# BIOL1110

## Genes to Organisms

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

*School of Natural Sciences*

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## Disclaimer

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General Information

Unit convenor and teaching staff
Jaco Le Roux
jaco.leroux@mq.edu.au

Credit points
10

Prerequisites

Corequisites

Co-badged status
BIOX1110

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.

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

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

Assessment Type 1: Quiz/Test
Indicative Time on Task 2: 13 hours
Due: 26 Sept
Weighting: 15%

The mid-semester test will consist of multiple choice questions covering all lecture material up 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

**Practical quizzes**

Assessment Type 1: Quiz/Test  
Indicative Time on Task 2: 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

**Database project**

Assessment Type 1: Report  
Indicative Time on Task 2: 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.

https://unitguides.mq.edu.au/unit_offerings/162733/unit_guide/print
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 1: Report
Indicative Time on Task 2: 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

**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. This exam will be invigilated and held during the Formal Examination Period.

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). 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 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). 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/.

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

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<th>Week</th>
<th>Dates</th>
<th>Lectures</th>
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<tr>
<td>1</td>
<td>22 - 26 Jul</td>
<td>Lecture 1: Introduction (In-person, 21 Wallys Walk - Macquarie Theatre)</td>
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<tr>
<td></td>
<td></td>
<td>Lecture 2: The scientific method</td>
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https://unitguides.mq.edu.au/unit_offerings/162733/unit_guide/print
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<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Lectures</th>
</tr>
</thead>
</table>
| 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                                      |
Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (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). 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) 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 ask.mq.edu.au or if you are a Global MBA
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 AskMQ, 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/.
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.

Unit information based on version 2024.01R of the Handbook