



# BIOX1110

## Genes to Organisms

Session 2, In person-scheduled-intensive, North Ryde 2024

*School of Natural Sciences*

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## General Information

Unit convenor and teaching staff

Jaco Le Roux

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Credit points

10

Prerequisites

Corequisites

Co-badged status

Unit description

This unit deals with the nuts and bolts of life on earth. Throughout the unit there is a single unifying theme – that all of the processes that give rise to life are derived from DNA. We show students that DNA controls life by acting as a blueprint for the construction of proteins, and that those proteins build cells which act as the basic structural and functional units of all life. To demonstrate these processes to students, we start by talking about the structure and function of DNA to show how it can act as a simple code for the construction of proteins. Students are then shown how proteins are constructed from the DNA code, and how those proteins can be used to build and maintain cells. Having established these basic principles, the unit then goes on to explain how cells construct multicellular organisms during development, and how the proper functioning of those organisms is maintained by regulating cellular activity. We also demonstrate that the DNA code is essentially immortal because it can be copied from generation to generation, from cell to cell. This unit requires attendance at an on-campus session.

## 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:

**ULO1:** Define how biological information is encoded in the structure of the genetic molecule, DNA

**ULO2:** Describe how large macromolecules, such as nucleic acids and proteins are constructed from simpler building blocks

**ULO3:** Explain how eukaryotic cells are constructed, in terms of the structure and functions of organelles

**ULO4:** Describe how genetic information is transmitted through the generations, and the evolutionary process

**ULO5:** Discuss modern applications of genetics and genomics

**ULO6:** Analyse scientific data and use the basic elements of scientific writing to write reports

## General Assessment Information

Requirements to pass this unit

To pass this unit you must achieve a total mark equal to or greater than 50%. This unit has no hurdle assessments.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Mid-semester test</a>	15%	No	26 Sept
<a href="#">Database project</a>	10%	No	Aug 30, Oct 18 (@11:55pm on all due dates)
<a href="#">Paper dissection</a>	25%	No	4 Oct
<a href="#">Practical quizzes</a>	10%	No	Weekly (opens Mondays @9am, closes Sundays @ 11:55pm)
<a href="#">Final Exam</a>	40%	No	Formal exam period (exact date TBA)

### Mid-semester test

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 13 hours

Due: **26 Sept**

Weighting: **15%**

The mid-semester test will consist of multiple choice questions covering all lecture material discussed to that point. The test will be conducted online under timed conditions.

On successful completion you will be able to:

- Define how biological information is encoded in the structure of the genetic molecule, DNA
- Describe how large macromolecules, such as nucleic acids and proteins are constructed from simpler building blocks
- Describe how genetic information is transmitted through the generations, and the evolutionary process

## Database project

Assessment Type <sup>1</sup>: Report

Indicative Time on Task <sup>2</sup>: 13 hours

Due: **Aug 30, Oct 18 (@11:55pm on all due dates)**

Weighting: **10%**

The PeerWise database will be available to students throughout the Session. Students must write and submit questions based upon lecture content, and answer questions of other students.

On successful completion you will be able to:

- Explain how eukaryotic cells are constructed, in terms of the structure and functions of organelles
- Describe how genetic information is transmitted through the generations, and the evolutionary process
- Discuss modern applications of genetics and genomics
- Analyse scientific data and use the basic elements of scientific writing to write reports

## Paper dissection

Assessment Type <sup>1</sup>: Report

Indicative Time on Task <sup>2</sup>: 25 hours

Due: **4 Oct**

Weighting: **25%**

A library of at least 10 public research papers will be made available to students. Students must select one paper (or choose a paper in which they are interested, with the approval of the convenors) and analyse the structure, underlying research, and implications of the paper, following the set of questions provided.

On successful completion you will be able to:

- Discuss modern applications of genetics and genomics
- Analyse scientific data and use the basic elements of scientific writing to write reports

## Practical quizzes

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 10 hours

Due: **Weekly (opens Mondays @9am, closes Sundays @ 11:55pm)**

Weighting: **10%**

Pre-prac quizzes to test preparedness and comprehension.

On successful completion you will be able to:

- Define how biological information is encoded in the structure of the genetic molecule, DNA
- Describe how large macromolecules, such as nucleic acids and proteins are constructed from simpler building blocks
- Explain how eukaryotic cells are constructed, in terms of the structure and functions of organelles
- Describe how genetic information is transmitted through the generations, and the evolutionary process

## Final Exam

Assessment Type <sup>1</sup>: Examination

Indicative Time on Task <sup>2</sup>: 40 hours

Due: **Formal exam period (exact date TBA)**

Weighting: **40%**

Assesses all material covered in practicals as well as the material in all lectures. Attendance at an invigilated exam is required.

On successful completion you will be able to:

- Define how biological information is encoded in the structure of the genetic molecule, DNA

- Describe how large macromolecules, such as nucleic acids and proteins are constructed from simpler building blocks
- Explain how eukaryotic cells are constructed, in terms of the structure and functions of organelles
- Describe how genetic information is transmitted through the generations, and the evolutionary process
- Discuss modern applications of genetics and genomics

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<sup>1</sup> If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

<sup>2</sup> Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

## Delivery and Resources

### Lectures

(1) Two 1-hour online lecture recordings per week (starting in week 1). Recordings will be guided online learning H5P modules. The class timetable for this unit can be found through the Timetable portal. The Monday lecture slots will be used for Zoom Q&A and discussion sessions (consult unit iLearn site for further details).

### Practicals

There are nine practicals in this unit (see table under 'Unit Schedule' heading). All practicals will be delivered in face-to-face mode. To check the availability of practicals for your unit, please go to timetable viewer, before enrolling in eStudent. To check detailed information on unit assessments, visit the unit iLearn site.

How to find the answers

1. Read the unit outline
2. Consult iLearn (often the majority of questions have already been asked)
3. All questions on lecture content should be posted on the iLearn forum. We will be monitoring the iLearn forum and ensuring all questions are correctly answered. If the answer to any course-related question will benefit the many please post it on iLearn.
4. Only email [biol1110@mq.edu.au](mailto:biol1110@mq.edu.au) if you have any questions about: a) organising alternative times for assessments or extensions, b) withdrawal from the unit, c) personal issues affecting your study, d) practical class allocations and e) mark queries

5. Please only approach teaching staff with questions during practical sessions
6. Please only approach Lab technicians during practical classes and only with technical questions
7. Unexpected adjustments made during the course will be announced via iLearn announcements so make sure you check iLearn regularly.

### **iLearn**

The primary means of communication for this unit is via iLearn and email ([biol1110@mq.edu.au](mailto:biol1110@mq.edu.au)). iLearn is a web-based computer-mediated communication package and can be accessed by most web browsers from inside or outside the University.

We expect you to use iLearn for:

- 1) Regularly checking subject announcements (at least twice per week)
- 2) Discussing the unit and its content with staff and other students
- 3) Downloading Lecture and Practical materials
- 4) Downloading reference materials

### **Logging in to iLearn**

The URL for the iLearn login page is: <https://ilearn.mq.edu.au/>. You will need to log in to iLearn each time you use it. Your username is your student number. If you are having trouble accessing your online unit due to a disability or health condition, please visit the Student Services Website <https://students.mq.edu.au/support/personal> or information on how to get assistance. If you are having problems logging on after ensuring you have entered your username and password correctly, you should contact Student IT Help, [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/).

### **Textbook**

CAMPBELL BIOLOGY 11th EDITION (ANZ) This textbook is available in hard copy from the Coop Bookshop (ISBN 9781488626241) or electronically via the MQ library. Please note that earlier editions (e.g., 10th Edition) of this text book can be used as reference source for this unit.

## **Unit Schedule**

Week	Dates	Lectures
1	22 - 26 Jul	Lecture 1: Introduction (In-person, 21 Wallys Walk - Macquarie Theatre)

		Lecture 2: The scientific method
2	29 Jul - 2 Aug	Lecture 3: DNA: The molecule of heredity
		Lecture 4: DNA replication
3	5 - 9 Aug	Lecture 5: Genes & Genomes
		Lecture 6: Transcription
4	12 - 16 Aug	Lecture 7: Translation
		Lecture 8: Proteins
5	19 - 23 Aug	Lecture 9: Gene regulation
		Lecture 10: Chromosomes
6	26 - 30 Aug	Lecture 11: The cell
		Lecture 12: Mitosis
7	2 - 6 Sept	Lecture 13: Meiosis
		Lecture 14: Mendelian genetics I
8	9 - 13 Sept	Lecture 15: Mendelian genetics II
		Lecture 16: Molecular evolution
	16 - 20 Sept	Mid-semester break
	23 - 27 Sept	Mid-semester break
9	30 Sept - 4 Oct	Lecture 17: Population genetics
		Lecture 18: Genetic tools



10	7 - 11 Oct	Lecture 19: Biological membranes
11	14 - 18 Oct	Lecture 20: Cell signalling
		Lecture 21: Prokaryotes
12	21 - 25 Oct	Lecture 22: Revision
13	28 Oct - 1 Nov	Q&A zoom session (No lectures or practicals)
14	4 Nov - 22 Nov	Exam period

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies \(https://students.mq.edu.au/support/study/policies\)](https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au) and use the [search tool](#).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

## Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released

directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit [connect.mq.edu.au](http://connect.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

## Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

### The Writing Centre

[The Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

## Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and

processes

## Student Enquiries

Got a question? Ask us via the [Service Connect Portal](#), or contact [Service Connect](#).

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/).

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

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Unit information based on version 2024.02 of the [Handbook](#)