BIOL12106 *Molecular Biology*

Term 1 - 2020

Profile information current as at 12/10/2024 02:27 pm

All details in this unit profile for BIOL12106 have been officially approved by CQUniversity and represent a learning partnership between the University and you (our student).The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

Corrections

Unit Profile Correction added on 28-05-20

The end of term examination has now been changed to an alternative form of assessment. Please see your Moodle site for details of the assessment.
The Residential School for this unit has been postponed and you will need to complete this at a later date. Please see your Moodle site for details of the assessment.

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 ZOOL11005 Foundation Animal Biology or BIOL11100 Functional Biology or BMSC11003 Introduction to Medical Sciences or BMSC11004 Introduction to Biochemistry or BMSC11005 Foundations of Biochemistry or BMED19010 Macromolecules and Cell Function
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 - 2020

- 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 and Written Assessment**
Weighting: 20%
3. **Examination**
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
Improve feedback for assessment items

Recommendation
Focus on contributing comprehensive assessment feedback and student follow up

Feedback from Student Feedback

Feedback
Availability of online quizzes and learning resources

Recommendation
Online quizzes and H5P learning resources will be incorporated into the unit moodle site

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

— N/A Level | • Introductory Level | • Intermediate Level | • Graduate Level | ◦ Professional Level | ◦ Advanced Level

Alignment of Assessment Tasks to Learning Outcomes

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

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes				
	1	2	3	4	5

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					

Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes									
	1	2	3	4	5	6	7	8	9	10
1 - Written Assessment - 20%			•	•						
2 - Practical and Written Assessment - 20%	•		•		•					
3 - Examination - 60%	•									

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

Additional Textbook Information
Copies can be purchased at the CQUni Bookshop here: http://bookshop.cqu.edu.au (search on the Unit code)

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 styles below:

- American Psychological Association 6th Edition (APA 6th edition)
- Harvard (author-date)

For further information, see the Assessment Tasks.

Teaching Contacts

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

Schedule

Week 1 - 09 Mar 2020

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 - 16 Mar 2020

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 - 23 Mar 2020

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 - 30 Mar 2020

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 - 06 Apr 2020

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 - 13 Apr 2020

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - 20 Apr 2020

Module/Topic	Chapter	Events and Submissions/Topic
Topic 6: DNA Sequencing (Chap 8 p220-223)	Fundamental Molecular Biology, Lizabeth A. Allison, 2nd Ed Chap 8: Recombinant DNA Technology	

Week 7 - 27 Apr 2020

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** **Essay** Due: Week 7 Monday (27 Apr 2020) 11:45 pm AEST

Week 8 - 04 May 2020

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 - 11 May 2020

Module/Topic	Chapter	Events and Submissions/Topic
Topic 9: Gene therapy	Fundamental Molecular Biology, Lizabeth A. Allison, 2nd Ed Chap 17: Medical Molecular Biology	**Residential School 14th to 16th May** If this residential school clashes with another subjects residential school, a second identical BIOL12106 Res School will be available in week 10 **(23rd-25th May)** **Laboratory Practical manuals can be submitted at end of Res-school or scanned and submitted via moodle**

Week 10 - 18 May 2020

Module/Topic	Chapter	Events and Submissions/Topic

Topic 10: High throughput analyses	Fundamental Molecular Biology, Lizabeth A. Allison, 2nd Ed Chap 16 : Genome Analysis	**Residential School 23rd-25th May** Identical residential school to week 9 and available to students who cannot attend the Week 9 res school **Laboratory Practical manuals can be submitted at end of Res-school or scanned and submitted via moodle**
Week 11 - 25 May 2020		
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 - 01 Jun 2020		
Module/Topic	**Chapter**	**Events and Submissions/Topic**
Revision		Recorded Zoom Tutorial
Review/Exam Week - 08 Jun 2020		
Module/Topic	**Chapter**	**Events and Submissions/Topic**
Exam Week - 15 Jun 2020		
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 session 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 or APA formats are acceptable).
Please save/upload your file in either a Word or PDF format. .

Assessment Due Date
Week 7 Monday (27 Apr 2020) 11:45 pm AEST

Return Date to Students
Week 9 Monday (11 May 2020)

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

- American Psychological Association 6th Edition (APA 6th edition)
- Harvard (author-date)

Submission
Online

Submission Instructions
via Assessment Block in Course Moodle Site

assessmentOutcome

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

assessmentGradAttribute

- Critical Thinking
- Information Literacy

2 Practical Report

Assessment Type
Practical and Written 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 will be collected at the end of the residential school by the unit co-ordinator or scanned copies of the workbook can be uploaded onto the Moodle site

Assessment Due Date

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

Results of the Practical Manual will be posted on moodle two weeks following the Residential School

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

- American Psychological Association 6th Edition (APA 6th edition)
- Harvard (author-date)

Submission
Offline Group

Submission Instructions
Hand in at end of Residential School

assessmentOutcome

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

assessmentGradAttribute

- Communication
- Critical Thinking
- Team Work

Examination

Outline
Complete an invigilated examination.

Date
During the examination period at a CQUniversity examination centre.

Weighting
60%

Length
120 minutes

Minimum mark or grade
Students must achieve at least 50% of the total examination mark to pass subject

Exam Conditions
Closed Book.

Materials
Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments).

assessmentOutcome

assessmentGradAttribute

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