School of Environmental and Life Sciences

BIOL3100: Microbiology

Callaghan
Semester 1 - 2024

COURSE OUTLINE

OVERVIEW

Course Description

Microorganisms are by far the most abundant and diverse life-forms. BIOL3100 will explore the range of microorganisms that exist and how they have adapted to live in almost every environment on the planet. It will also examine the involvement of pathogens in human disease, how the immune system fights infection and how epidemiology can be used to monitor, track and prevent further spread of infectious disease. Microbes are also of great use to us; the modern biotechnology applications of microbes will be examined showing how microorganisms have been used by industry to produce a range of products essential to modern society, including the development of novel antibiotics to combat the growing threat of antimicrobial drug resistance.

Academic Progress Requirements

Nil

Requisites

Students must have successfully completed BIOL2090 to be enrolled in in this course.

Assumed Knowledge

BIOL2090

Contact Hours

Callaghan
Lecture
Face to Face On Campus
3 hour(s) per week(s) for 8 week(s)
Any 8 weeks across the entire semester.
Tutorial
Face to Face On Campus
1 hour(s) per week(s) for 8 week(s)
Any 8 weeks across the entire semester.

Unit Weighting

10

Workload

Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

CONTACTS

Course Coordinator

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SYLLABUS

Course Content

Evolution and Diversity
- Archaea and Proteobacteria
- Eukaryotic microbes
- Microbial interactions
- Environmental microbiology

Microbial Biotechnology
- Molecular microbiology
- Fermentation and degradation
- Virology

Human Disease
- Pathogenesis and antimicrobial strategies
- Mobile DNA and antimicrobial drug resistance
- Epidemiology

Course Learning Outcomes

On successful completion of this course, students will be able to:

1. Describe the biotechnology processes for which microorganisms can be used and manipulated;
2. Outline the dynamic nature of symbiotic interactions and apply this knowledge to the changing environment;
3. Explain the problems involved in antimicrobial therapy and the need for development of new chemicals for the control of microorganisms;
4. Contrast the protective role of the human immune system with strategies of pathogenic microorganisms to evade the immune system and cause disease;
5. Describe the application of microbiology to industrial processes and environmental management in the modern world.

Course Materials

Recommended Reading:

- **Recommended Text:**
  Prescott's Microbiology 10th edition, 2017. Authors: Willey, Sherwood and Woolverton. Publisher: McGraw-Hill. ISBN : 978-1-259-28159-4 In addition to the text book, you are also expected to read primary references (journal articles) and reviews. References for these will be provided by the lecturers.
  Useful Reference Books:
  Encyclopedia of Microbiology [electronic resource], Maczulak,A. New York : Infobase Publishing, 2011 ISBN 9781438134062 BIOS Instant Notes in Microbiology [electronic resource], Baker, S. Hoboken : Taylor & Francis, 2011 4th ed ISBN 9780203808313
  Required Reading:
  References for journal articles and reviews will be provided during lectures or placed on Canvas as necessary.

SCHEDULE

Week	Week Begins	Topic	Learning Activity	Assessment Due
1	26 Feb	Evolution and diversity/Archaea and proteobacteria	Attend Lectures/Tutorial. Read texts provided on Canvas/in lectures	
2	4 Mar	High and low G+C groups/Microbial interactions/Microbes and salt water	Attend Lectures/Tutorial. Read texts provided on Canvas/in lectures	
3	11 Mar	BIOL3001 Lab week	No lectures this week	
4	18 Mar	Microbes and fresh water/microbes in soil/infection and immunity	Attend Lectures/Tutorial. Read texts provided on Canvas/in lectures	
5	25 Mar	Infection and immunity/pathogenesis	Attend Lectures/Tutorial. Read texts provided on Canvas/in lectures	Quiz 1 Written assessment 1
6	1 Apr	BIOL3001 Lab week	No lectures this week	
7	8 Apr	Disease/Antibiotics and resistance	Attend Lectures/Tutorial. Read texts provided on Canvas/in lectures	
Mid-Semester Recess				
Mid-Semester Recess				
8	29 Apr	Epidemiology/Viruses	Attend Lectures/Tutorial. Read texts provided on Canvas/in lectures	
9	6 May	BIOL3001 Lab week	No lectures this week	Quiz 2 Written assessment 2
10	13 May	Viruses/Eukaryotic viruses	Attend Lectures/Tutorial. Read texts provided on Canvas/in lectures	
11	20 May	Virology/Biotechnology: Fermentation/biodegradation /Applications	Attend Lectures/Tutorial. Read texts provided on Canvas/in lectures	
12	27 May	BIOL3001 Lab week	No lectures this week	
13	3 Jun	Biotechnology: Fermentation/Biodegredation /Applications	Attend Lectures/Tutorial. Read texts provided on Canvas/in lectures	Quiz 3 Written assessment 3
Examination Period				Formal Exam: date to be determined by Exams team
Examination Period				

ASSESSMENTS

This course has 4 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	On-line Quiz	5pm Friday Weeks 5, 9 & 13	Individual	15%	1, 2, 3, 4, 5
2	Essay/Written Assessment	Monday 5pm of Weeks 5, 9 & 13	Individual	30%	1, 2, 3, 4, 5
3	Formal Examination	In exam period	Individual	45%	1, 2, 3, 4, 5
4	Tutorial Exercises	Questions to be completed before the weekly tutorial.	Individual	10%	1, 2, 3, 4, 5

Late Submissions The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

Assessment 1 - On-line Quiz

Assessment Type Quiz
Purpose Will test knowledge after the completion of each course module
Description Online quiz consisting of multiple-choice questions
Weighting 15%
Length 1 hour
Due Date 5pm Friday Weeks 5, 9 & 13
Submission Method Online
Online, multiple choice questions in Canvas.
Assessment Criteria Multiple choice questions: right/wrong answer.
Return Method Online
Feedback Provided Online - Immediately upon completion. No written feedback provided.

Assessment 2 – Essay/Written Assessment

Assessment Type Written Assignment
Purpose To test in depth knowledge and interpretation or application of learning from various aspects in each module.
Description Written assignments consisting of essay or short written response questions, as instructed by module coordinators.
Weighting 30%
Length Variable – Refer to assignment guidelines on Canvas.
Due Date Monday 5pm of Weeks 5, 9 & 13
Submission Method Online
Submit via Turnitin on Canvas site.
Assessment Criteria As instructed by module coordinators.
Return Method Online
Feedback Provided Online- 3 weeks after submission. Detailed feedback will be written on your essay/short answer questions

Assessment 3 - Formal Examination

Assessment Type Formal Examination
Purpose The final formal examination is designed to test the individual student's knowledge of the course material and their ability to describe, analyse and hypothesise from this material.
Description Formal written exam consisting of multiple choice and short answer questions.
Weighting 45%
Length 2 hours
Due Date In exam period
Submission Method Online
Assessment Criteria In multiple-choice questions, only correct answers will receive marks, and there is no penalty for incorrect answers. In short answer questions, full marks will be allocated to responses that correctly explain or apply appropriate concepts to the context of the questions. Partial marks will be awarded in accordance with the level of completeness, understanding and accuracy

	of a response. Incorrect responses will not be penalised with negative points.
Return Method	Not Returned
Feedback Provided	No Feedback

Assessment 4 - Tutorial Exercises

Assessment Type	Tutorial / Laboratory Exercises
Purpose	To test knowledge from the week's lectures, and the ability to describe, analyse and hypothesise from the lecture material.
Description	Topics related to lectures will be set in the tutorials- questions will be posted on Canvas for each week.
Weighting	10%
Length	1 hour tutorial session. Thursdays, 10-11am
Due Date	Questions to be completed before the weekly tutorial.
Submission Method	In Class Bring answers to class where they will be discussed as a group and marked in class.
Assessment Criteria	Questions will be marked in class and marked papers will be collected.
Return Method	In Class
Feedback Provided	In Class - In Class - immediately, in the tutorial. In Class - immediately, in the tutorial. Each question will be discussed and model answers provided.

ADDITIONAL INFORMATION

Grading Scheme This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

*Skills are those identified for the purposes of assessment task(s).

Communication Methods Communication methods used in this course include:

- Canvas Course Site: Students will receive communications via the posting of content or announcements on the Canvas course site.
- Email: Students will receive communications via their student email account.
- Face to Face: Communication will be provided via face to face meetings or supervision.

Lectures and tutorials will be presented face-to-face, but this may be subject to change depending upon the Covid situation. Changes to course delivery, reminders for assignments and general information will be put on the Canvas site and by email.

Course Evaluation

Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.

Oral Interviews (Vivas)

As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the Oral Examination (viva) Procedure. In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the Student Conduct Rule.

Academic Misconduct

All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to https://policies.newcastle.edu.au/document/view-current.php?id=35.

Adverse Circumstances

The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where:

1. the assessment item is a major assessment item; or
2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system;
3. you are requesting a change of placement; or
4. the course has a compulsory attendance requirement.

Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at:
https://policies.newcastle.edu.au/document/view-current.php?id=236

Important Policy Information

The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures that support a safe and respectful environment at the University.

Other Information

Reasonable Adjustment Plans (RAP)
If you are registered with AccessAbility and have been provided with a Reasonable Adjustment Plan (RAP), please ensure that you provide your Course Coordinator with a copy as soon as you can, or let your Course Coordinator know that you are still waiting for your RAP.

This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.
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