BIOL12106 *Molecular Biology*
Term 1 - 2021

Profile information current as at 29/07/2025 03:03 pm

General Information

Overview
This unit focuses on developing an understanding of how genomes are organised, how they function within the cell, how molecular medical treatments can be developed, ways in which we can manipulate genomes and utilise their components for a range of purposes including medical, agricultural, and commercial.

Details
Career Level: *Undergraduate*
Unit Level: *Level 2*
Credit Points: *6*
Student Contribution Band: *8*
Fraction of Full-Time Student Load: *0.125*

Pre-requisites or Co-requisites
Prerequisites BIOL11100 Functional Biology or BIOL11102 Life Science Laboratory or BMSC11003 Introduction to Medical Sciences or BMSC11005 Foundations of Biochemistry
Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the Assessment Policy and Procedure (Higher Education Coursework).

Offerings For Term 1 - 2021

- Mixed Mode
- Rockhampton

Attendance Requirements
All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

Website
This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.

Class and Assessment Overview

Recommended Student Time Commitment

Each 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

Class Timetable

Regional Campuses
Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

Metropolitan Campuses
Adelaide, Brisbane, Melbourne, Perth, Sydney

Assessment Overview

1. **Written Assessment**
Weighting: 20%
2. **Practical Assessment**
Weighting: 20%
3. **Online Test**
Weighting: 60%

Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the University's Grades and Results Policy for more details of interim results and final grades.

CQUniversity Policies

All University policies are available on the CQUniversity Policy site.
You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the CQUniversity Policy site.

Previous Student Feedback

Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

Feedback from Student Feedback

Feedback
Students appreciated the Moodle format and found it easy to navigate.

Recommendation
Continue to provide an easily navigable Moodle page.

Feedback from Student Feedback

Feedback
Students enjoyed the lectures and found the supporting material enhanced learning.

Recommendation
Continue with the lecture format and provision of supporting materials.

Feedback from Student Feedback

Feedback
Students found the weekly study questions helpful.

Recommendation
Continue to provide weekly questions to consolidate learning.

Unit Learning Outcomes

On successful completion of this unit, you will be able to:

1. Demonstrate a clear understanding of the structure, organisation, utility and isolation of nucleic acids
2. Demonstrate a clear understanding of the principles of gene cloning and sequencing
3. Accurately review and evaluate the strategies associated with the transformation of micro-organisms, plants and animals
4. Demonstrate safe and efficient laboratory skills in molecular biology
5. Demonstrate knowledge on the applications of molecular biology skills to medical molecular biology.

Alignment of Learning Outcomes, Assessment and Graduate Attributes

Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes				
	1	2	3	4	5
1 - Written Assessment - 20%					•
2 - Practical Assessment - 20%	•	•		•	
3 - Online Test - 60%	•	•	•		•

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes				
	1	2	3	4	5
1 - Communication	•	•	•		•
2 - Problem Solving			•		•
3 - Critical Thinking					
4 - Information Literacy	•	•	•		
5 - Team Work				•	
6 - Information Technology Competence					
7 - Cross Cultural Competence					
8 - Ethical practice				•	
9 - Social Innovation					
10 - Aboriginal and Torres Strait Islander Cultures					

Textbooks and Resources

Textbooks

BIOL12106

Prescribed

Fundamental Molecular Biology
Edition: 2nd edn (2012)
Authors: Lizabeth A Allison
John Wiley
Hoboken , NJ , USA
ISBN: 9781118312599
Binding: Paperback

View textbooks at the CQUniversity Bookshop

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)

Referencing Style

All submissions for this unit must use the referencing style: Harvard (author-date)
For further information, see the Assessment Tasks.

Teaching Contacts

Wayne Pederick Unit Coordinator
w.pederick@cqu.edu.au

Schedule

Week 1 - 08 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
Topic 1: Introduction to molecular biology	Fundamental Molecular Biology, Lizabeth A. Allison, 2nd Ed Chap 1 (The beginnings of molecular biology)	

Week 2 - 15 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
Topic 2: DNA replication and the polymerase chain reaction (PCR)	Fundamental Molecular Biology, Lizabeth A. Allison, 2nd Ed Chap 2 (The structure of DNA); Chap 6 (DNA replication) Chap 8 (Recombinant DNA technology)	Recorded Zoom Tutorial

Week 3 - 22 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
Topic 3: RNA	Fundamental Molecular Biology, Lizabeth A. Allison, 2nd Ed Chap 3 (The versatility of RNA)	Recorded Zoom Tutorial

Week 4 - 29 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
Topic 4: Genome organisation	Fundamental Molecular Biology, Lizabeth A. Allison, 2nd Ed Chap 5 (Genome Organisation)	Recorded Zoom Tutorial

Week 5 - 05 Apr 2021

Module/Topic	Chapter	Events and Submissions/Topic
Topic 5: Nucleic acid isolation & characterisation, electrophoresis	Fundamental Molecular Biology, Lizabeth A. Allison, 2nd Ed Chap 8: Recombinant DNA Technology	Recorded Zoom Tutorial

Vacation Week - 12 Apr 2021

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 19 Apr 2021

Module/Topic	Chapter	Events and Submissions/Topic
Topic 6: DNA Sequencing	Fundamental Molecular Biology, Lizabeth A. Allison, 2nd Ed Chap 8: Recombinant DNA Technology	Recorded Zoom Tutorial

Week 7 - 26 Apr 2021

Module/Topic	Chapter	Events and Submissions/Topic
Topic 7: DNA Cloning	Fundamental Molecular Biology, Lizabeth A. Allison, 2nd Ed Chap 8: Recombinant DNA Technology	Recorded Zoom Tutorial

Week 8 - 03 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Topic 8: Genetically modified organisms	Fundamental Molecular Biology, Lizabeth A. Allison, 2nd Ed Chap 15: Genetically Modified Organisms	Recorded Zoom Tutorial

Week 9 - 10 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Topic 9: Gene therapy	Fundamental Molecular Biology, Lizabeth A. Allison, 2nd Ed Chap 17: Medical Molecular Biology	**Compulsory Residential School 10th to 12th May** **Laboratory Practical manuals can be scanned and uploaded via Moodle** **Essay** Due: Week 9 Monday (10 May 2021) 11:45 pm AEST

Week 10 - 17 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Topic 10: High throughput analyses	Fundamental Molecular Biology, Lizabeth A. Allison, 2nd Ed Chap 16 : Genome Analysis	**Practical Assessment** Due: Week 10 Monday (17 May 2021) 11:45 pm AEST

Week 11 - 24 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Topic 11: Epigenetics	Fundamental Molecular Biology, Lizabeth A. Allison, 2nd Ed Chap 12: Epigenetic mechanisms of gene regulation	Recorded Zoom Tutorial

Week 12 - 31 May 2021

Module/Topic	Chapter	Events and Submissions/Topic

Revision		Recorded Zoom Tutorial

Review/Exam Week - 07 Jun 2021

Module/Topic	Chapter	Events and Submissions/Topic
		The online test will scheduled during the exam week

Exam Week - 14 Jun 2021

Module/Topic	Chapter	Events and Submissions/Topic

Term Specific Information

Molecular biology is an area of biology that focuses on understanding structure and function of molecules in the cell such as nucleic acids and proteins and their role in maintaining cellular function. In this unit we will also explore nucleic acid replication and detection and how nucleic acid can be delivered to cells and tissues as a therapeutic molecule. Furthermore, the unit will explore how nucleic acid function can be regulated through epigenetic modification.
Lectures will be provided on the Rockhampton campus, recorded and accessible through the Moodle site. Online 'Zoom' tutorials will compliment lecture material. The assessment items for this unit, include (1) a written assessment, (2) attendance at a one compulsory residential school and completion of a laboratory manual (3) an end of term examination.
Unit Co-ordinator Contact details
Dr Padraig Strappe
p.strappe@cqu.edu.au
Tel: 07 4930 6499

Assessment Tasks

1 Essay

Assessment Type
Written Assessment

Task Description

Gene Therapy is an important area in modern medical research providing novel therapeutic approaches to treat disease.

Gene therapy can be categorised in terms of viral or non-viral, use of nanomaterials and biomaterials which complex

nucleic acid and allow delivery to the host, using an in vivo or ex-vivo approach. In this assessment you should choose

one clinical area of gene therapy research for your essay and undertake literature searches for information on the

developments, status and challenges on your chosen topic. You can also compare the gene therapy approaches with

other treatment modalities.

Your essay should provide a very brief introductory overview of what Gene therapy is, and then focussing on a particular clinical area of your choice, e.g. Cancer, neurological disease, hereditary metabolic diseases as examples and then consider the gene therapy approaches that have been previously used to treat disease in animal models and/or human clinical trials.
In this assessment, you should aim to make use of scientific journal articles and case reports from the past 7 years, to make your work as up-to-date as possible and to obtain the best possible mark. A video presentation on this assessment task will be available on the Moodle site for this unit, to give you further support.
Please note the following details:

- The length of the main body of your essay is 3000 words, excluding references - making the best use of the word allocation is always better than being off-message.
- Text should be word-processed, with appropriate layout and use of headings/sub-headings. Font and line spacing are not part of the assessment criteria, listed below.

Diagrams should can be used to illustrate specific aspects - (please ensure that you correctly cite/reference all sources of diagrams used, unless they are original and composed by you, since this is an important aspect of academic integrity).
Please avoid images with very large file sizes, as this will make your essay too large to upload/download (save any images as lower resolution, to decrease the file size).
The list of references should form the last page or two, at the end of the assessment. Referencing should be in a consistent style - Harvard format is required).
Please save/upload your file in either a Word or PDF format. .

Assessment Due Date
Week 9 Monday (10 May 2021) 11:45 pm AEST

Return Date to Students
Week 10 Wednesday (19 May 2021)

Weighting
20%

Minimum mark or grade
50% (35/70)

Assessment Criteria

Title: Write a descriptive, scientific title for the essay. Try and give your work a title that is appropriate to what your final work represents. (5 mark)
Introduction: A one paragraph lead-in to immediately capture attention and indicate the material you will cover. (15 marks)
Discussion: A thorough review of literature on your chosen topic area written using scientific references up to the previous seven years. The discussion should be organised around the scientific development in your chosen topic and highlighting 'Landmark' discoveries and challenges in the clinical application of gene therapy. (30 marks)
Conclusions: In one paragraph summarise the status of the research you have reviewed in this area and any future research directions. (10 marks)
References: Cite and list all references referred to in your essay. Marks will be awarded for reference quality, citing within the report and listing references correctly at the end of the report. (5 marks)
Spelling, Grammar, Style: Accuracy. (5 marks)
A detailed marking rubric will be available on the Moodle site.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
via Assessment Block in Course Moodle Site

Learning Outcomes Assessed

- Demonstrate knowledge on the applications of molecular biology skills to medical molecular biology.

2 Practical Assessment

Assessment Type
Practical Assessment

Task Description
During the residential school you will be required to perform experimental protocols involving for example transformation of bacteria with plasmid DNA, restriction endonuclease digestion of DNA and amplification of DNA using polymerase chain reaction (PCR). In your residential School laboratory manual you will be expected to complete a workbook and perform experimental calculations, report experimental results and answer questions provided. Clearly label the report with student names and student numbers. The Laboratory workbook can be scanned and the workbook can be uploaded onto the Moodle site

Assessment Due Date
Week 10 Monday (17 May 2021) 11:45 pm AEST

Submit a scanned version of the workbook section to the moodle site by one week following the end of the Residential School.

Return Date to Students
Week 11 Wednesday (26 May 2021)

Results of the Practical Assessment will be posted on moodle

Weighting
20%

Minimum mark or grade
50%

Assessment Criteria
Assessment will be based on the accuracy of calculations and correctness of answers to questions.

Referencing Style

- Harvard (author-date)

Submission
Online

Submission Instructions
Submit a scanned version of the workbook section via the moodle site by one week following the end of the Residential School.

Learning Outcomes Assessed

- Demonstrate a clear understanding of the structure, organisation, utility and isolation of nucleic acids
- Demonstrate a clear understanding of the principles of gene cloning and sequencing
- Demonstrate safe and efficient laboratory skills in molecular biology

3 ONLINE TEST

Assessment Type
Online Test

Task Description
The online test will take place in the Exam Period and the exact date for the online test will be provided at a later date

Assessment Due Date

Return Date to Students

Weighting
60%

Minimum mark or grade
50%

Assessment Criteria
No Assessment Criteria

Referencing Style

- Harvard (author-date)

Submission
Online

Learning Outcomes Assessed

- Demonstrate a clear understanding of the structure, organisation, utility and isolation of nucleic acids
- Demonstrate a clear understanding of the principles of gene cloning and sequencing
- Accurately review and evaluate the strategies associated with the transformation of micro-organisms, plants and animals
- Demonstrate knowledge on the applications of molecular biology skills to medical molecular biology.

Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the **Student Academic Integrity Policy and Procedure**. This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

What is a breach of academic integrity?
A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

Why is academic integrity important?
A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

Where can I get assistance?
For academic advice and guidance, the Academic Learning Centre (ALC) can support you in becoming confident in completing assessments with integrity and of high standard.

What can you do to act with integrity?

Be Honest
If your assessment task is done by someone else, it would be dishonest of you to claim it as your own

Seek Help
If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)

Produce Original Work
Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem