



BIOX1110

Genes to Organisms

Session 2, Fully online/virtual 2020

Department of Biological Sciences

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Notice

As part of [Phase 3 of our return to campus plan](#), most units will now run tutorials, seminars and other small group learning activities on campus for the second half-year, while keeping an online version available for those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face and online activities for your unit, please go to [timetable viewer](#). To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

General Information

Unit convenor and teaching staff

Convenor

Oliver Griffith

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Co-Convenor

Kerstin Bilgmann

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First Year Coordinator

Kate Barry

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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

UNIT COMPLETION REQUIREMENTS

1. Submit all assessments and attempt all exams
2. Participate in all practicals (this is a hurdle requirement)

To pass BIOL1110, the above requirements need to be fulfilled and an overall mark of 50/100 (50%) needs to be achieved. Failure to fulfil these requirements will lead to a Fail grade for this unit.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Practical quizzes</u>	10%	No	Weekly (on Monday @ 12pm)
<u>Database project</u>	10%	No	Sep 6, Oct 18, Nov 8 2020
<u>Mid-semester test</u>	15%	No	15 September 2020
<u>Paper dissection</u>	25%	No	4 October 2020
<u>Final Exam</u>	40%	No	Formal exam period (exact date TBA)

Practical quizzes

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 10 hours

Due: **Weekly (on Monday @ 12pm)**

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

Database project

Assessment Type **1**: Report

Indicative Time on Task **2**: 10 hours

Due: **Sep 6, Oct 18, Nov 8 2020**

Weighting: **10%**

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

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

Mid-semester test

Assessment Type **1**: Examination

Indicative Time on Task **2**: 13 hours

Due: **15 September 2020**

Weighting: **15%**

The mid-semester test will consist of multiple choice questions covering all lecture material up to and including Lecture 10. 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

Paper dissection

Assessment Type **1**: Report

Indicative Time on Task **2**: 25 hours

Due: **4 October 2020**

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. The results must be written up in the form of a report of no more than three pages.

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

Final Exam

Assessment Type **1**: Examination

Indicative Time on Task **2**: 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

¹ 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.

² 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)

(2) Mondays 11am-12pm: live Zoom lecture Q&A session (optional attendance starting in week 2; you must listen to the lecture recordings from the previous week before attending the Zoom session)

EXTERNAL BLOCK SESSIONS (ONLINE - ZOOM)

(1) Saturday 22nd August 9am-5pm

(2) Sunday 23rd August 9am-5pm

(3) Tuesday 15th September 9am-5pm

(4) Wednesday 16th September 9am-5pm

Unit Schedule

LECTURES

(1) Two 1-hour online lecture recordings per week (starting in week 1)

(2) Mondays 11am-12pm: live Zoom lecture Q&A session (optional attendance starting in week 2; you must listen to the lecture recordings from the previous week before attending the Zoom session)

Schedule:

<u>Week of Session</u>	<u>Lectures (Online - recording)</u>	<u>Zoom Question Session</u>	
1	Lecture 1: Introduction	None	
	Lecture 2: The scientific method		
2	Lecture 3: DNA: The molecule of heredity	Mon 11am-12pm	
	Lecture 4: DNA replication		
3	Lecture 5: Genes & Genomes	Mon 11am-12pm	
	Lecture 6: Transcription		
4	Lecture 7: Translation	Mon 11am-12pm	
	Lecture 8: Proteins		
5	Lecture 9: Gene regulation	Mon 11am-12pm	
	Lecture 10: Chromosomes		
6	Lecture 11: The cell	Mon 11am-12pm	
	Lecture 12: Mitosis		
7	Lecture 13: Meiosis	Mid-Semester Test	
	Mid-semester break	Mid-semester break	
	Mid-semester break	Mid-semester break	
8	Lecture 14: Mendelian genetics I	Mon 11am-12pm	
	Lecture 15: Mendelian genetics II		

9	Lecture 16: Molecular evolution	None (Public Holiday)	
	Lecture 17: Population genetics		
10	Lecture 18: Genetic tools	Mon 11am-12pm	
	Lecture 19: Biological membranes		
11	Lecture 20: Cell signalling	Mon 11am-12pm	
	Lecture 21: Prokaryotes		
12	Lecture 22: Revision	Mon 11am-12pm	
13	No lectures	Mon 11am-12pm	

PRACTICALS

Schedule:

<u>Prac number/block session</u>	<u>Practical topic</u>
1 - BLOCK1	The Cellular Basis of Life
2 - BLOCK1	DNA
3 - BLOCK2	Transcription & Translation
4 - BLOCK1	Flagella Regeneration
5 - BLOCK3	Protein Quantification
6 - BLOCK4	Gene Expression - Lac operon
7 - BLOCK4	Phylogeny & Bioinformatics
8 - BLOCK3	Mitosis
9 - BLOCK4	Meiosis & Population Genetics

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>). 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](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

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

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/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 ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Student Support

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

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- [Getting help with your assignment](#)
- [Workshops](#)
- [StudyWise](#)
- [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

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

IT Help

For help with University computer systems and technology, visit 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.