

BIOL1001: Molecules, Cells and Organisms

Callaghan

Winter - 2024



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

OVERVIEW

Course Description

Introduces the basic principles and concepts of cell and molecular biology to explore the nature of life's molecular building blocks and systems and how these interact to form functional cells and ultimately organisms. Students will discover some of the principles behind how cells work and explore ideas about how biological complexity and life itself may have originated. This knowledge underpins our ability to combat disease, to harness solar energy to feed the world, to sustainably power human industry and to recycle our waste efficiently using microbial systems. The production of new cells is vital to the survival of species and there will be an introduction to basic genetic concepts to explain how organisms can pass on their traits which convey selective advantages for survival in a fiercely competitive world. Cells must also communicate with other cells and be able to detect and respond to external stimuli from its environment. Students that have completed this course will be well placed to further their studies in cell and molecular biology, biochemistry, microbial biology, molecular genetics and animal & plant physiology courses at 2000 and 3000 level.

Academic Progress Requirements

Nil

Requisites

Course Replacement:
You cannot enrol if you have successfully completed any of the following course(s):
BIOL1040
BIOL1050

Assumed Knowledge

HSC Chemistry HSC Mathematics Advanced or HSC Mathematics Standard

Contact Hours

**Callaghan
Lecture**
Face to Face On Campus
52 hour(s) per term for 1 term starting Week 1

Unit Weighting Workload

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

COURSE OUTLINE

CONTACTS

Course Coordinator **Callaghan**
Ms Chloe Peneaux
Chloe.Peneaux@newcastle.edu.au
Consultation: Email to arrange an appointment.

Teaching Staff Other teaching staff will be advised on the course Canvas site.

School Office **School of Environmental and Life Sciences**
Room C228 Chemistry Building
Callaghan
Science-SELS@newcastle.edu.au
+61 2 4921 5080
9am-5pm (Mon-Fri)

SYLLABUS

Course Content Introduction to Molecules, Cells and Organisms: This course aims to introduce students to the underlying principles and concepts of biology at the level of the molecule and cell. These fundamental units form the building blocks of complex multicellular organisms.

Cell Structure & Energetics:

- Molecular basis of life
- Introduction to cell structure & function
- Relationship of biomolecular structure to cellular function
- Components of prokaryotic and eukaryotic cells
- Origin of Life
- Molecular genetics & protein synthesis
- Enzyme function
- Cellular metabolism
- Photosynthesis
- Glycolysis, fermentation, respiration

Cell Division & Regulation:

- Molecular and cell biology of cell division
- Regulation of gene expression
- Inter and intra cellular communication
- Cell differentiation/specialisation

Sex, Inheritance & Multicellular Organisms:

- Meiosis & sexual reproduction
- Genetics & mechanisms of inheritance
- From cells to multicellular organisms

**Course Learning
Outcomes**

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

1. Demonstrate understanding of biological terminology and concepts in relation to molecules and cells
2. Define the hierarchy of structure within cells
3. Explain the processes which regulate and integrate cell function
4. Interpret the origin and evolution of biological complexity at the cellular level
5. Summarise the mechanisms and characteristics of reproduction and inheritance
6. Retrieve, collect and interpret biological information
7. Apply critical thinking and the scientific approach

Course Materials

Other Resources:

- Students enrolled in the course can login to <https://canvas.newcastle.edu.au/> to access the Canvas site used to support this course. All course materials, announcements and assessments related to the course will be posted on the site, and you should visit it regularly throughout the course.

Recommended Text:

- Freeman, Scott, et al. (2017) Biological Science, 6th Ed (Global) Pearson Education ISBN-13: 9781292165080
Available as a hardcopy (\$130) from The School Locker (<https://theschoollocker.com.au/universities/the-university-of-newcastle/subjects/semester-one/biol1001-molecules-cells-and-organisms>) or as an eBook (\$70) from the publisher (https://www.pearson.com/store/p/biological-science-ebook-global-edition/GPROG_A100061717823_learnerau-availability/9781292165080)

SCHEDULE

Week	Week Begins	Topic	Learning Activity	Assessment Due
1	17 Jun	Unit 1: 1. Molecules, cells and evolution 2. Nucleic acids and proteins 3. Enzymes and carbohydrates 4. Lipids, membranes and cells	Read Chapters 1-6 of prescribed text Practice Quiz 1 Assessment Quiz 1	
2	24 Jun	Unit 2: 5. Cells and cell-cell interactions 6. Respiration and fermentation 7. Photosynthesis 8. The cell cycle and mitosis	Read Chapters 7-12 of prescribed text Practice Quiz 2 Assessment Quiz 2	Assessment Quiz 1 due Thursday 27th June at 11:59PM
3	1 Jul	Unit 3: 9. Meiosis and sexual reproduction 10. Genetics and mechanisms of inheritance 11. DNA synthesis and molecular genetics 12. Transcription and translation	Read Chapters 13-17, and Chapter 20 of prescribed text Practice Quiz 3 Assessment Quiz 3	Assessment Quiz 2 due Thursday 4th July at 11:59PM
4	8 Jul	Revision	Revision for Final Examination	Assessment Quiz 3 due Thursday 11th July at 11:59PM
Exams				

ASSESSMENTS

This course has 2 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Exam	Formal Examination Period	Individual	50%	1, 2, 3, 4, 5, 6, 7
2	Quiz - Online	11:59pm Thursday of Weeks 2, 3 and 4	Individual	50%	1, 2, 3, 4, 5, 6

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 - Exam

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 Examination
Weighting	50%
Length	2 hours
Due Date	Formal Examination Period
Submission Method	Formal Exam
Assessment Criteria	The structure of the exam will be provided during the lectures. The given answers must match the correct answers.
Return Method	Not Returned
Feedback Provided	No Feedback
Opportunity to Reattempt	Students WILL NOT be given the opportunity to reattempt this assessment.

Assessment 2 - Quiz - Online

Assessment Type	Quiz
Purpose	The purpose of the three weekly quizzes is to provide students with regular feedback on student learning.
Description	Each quiz is a multiple-choice quiz covering material from a single week's lectures to assess student progression and understanding.
Weighting	50%
Due Date	11:59pm Thursday of Weeks 2, 3 and 4
Submission Method	Online Quizzes will be completed online via Canvas.
Assessment Criteria	Quiz structure and assessable content will be highlighted and delivered during the lectures. Correct answers to questions.
Return Method	Online
Feedback Provided	Online - Correct answers will be issued on Canvas following the due date.
Opportunity to Reattempt	Students WILL NOT be given the opportunity to reattempt this assessment.

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.

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

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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.

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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