

BIOL313-22S2 Semester 2, 2023

## Advanced Microbiology

0.125 EFTS, 15 Points

Jul 2023 - Nov 2023

### **Whakamahuki | Description**

#### ***Ko te mātai koiora moroiti whakamua | Advanced Microbiology***

This course builds on BIOL213 and explores microbial ecology, advanced food and agricultural microbiology, disease and pathogenesis. The course emphasises bacteria and fungi, with other microbes also considered. Both fundamental and applied microbiology will be covered. The practical component of the course consists of isolating and characterising novel microbial strains, using both molecular and traditional approaches.

The general aim of the course is to advance your microbiological knowledge by covering the key principles of:

- Current methods used in microbiology (traditional and molecular)
- Microbial ecology
- Environmental and applied microbiology
- Culture selection and food microbiology
- Agriculture (water, soil and gut)
- Pathogenesis/symbiosis
- Biogeochemical processes and life at the extremes

The laboratory-based component of the course consists of student-led, research project.

#### **Who is this course intended for?**

BIOL313 is targeted at students with an interest in microbiology, microbial ecology, biodiversity, and biotechnology using microorganisms. Students will explore advanced microbiological concepts and will undertake a laboratory programme designed build applied and fundamental microbiological research skills. The course is also designed to build research and employment skills, in particular, skills needed for the critical analyses of literature and data, and microbiology research experimental design.

### **Āhuatanga Taura | Graduate Profile**

This course will provide students with an opportunity to develop these UC Graduate Attributes (GP) and Kaupapa (K) ([www.canterbury.ac.nz/study/graduate-profile/students/what-are-the-graduate-attributes/](http://www.canterbury.ac.nz/study/graduate-profile/students/what-are-the-graduate-attributes/)):

- **GP1:** Critically competent in a core academic discipline. This course teaches you core knowledge and skills for microbiological sciences.
- **GP2:** Employable, innovative and enterprising. Transferable skills such as communication, analytical, critical thinking, and problem-solving skills are sought-after by employers.
- **GP3:** Biculturally competent and confident.
- **GP5:** Globally aware.
- **K7:** Application of bicultural competence and confidence in a chosen discipline and career.

## ***Hua Akoranga* | Intended Learning Outcomes and Associated Assessment**

As a student in this course I will:

- Demonstrate an understanding of the techniques used in modern and traditional microbiology and their advantages and disadvantages (**Graduate profiles:** GP1, GP2; **Assessment task:** Mid-term tests and Final exam).
- Master microbiological techniques. The laboratory component will give you time to hone your experimental skills and to learn the tools of the trade including aseptic technique, media preparation, independent planning of experiments, laboratory mathematics, as well as documentation and evaluation of results (**Graduate profiles:** GP1, GP2; **Assessment task:** Laboratory report).
- Apply general microbiology knowledge to interpretation and understanding ecological processes in industrial, food, and environmental microbiology (**Graduate profiles:** GP1, GP2, GP5, K7; **Assessment task:** Mid-term tests and Final exam)
- Design and critically evaluate experiments to enrich and isolate microorganisms, and determine growth, physiology and test chemotaxonomic traits (**Graduate profiles:** Mastering their chosen discipline; **Assessment task:** Laboratory report).
- Understand, interpret and evaluate experimental data and communicate scientific findings in a written form (**Graduate profiles:** GP1; **Assessment task:** Laboratory report).
- Demonstrate an awareness of issues linked with data sovereignty and the implications of using indigenous microorganisms for research or applications to Maori (**Graduate profiles:** K7; GP5; **Assessment task:** Mid-term tests and Final exam)

## ***Pūkenga Ngaio* | Transferable Skills**

As a student in this course, I will develop the following skills:

- Scientific reading, writing and presentation: In most scientific jobs you will be required to read and understand scientific literature. Clear written and oral communication is essential for any professional career (**Graduate profiles:** GP1, GP2; **Assessment task:** Laboratory report)
- Experimental design, microbiology experimental skills, numeracy and data analysis: Important in any research focused jobs (**Graduate profiles:** GP1, GP2; **Assessment task:** Laboratory report)

### **Prerequisites:**

- BIOL 213

### **Tutorials:**

Taught material for BIOL313 will be undertaken in the form of nine 2-hour tutorials. The tutorials will consist of either a flipped classroom approach in which students are expected to

prepare outside of class and come along to do an activity in the tutorial time or approximately 45-60 minutes lectured material followed by ~45-60 minutes of group work/tutorial working through problems/concepts raised in the lecture portion of the tutorial.

***In order to be successful in the tutorial sessions, students will be required to engage with material posted on our LEARN site in advance of the tutorial sessions. This may mean watching a video, following some instructions or reading an article before class. These materials will be chosen carefully and will allow us to make the most of the time we have together in class for activities, collaboration and putting what we have learned into practice.***

- To get the most from the group work and ensuing discussions, it is strongly encouraged that tutorials are attended in-person.
- Check university website for times and rooms in case of changes.

### **Laboratories:**

Check university website for times and rooms in case of changes. Students need to prepare in advance for the labs. The BIOL313 laboratory work will consist of a student-driven microbiology research project. The project will involve enriching and isolating a bacterium, archaeon or microeukaryote, identifying the isolated via molecular methods, and then describing the morphological, metabolic and phenotypic characteristics. Assessment will be via a final research-article styled report.

Please note that attendance of all laboratories is **compulsory**.

### **Textbooks:**

The course textbook (also for BIOL213) is *Brock - Biology of Microorganisms 15<sup>th</sup> Edition*. *Prescott's Microbiology 9<sup>th</sup> Ed* (Willey, Sherwood, Woolverton) is also a useful textbook for the course.

### **LEARN:**

This course is supported by LEARN. You will find electronic copies of lecture notes and other material distributed solely by this method. Please also note that written work will be requested in hard copy (for grading) and electronic form (for assessment of originality using *Turnitin*). Instructions will be given on how you do this via LEARN. The course is attempting to be as environmentally friendly as possible, so you will receive a minimum of 'paper' handouts.

### **Kairuruku akoranga | Course coordinator**

- Dr. Heather Hendrickson - Room 538 Julius von Haast Building (Biology)  
[Heather.hendrickson@canterbury.ac.nz](mailto:Heather.hendrickson@canterbury.ac.nz)

### **Lecturers:**

- Prof. Ian Dickie - Room 320 Julius von Haast Building (Biology)  
[ian.dickie@canterbury.ac.nz](mailto:ian.dickie@canterbury.ac.nz)
- Dr. Heather Hendrickson - Room 538 Julius von Haast Building (Biology)  
[Heather.hendrickson@canterbury.ac.nz](mailto:Heather.hendrickson@canterbury.ac.nz)
- Assoc. Prof. Matthew Stott - Room 537 Julius von Haast Building (Biology)  
[matthew.stott@canterbury.ac.nz](mailto:matthew.stott@canterbury.ac.nz)

### **Technical Staff:**

- Mr Craig Galilee - Room 517 Julius von Haast Building (Biology)  
[craig.galilee@canterbury.ac.nz](mailto:craig.galilee@canterbury.ac.nz)

Any queries concerning the course should be directed to the course co-ordinator. She will attempt to answer all queries quickly. **Please try to answer questions about scheduled events by referring to this course outline and use an email to the course coordinator about such business as a last resort. If your question can be answered using this handout, you may not receive a reply by email.** Queries concerning specific lecturers should be discussed with the lecturer concerned. If that is not possible or comfortable for you, then see the Course Coordinator or Head of School (Prof. Matthew Turnbull)

## **Aromatawai | Assessment**

Laboratory Research Project:	49%
Test 1:	17%
Test 2:	17%
Final Exam:	17%

### **Notes on assessments:**

- Students should expect that assessed course material will be sourced from content from tutorials, content posted on LEARN, and/or laboratory work.
- The course will be subject to the SBS policy on late submission of work (see Rules, Regulations and what to do when things go wrong).

## **Rules, Regulations, and what to do when things go wrong**

[updated 3 April 2020]

**If in doubt:** ASK! The course coordinator is happy to answer questions at any time. All staff involved in the course are available for advice on specific issues.

### **What do I do if I have to miss something or if my performance was impaired?**

If you feel that **illness, injury, bereavement or other extenuating circumstances beyond your control** prevented you from completing an item of assessment worth 10% or more of total course assessment or if these circumstances affected your performance in such assessments, you should apply for Special Consideration. Applications for Special Consideration should be submitted via the Special Consideration website <http://www.canterbury.ac.nz/study/special-consideration/> and you need to notify the course coordinator *within five days* of the assessment or its due date. If you apply for Special Consideration, because of medical reasons, you should visit a doctor within 24 hours of the assessment (application form available on the website above or from the Student Health Centre).

The Special Consideration provisions are intended to assist students who have covered the work of a course but have been prevented by illness or other critical circumstances from demonstrating their mastery of the material or skills at the time of assessment – they do not excuse you from doing the assessment within a reasonable time agreed with the course coordinator. You should expect to be required to submit additional work if you miss a major assignment (e.g. a field trip for which a major write-up is required).

In rare cases you may not be able to complete an assessment or attend a field trip, because of **involvement in international or national representative sport or cultural groups**. In such cases you should also apply for Special Consideration. Please review the Special Considerations policy because very few kinds of activities will be eligible for consideration (e.g. holiday trips, birthday parties etc. are not given special status in the University policy)

**Students prevented by extenuating circumstances from completing the course** after the final date for withdrawing, may apply for Special Consideration for late discontinuation of the course. Applications *must* be submitted via <http://www.canterbury.ac.nz/study/special-consideration/> within five days of the end of the main examination period for the semester.

### **Use of Artificial Intelligence Tools:**

In this course you will be producing a report that must represent your original writing. Some UC assessments permit the use of Artificial Intelligence (AI) tools. Please read each assessment's guidelines carefully so you know what AI use is permitted or not, and ensure that you follow the guidance on both usage and how to declare any permitted AI usage in your assignment (e.g., do you explain the AI tools and procedures employed in the assessment Methodology section, in the Acknowledgements, or in another manner). If AI use is not expressly permitted in an assessment, assume it is not allowed. If at all unsure regards AI use and documentation, please ask your course teaching staff.

### **Plagiarism**

It is essential that you are aware that plagiarism is considered a very serious offence by the academic community, the University and the School of Biological Sciences. Plagiarism is defined as taking content from another work or author and presenting it, without attribution, as if it is your own work. Content here includes text (sentences or major parts of sentences), display items (graphs and tables), and overall structure (the detailed sequence of ideas). Plagiarism includes:

- re-use of previous assignments (even if each individual sentence has been rephrased to say the same thing in different words, if the overall structure is re-used)
- copying of another student's work (with or without their consent)
- the unreferenced use of published material or material from the internet e.g. cutting and pasting of paragraphs or pages into an essay.

For most pieces of in-term assessment you will be given information concerning the use of direct and indirect quotes from previously published work. If you are in any doubt about appropriate use of published material, please speak with a member of academic staff. If you are still unsure what plagiarism is, then seek advice.

It is a School policy that courses may request you submit work electronically for subsequent analysis of originality using *Turnitin*. Students agree that by taking courses in BIOL, assessments may be submitted to Turnitin.com for textual similarity review. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Terms and Conditions of Use posted on the Turnitin.com site.

### **Where do I hand in assignments and then collect them once marked?**

All assignments should be placed in the designated collection box in the foyer of the 2nd floor of the School of Biological Sciences (Von Haast building, near the main reception), unless directed otherwise by the course coordinator. All assignments must be accompanied by a cover sheet signed by you stating that the submitted work is not plagiarised. Cover sheets are available on top of the collection boxes, or you can download one from the Biology website (<http://www.canterbury.ac.nz/media/documents/science-documents/assignment-coversheet.pdf>). In addition, you may also be asked to submit your work electronically (via Learn) for analysis in *Turnitin*.

Marked assignments can be collected from the School of Biological Sciences reception, unless directed otherwise by the course coordinator. Teaching staff will endeavour to return work as

soon as possible, and should contact you if there are likely to be any delays that will prevent return within the maximum 4-week timeframe.

### **What if I can't get it finished in time?**

Reports and assignments should be handed in on time. Extensions may be granted if you have a valid reason. **If you require an extension, you should request one from the course coordinator** (or the lecturer responsible for marking the work), with as much notice as possible. Please do this **BEFORE** the deadline for the assignment. **If you have been given an extension you should hand the work DIRECTLY to the course coordinator** (do not put it in the drop box as it may not be cleared after the due date).

If an extension has not been granted:

- work must be handed in by the due date to gain full credit
- work handed in up to 7 days after the deadline will be marked, but the marks will be discounted 25% before they are recorded to the student's credit
- any work handed in more than 7 days after the deadline date will not be marked or earn credit.

### **What if I have written more than the word or page limit?**

If there is a word limit on an assignment, it is usually there to stop you doing too much work and to encourage you to write succinctly. It also makes things easier to assess. You can be up to 10% over without too much worry, but if the length increases beyond that your mark may suffer due to failure to follow the requirements. If you find yourself way over the word limit talk to the lecturer concerned about how to get your assignment to an acceptable length.

### **What if I fail part of the course?**

In Biological Sciences, we require a satisfactory level of achievement in both the theoretical aspects of the discipline and in practical activities. This means you must attend all class activities and submit all items of assessment unless you have a very good reason not to (e.g. medical reasons). **A student must attain an average score of at least 40% for in-course assessments (e.g. assignments, reports) and an average score of at least 40% in the exam and/or tests, AND score at least 50% overall for the course, to be awarded a passing grade. See the course outlines for clarification of the assessment items included in each category and ask the coordinator if you are still unsure.**

### **What's the best way to give feedback?**

We welcome constructive feedback at all times – help us to make this a valuable course for you. We endeavour to remain approachable at all times. If you would rather give feedback anonymously, please use the online course survey or talk to lab demonstrators, or your class rep (who will all report back to the staff-student liaison committee that includes a representative from each of the undergraduate classes). Class representatives will be selected from each class at the start of course.

### **What's the best way to complain?**

If you feel you have not been fairly treated during this course, please raise the issue with the lecturer or course coordinator in the first instance. Other avenues include your class rep., who can raise issues anonymously, or the UCSA education coordinator.

### **Grading**

A+	90% or above
A	85 – 90
A-	80 – 84
B+	75 – 79

B	70 – 74
B-	65 – 69
C+	60 – 64
C	55 – 59
C-	50 – 54

A restricted pass (R) **may** be awarded to those who are close to a pass (i.e. an overall score of 48-49.9%) AND who have achieved at least a 40% overall score in both in-course assessment and tests/exams. If an R grade is awarded you gain credit for the course but **cannot continue into papers that require this course as a pre-requisite**. NB. The R grade is only available at 100 and 200 level - it cannot be awarded for third year papers. Failing grades: D 40-49