2020**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Microbial form and function | 1, 2 | |

**Week 3 - 27 Jul 2020**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Microbial growth and control of growth | 3 | |

**Week 4 - 03 Aug 2020**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Microorganisms in nature | 4, 5, 6, 7 | |

**Week 5 - 10 Aug 2020**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Microbial interactions with the environment | 15, 16 | Online test 1 due. |

**Vacation Week - 17 Aug 2020**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|

**Week 6 - 24 Aug 2020**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Microbial ecology | 19, 20 | |

**Week 7 - 31 Aug 2020**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Mechanisms of disease | Readings will be provided on Moodle. | |

**Week 8 - 07 Sep 2020**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Waste water microbiology | 23, 25, 26, 27, 28, 29 (sections will be specified on Moodle) | **Essay and Seminar on Controversial Issue** Due: Week 8 Monday (7 Sept 2020) 9:00 am AEST |

**Week 9 - 14 Sep 2020**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Sampling, processing and culture of microbes | 8, 10 | Online test 2 due. |

**Week 10 - 21 Sep 2020**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Detection, enumeration and bioinformatics | 11, 12, 13, 21 | **Practical skills, Project Report and Peer Assessment** Due: Week 10 Monday (21 Sept 2020) 9:00 am AEST |

**Week 11 - 28 Sep 2020**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Biodegradation, bioremediation and bioleaching | 17, 18 | |

**Week 12 - 05 Oct 2020**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| Industrial microbiology and biofuels | Readings will be provided on Moodle. | |

**Review/Exam Week - 12 Oct 2020**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|
| | | Online test 3 due. |

**Exam Week - 19 Oct 2020**

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|---|---|

## Assessment Tasks

### 1 Essay and Seminar on Controversial Issue

**Assessment Type**
Presentation and Written Assessment

**Task Description**
You will be assessed on two tasks (for a total weighting of 20%):

15% - essay
5% - seminar

**Essay**

On the unit Moodle site, you will have a choice of 5 topics, each of which is a controversial issue in microbiology. Please note that the number of students in each topic will be restricted. You will need to write a critical debate on your chosen topic. There is no right or wrong answer, but you will need to critically review all sides of the issue and defend your opinion with references.
Word length: 1000-1400 words.

**Seminar**

You will need to prepare a short (3-6 minute) seminar presenting one aspect of your essay; there will be several choices available per essay topic on the unit Moodle site. All seminars will be delivered via Zoom at a time and date negotiated between students and the unit coordinator (it will be after Week 10). The use of a PowerPoint presentation is optional.

**Assessment Due Date**

Week 8 Monday (7 Sept 2020) 9:00 am AEST

**Return Date to Students**

Week 10 Monday (21 Sept 2020)

**Weighting**

20%

**Minimum mark or grade**

40%

**Assessment Criteria**

For the essay, a full assessment rubrics will be available on the unit Moodle site, using the following criteria:

- Content and range of knowledge (20%)
- Application of critical analysis (40%)
- Defense of argument (10%)
- Presentation (10%)
- Clarity of expression (10%)
- Referencing (10%)

For the seminar, detailed marking criteria will be available on the unit Moodle site, and will be based on the following:

- Seminar content (60%)
- Seminar presentation (40%)

**Referencing Style**

- Harvard (author-date)

**Submission**

Online

**Learning Outcomes Assessed**

- Explain the fundamental principles of environmental microbiology
- Discuss the role of microbial interactions with the environment and other organisms, including industrial applications

**Graduate Attributes**

- Communication
- Critical Thinking
- Information Literacy

## 2 Practical skills, Project Report and Peer Assessment

**Assessment Type**

Practical and Written Assessment

**Task Description**

For this assessment,you will be assessed on three tasks (for a total weighting of 30%):
10% - Practical skills
15% - Written report
5% - Peer assessment

**Practical Skills**

During the residential school you will be marked on basic microbiological techniques, on both your performance of the task and the results. The marking will occur during the normal course of the residential school (it is not under exam conditions). Detailed descriptions and requirements for this task will be available on the Moodle site.

**Written Report**

During the residential school you will do set practicals both individually and in groups. In addition to this you will undertake a small group project. At the start of term, you will be given a choice of two or three potential projects. Based on each student's preference of project, you will be assigned to a group by the unit coordinator. You will carry out the project experiment during the residential school in your group, and then individually write a scientific report on the project results.

The written report will be in the style of an article for a journal submission. As such, you will need to follow the "Guidelines for Authors" document for the journal when preparing your submission. This document, the conventions to follow and the passing standards will be available on Moodle, and will be clearly outlined in the residential school.

Word limit: 1500 words max.

**Peer Assessment**

You will be asked to grade yourself and each of your team members on how well they performed as a team member. This will be done after the practical block session. Each student's final mark will be an average of the summative peer assessments. These will be done via the Self and Peer Assessment program, which will be available in Moodle.

**Assessment Due Date**

Week 10 Monday (21 Sept 2020) 9:00 am AEST

This is both the written report and the peer assessment.

**Return Date to Students**

Week 12 Monday (5 Oct 2020)

**Weighting**

30%

**Minimum mark or grade**

40%

**Assessment Criteria**

The practical skills will be marked on how well you perform each skill and the result (final product). A detailed marks sheet will be available on the Moodle site.

For the report, a full assessment rubrics will be available on the unit Moodle site, using the following criteria:

- Scientific writing (10%)
- Data presentation and analysis (20%)
- The extent to which the results are considered and discussed (40%)
- Report presentation (10%)
- Clarity of expression (10%)
- Referencing (10%)

The peer assessment questionnaire will be available on the unit Moodle site from the time of the residential school, and the criteria will be discussed at that time.

**Referencing Style**

- Harvard (author-date)

**Submission**

Online

**Learning Outcomes Assessed**

- Practice and demonstrate selected microbiological procedures in the laboratory in a safe and efficient manner
- Interpret the results of laboratory experiments both individually and in groups.

**Graduate Attributes**

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Team Work
- Cross Cultural Competence
- Ethical practice

## 3 Online Tests

**Assessment Type**
Online Test

**Task Description**
Your knowledge of the content and concepts will be examined by three online tests held at regular intervals throughout the term.
The first online test will be in week 5, and will cover the content of weeks 1-4. The second will be in week 9, and cover the content of weeks 5-8. The third will be during the examination period, and will cover the content of weeks 9-12.
These online tests will be done as quizzes in Moodle. Exact dates and times will be found on the unit Moodle page.

**Assessment Due Date**

Online test 1 in week 5, online test 2 in week 9, online test 3 during the exam period.

**Return Date to Students**

**Weighting**
50%

**Minimum mark or grade**
50%

**Assessment Criteria**
Each question in each online test will be marked automatically by Moodle. Your total mark for this assessment will be the sum of all three online test marks.

**Referencing Style**

- Harvard (author-date)

**Submission**
No submission method provided.

**Learning Outcomes Assessed**

- Describe the relationships between form and function, genetics, and growth dynamics in the major microbial groups
- Explain the fundamental principles of environmental microbiology
- Discuss the role of microbial interactions with the environment and other organisms, including industrial applications
- Discuss sampling, processing and analysis methods with respect to environmental microorganisms

**Graduate Attributes**

- Communication
- Problem Solving

## Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the **Student Academic Integrity Policy and Procedure**. This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

**What is a breach of academic integrity?**
A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

**Why is academic integrity important?**
A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

**Where can I get assistance?**
For academic advice and guidance, the Academic Learning Centre (ALC) can support you in becoming confident in completing assessments with integrity and of high standard.

**What can you do to act with integrity?**

**Be Honest**
If your assessment task is done by someone else, it would be dishonest of you to claim it as your own

**Seek Help**
If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)

**Produce Original Work**
Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem