



# BMSC12012 Applied Molecular and Cellular Pathology

## Term 2 - 2022

Profile information current as at 20/04/2024 07:12 pm

All details in this unit profile for BMSC12012 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.

## General Information

### Overview

Molecular and cellular pathology involves the study of disease processes at the molecular level and allows diagnosis of disease through the detection of genetic mutations, dysregulated gene expression and non functional or cytotoxic proteins. In this unit, you will understand the role of cellular genetic material and associated genetic rearrangements and mutations. You will explore the application of molecular techniques, such polymerase chain reaction and next generation sequencing, and their revolutionary impact on diagnostic testing.

### 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

Prerequisite: BIOL12106 Molecular Biology

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 2 - 2022

- Online
- 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. **Group Work**

Weighting: 40%

#### 2. **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 SUTE

**Feedback**

Good use of extra resources and guest lecturers.

**Recommendation**

Continue to enhance the extra resources, and maintain the same teaching staff where possible.

#### Feedback from SUTE and Self Reflection

**Feedback**

Tutorials and revision can be improved

**Recommendation**

Participation in the weekly tutorials was not optimal so consideration will be given to substituting these with a series of three or four online workshops covering a number of topics spread throughout the term to increase engagement. These can be scheduled at times that are more appealing to the students.

#### Feedback from SUTE and Self Reflection

**Feedback**

Revise group activity

**Recommendation**

While significant progress has been made with the group task, students felt that more clarity could be provided regarding this task. Enabling students to select their topic via a poll has also been suggested rather than a random allocation. Also, reflection as to how the group task is presented (literary review vs poster) will be considered.

## Unit Learning Outcomes

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

1. Describe the molecular basis of disease, in terms of gene mutations or rearrangements, and their detection
2. Describe the relationship of disease to epigenetic modification of the genome
3. Explain the process of identifying genetic changes and their significance
4. Explain the use of molecular pathology in disease diagnosis and / or prevention and treatment, including the development of personalised medicines.

The learning outcomes achieved are linked to the objectives of the accrediting body, Australian Institute of Medical Scientists (AIMS).

## Alignment of Learning Outcomes, Assessment and Graduate Attributes



### Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes			
	1	2	3	4
<b>1 - Group Work - 40%</b>	•	•	•	•

Assessment Tasks	Learning Outcomes			
	1	2	3	4
2 - Online Test - 60%	•	•	•	

### Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes			
	1	2	3	4
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 - Group Work - 40%	•	•	•	•	•		•	•		
2 - Online Test - 60%	•	•	•			•				

## Textbooks and Resources

### Textbooks

BMSC12012

#### Prescribed

##### **Molecular Pathology: The Molecular Basis of Human Disease**

Edition: 2nd (2017)

Authors: Coleman, W. & Tsongalis, G.

Academic Press

ISBN: 9780128027615

Binding: Hardcover

#### Additional Textbook Information

Paper 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)
- ZOOM
- MS Teams

## Referencing Style

#### All submissions for this unit must use the referencing styles below:

- [Harvard \(author-date\)](#)
- [American Psychological Association 7th Edition \(APA 7th edition\)](#)

For further information, see the Assessment Tasks.

## Teaching Contacts

**Ingrid Christiansen** Unit Coordinator

[i.christiansen@cqu.edu.au](mailto:i.christiansen@cqu.edu.au)

## Schedule

### Week 1 - 11 Jul 2022

Module/Topic	Chapter	Events and Submissions/Topic
Revision of molecular pathology Understanding of human molecular genetics	1, 2, 3, 4, 5	Tutorial

### Week 2 - 18 Jul 2022

Module/Topic	Chapter	Events and Submissions/Topic
'Omics' technologies supporting molecular diagnosis Pathology and pathogenesis	6, 7, 8, 9 10, 11, 12, 13	Tutorial

<b>Week 3 - 25 Jul 2022</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Epigenetics and human disease	6, 7, 8	Tutorial
<b>Week 4 - 01 Aug 2022</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Molecular basis of cardiovascular and pulmonary diseases	14, 18	Tutorial
<b>Week 5 - 08 Aug 2022</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Molecular basis of blood disorders	15, 16, 17	Tutorial
<b>Vacation Week - 15 Aug 2022</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
<b>Week 6 - 22 Aug 2022</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Molecular basis of colorectal, prostate and gynaecological cancers	19, 23, 25, 26	Tutorial
<b>Week 7 - 29 Aug 2022</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Molecular basis of liver and kidney disease	20, 24	Tutorial
<b>Week 8 - 05 Sep 2022</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Molecular basis of skin disease	27	Tutorial
		<b>Portfolio Assignment</b> Due: Week 8 Friday (9 Sept 2022) 11:45 pm AEST
<b>Week 9 - 12 Sep 2022</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Molecular basis of diseases of the nervous system	29	Tutorial
<b>Week 10 - 19 Sep 2022</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Molecular basis of musculoskeletal disease	28	Tutorial
<b>Week 11 - 26 Sep 2022</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Molecular basis of diseases of the exocrine and endocrine systems	21, 22	Tutorial
<b>Week 12 - 03 Oct 2022</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
Molecular diagnosis of human disease in the clinical laboratory Pharmacogenetics and personalised medicine	30, 31, 32	Tutorial
<b>Review/Exam Week - 10 Oct 2022</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>
<b>Exam Week - 17 Oct 2022</b>		
<b>Module/Topic</b>	<b>Chapter</b>	<b>Events and Submissions/Topic</b>

## Term Specific Information

Your unit coordinator for BMSC12012 Applied Molecular and Cellular Pathology is Ingrid Christiansen. You can contact me using the forum on the unit's Moodle site or alternatively through email (i.christiansen@cqu.edu.au) or on 07 4930 6518. The forum for this unit is continuously monitored and you can expect a response within 24 hours of posting your question.

As the name suggests, this unit will provide you with foundation knowledge of the research and diagnosis in pathology using cellular and molecular pathology techniques. BMSC12012 Applied Molecular and Cellular Pathology is a core unit in three courses:

- CG93 - Bachelor of Medical Sciences (Pathology)
- CG93 - Bachelor of Medical Sciences (Biotechnology)
- CL10 - Bachelor of Medical Laboratory Science

Tutorials are delivered each week live in Rockhampton and synchronously via ZOOM. Students enrolled in distance delivery mode can also attend the live tutorials using ZOOM. These tutorials will also be recorded for the benefit of those students who are unable to attend the live tutorial. During these tutorials, we will work through weekly study questions, any questions which you may have and sometimes case studies or published articles. The weekly study questions will help you apply knowledge learned during the weekly lecture and prepare you for the assessments. You will get the most benefit from the tutorials if you watch the weekly lectures beforehand. You are strongly encouraged to participate in tutorials.

As per Australian educational standards, you are expected to commit 150 hours of engagement to your study of this unit. This is broken down as:

- 2 - 3 hours per week watching recorded lectures and revising the content through study notes
- 3 - 4 hours per week completing weekly study questions/weekly revision quizzes on the unit's Moodle site.
- 1 - 2 hours per week attending the weekly tutorial and reflecting on your answers to weekly study questions
- 3 - 4 hours per week preparing your assessments or studying for your exams

This unit does not have a Residential School.

## Assessment Tasks

### 1 Portfolio Assignment

#### **Assessment Type**

Group Work

#### **Task Description**

Increased understanding of disease pathogenesis at the cellular and molecular level leads to the discovery of novel biomarkers to enhance diagnosis and new targets for therapeutics. In this assignment, you will be required to produce a comprehensive review of molecular advances associated with a particular disease in terms of (A) Pathogenesis, (B) Diagnosis and (C) Treatment.

This assessment is a group task, and groups of three (3) students will be assigned a topic according to their choice of pathology via a Moodle poll to be completed by the end of week 3. Details of group members will be posted on the Moodle site or MS Teams. Each group will be assigned a specific disease / pathological disorder.

Examples of specific diseases available for this assignment will include but are not limited to:

- Diabetic Nephropathy
- Liver Cirrhosis
- Pulmonary Arterial Hypertension
- Multiple Sclerosis
- Prostate Cancer
- Acute Myeloid Leukaemia
- Chronic wound healing
- Chronic heart failure
- Paget's disease of bone

For each of these 3 sections (Pathogenesis, Diagnosis and Treatment) the group will decide which section each student will focus on and each student will be required to:

- Write a 1000 word essay supported by relevant, quality, primary references outlining advances in either understanding disease pathology, laboratory based diagnosis or therapeutic strategies
- Review and critique in detail one scientific paper which has contributed to advanced knowledge associated with each section (Pathogenesis, Diagnosis and Treatment).
- Reflect on the group activity

**Part 1:** Group based assignments can provide enhanced learning through collaborative generation of ideas, delegation of tasks and presentation.

The final group portfolio will be a combination of:

- The three essays
- An introduction, summary and conclusion section written as a group (linking the essays together).

**Only one submission is required per group.**

Each group will submit a portfolio containing:

Their group identification, names, student numbers and a statement of contribution (which section each member contributed to) and:

1. Introduction (written as a group)
2. Pathogenesis (individual A)
3. Diagnosis (individual B)
4. Treatment (individual C)
5. Summary (written as a group)
6. Conclusion (written as a group)

**Part 2:** Your individual critical appraisal of a major scientific paper should include:

- Summary of the outcomes of the described research,
- How these findings were a significant advance in either pathogenesis/diagnosis/treatment,
- What methodology was used and what further developments have occurred based on the original paper.

The written critique is expected to be concise, between 500 and 750 words.

**Part 3:** Assessment of individual contributions to the team will be performed by evidence of activity based on:

- engagement in an online team forum; and
- Self and Peer Assessment questionnaire.

This data is collated to give a score for team participation to each student. An individual Microsoft Teams/collaborative forum page will be set up for each group to facilitate group collaboration for part 1 of the assessment task, production of a draft form and final submission.

The overall 40% available for this assessment is broken down as follows:

- Part 1: Overall quality of the portfolio (24%) - Marked as a group
- Part 2: Critique (12%) - Marked individually
- Part 3: Self and Peer Assessment and contribution to team (4%) - Marked individually

For all parts, a detailed marking rubric will be available on the Moodle site.

### **Assessment Due Date**

Week 8 Friday (9 Sept 2022) 11:45 pm AEST

### **Return Date to Students**

Week 10 Friday (23 Sept 2022)

### **Weighting**

40%

### **Minimum mark or grade**

50%

### **Assessment Criteria**

The portfolio assessment is an opportunity to further research the contribution that molecular and cell biology has made to understanding a specific disease together with advances in diagnostic technology and treatment.

A detailed marking rubric will be available on the unit Moodle site. A brief overview of assessment criteria are as follows:

- Part 1: Review Section (The overall review is composed of three sections relating to Pathogenesis, Diagnosis and Treatment [plus introduction, summary and conclusions].) - 60% of overall grade for this assessment (marked as

a group effort)\*

- Part 2: Critique of three scientific papers - 30% of overall grade for this assessment (individually marked)
- Part 3: Individual contribution to group work (evaluated via Self and Peer Assessment) - 10% of overall grade for this assessment (individually marked)

If a student is allocated to a team but does not contribute to the group activity, they will not be awarded the group score for the assessment.

\*When the cohort is not divisible by 3, groups of 2 will not be penalised - one section will be omitted following consultation with the unit coordinator.

### Referencing Style

- [Harvard \(author-date\)](#)
- [American Psychological Association 7th Edition \(APA 7th edition\)](#)

### Submission

Online Group

### Submission Instructions

One person per group to submit part A via Moodle. Parts B and C are to be submitted individually.

### Learning Outcomes Assessed

- Describe the molecular basis of disease, in terms of gene mutations or rearrangements, and their detection
- Describe the relationship of disease to epigenetic modification of the genome
- Explain the process of identifying genetic changes and their significance
- Explain the use of molecular pathology in disease diagnosis and / or prevention and treatment, including the development of personalised medicines.

### Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Team Work
- Cross Cultural Competence
- Ethical practice

## 2 Online Test

### Assessment Type

Online Test

### Task Description

Complete an online test consisting of a variety of answer types including (but not limited to): diagram labelling, image identification, multiple choice, short answer questions and long answer questions.

This particular assessment requires you to demonstrate an application of knowledge as an extension on the content learnt in this unit. The intent of this assessment is to provide you with an opportunity to assess your understanding of how to apply and interpret the content.

- The test will be divided into four parts:

1. Part A: Short answer, technical based questions. 1 mark each. 20 questions. (20)
2. Part B: Long answer, interpretive questions. 5 marks each. 10 questions. (50)
3. Part C: Image interpretation 2 marks each. 10 questions. (20)
4. Part D: Case studies/Long Answer Questions. 3 Cases/Questions 10 marks each. (30)

- Your time limit for the test is 120 minutes.
- The quiz will automatically submit at the completion of the 120 minute duration.
- You will be allowed one attempt at the test.

Your score from the test will contribute 60% to your final grade.

### Assessment Due Date

Exam Week Friday (21 Oct 2022) 11:45 pm AEST

The online test will be available for a 24 hour period during the allocated examination period. The exact date and times are to be advised.

**Return Date to Students**

Certification of grades

**Weighting**

60%

**Minimum mark or grade**

50%

**Assessment Criteria**

The online test will be marked automatically (for short answer, drag and drop, and multiple choice questions), and manually (for longer answer questions and case studies). The test will be comprised of sections which are drawn from a question bank, so each student will have a randomised set of questions.

Marks will be accessible at the certification of grades.

**Referencing Style**

- [Harvard \(author-date\)](#)
- [American Psychological Association 7th Edition \(APA 7th edition\)](#)

**Submission**

Online

**Learning Outcomes Assessed**

- Describe the molecular basis of disease, in terms of gene mutations or rearrangements, and their detection
- Describe the relationship of disease to epigenetic modification of the genome
- Explain the process of identifying genetic changes and their significance

**Graduate Attributes**

- Communication
- Problem Solving
- Critical Thinking
- Information Technology Competence

## 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