



LMED29001 Genomic Pathology 1

Term 2 - 2024

Profile information current as at 29/07/2024 05:26 pm

All details in this unit profile for LMED29001 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 learn about the role of cellular genetic material and associated genetic rearrangements and mutations. You will explore the application of molecular techniques, such as polymerase chain reaction and next generation sequencing, and their revolutionary impact on diagnostic testing. The residential school may be scheduled outside of the term of offering of the unit.

Details

Career Level: *Postgraduate*

Unit Level: *Level 9*

Credit Points: 6

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.125

Pre-requisites or Co-requisites

Prerequisites: Enrolment in Master of Laboratory Medicine.

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 - 2024

- Melbourne
- Mixed Mode
- Rockhampton
- Sydney

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).

Residential Schools

This unit has a Compulsory Residential School for distance mode students and the details are:

Click here to see your [Residential School Timetable](#).

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 Postgraduate 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. **Written Assessment**

Weighting: 30%

3. **Laboratory/Practical**

Weighting: Pass/Fail

4. **Examination**

Weighting: 50%

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

Students felt that the 1.5h lectorial time was not sufficient to fully understand all unit requirements and receive sufficient feedback on assessments

Recommendation

Consider increasing the lectorial time to 2h per week to allow more time for engagement with students, to provide feedback on assessments and to ensure unit requirements are clearly understood.

Feedback from SUTE, CM18 Student Staff Consultative Committee (SSCC) meetings, Self-reflection

Feedback

Students enjoyed the Kahoot quizzes and found them beneficial for learning

Recommendation

Continue including Kahoot quizzes in the lectorials

Feedback from SUTE, CM18 Student Staff Consultative Committee (SSCC) meetings

Feedback

Students enjoyed the 'flipped classroom' style of teaching

Recommendation

Consider continuing to use the flipped classroom/lectorial style of delivery

Unit Learning Outcomes

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

1. Critically discuss how gene mutations or rearrangements underpin the molecular aetiology of particular diseases
2. Evaluate the role of epigenetic modifications of the genome in disease pathogenesis
3. Explain the process of identifying genetic modifications and their clinical significance
4. Demonstrate skills in the use of genetic techniques in molecular pathology, including genetic amplification
5. Explain the use of molecular pathology in disease diagnosis, prevention and treatment, including the development of personalised medicines.

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 - Written Assessment - 30% | | | | • | |
| 3 - Laboratory/Practical - 0% | | | | • | |
| 4 - Examination - 50% | • | • | • | | • |

Alignment of Graduate Attributes to Learning Outcomes

| Graduate Attributes | Learning Outcomes | | | | |
|--|-------------------|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| 1 - Knowledge | ○ | ○ | ○ | ○ | ○ |
| 2 - Communication | ○ | ○ | ○ | ○ | ○ |
| 3 - Cognitive, technical and creative skills | ○ | ○ | ○ | ○ | ○ |
| 4 - Research | | | | | |
| 5 - Self-management | | | | | |
| 6 - Ethical and Professional Responsibility | | | | | |
| 7 - Leadership | | | | | |
| 8 - Aboriginal and Torres Strait Islander Cultures | | | | | |

Textbooks and Resources

Textbooks

There are no required textbooks.

IT Resources

You will need access to the following IT resources:

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

Referencing Style

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

- [Harvard \(author-date\)](#)
- [Vancouver](#)

For further information, see the Assessment Tasks.

Teaching Contacts

Jalal Jazayeri Unit Coordinator
j.jazayeri@cqu.edu.au

Schedule

Week 1 - Apoptosis, Necrosis and inflammation - 08 Jul 2024

| Module/Topic | Chapter | Events and Submissions/Topic |
|--|--|---|
| Revision of molecular pathology and understanding human molecular genetics | No prescribed textbook for this unit. Pls review the lecture material and recordings available for week 1 in Moodle <u>prior</u> to your tutorial/lectorial as well as other provided resources in your Moodle for Week 1. | Welcome and introduction to the unit. Revision of molecular pathology. |

Week 2 - Omics - 15 Jul 2024

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|--|---|
| 'Omics' techniques supporting molecular diagnosis, pathology and pathogenesis. This will include the study and analysis of various biological molecules that constitute the cells of an organism, such as genomics, proteomics, and metabolomics. | No prescribed textbook for this unit. Pls review the lecture material and recordings available for week 2 in Moodle <u>prior</u> to your tutorial/lectorial as well as the peer-reviewed article indicated for Week 2. | 'Omics' techniques supporting molecular diagnosis, pathology and pathogenesis. SARS-CoV-2 pandemic: a review of molecular diagnostic tools. |

Week 3 - Epigenetics - 22 Jul 2024

| Module/Topic | Chapter | Events and Submissions/Topic |
|--------------|---------|------------------------------|
|--------------|---------|------------------------------|

Epigenetics and human disease. The study of heritable changes in gene expression that do not involve changes to the DNA sequence, often involving mechanisms such as DNA methylation.

No prescribed textbook for this unit. Pls review the lecture material and recordings available for week 3 in Moodle prior to your tutorial/lectorial as well as the peer-reviewed article indicated for Week 3.

Epigenetics and human disease. Epigenetic deregulation in myeloid malignancies.

Week 4 - Cardiovascular and Pulmonary Diseases - 29 Jul 2024

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|--|--|
| Molecular basis of cardiovascular and pulmonary diseases. | No prescribed textbook for this unit. Pls review the lecture material and recordings available for week 4 in Moodle <u>prior</u> to your tutorial/lectorial as well as the peer-reviewed article indicated for Week 4. | Molecular basis of cardiovascular and pulmonary diseases. Genetic, hormonal and metabolic aspects of PCOS. |

Week 5 - Molecular basis for blood disorders - 05 Aug 2024

| Module/Topic | Chapter | Events and Submissions/Topic |
|-------------------------------------|--|--|
| Molecular basis of blood disorders. | No prescribed textbook for this unit. Pls review the lecture material and recordings available for week 5 in Moodle <u>prior</u> to your tutorial/lectorial as well as the peer-reviewed article indicated for Week 5. | Molecular basis of blood disorders. Genetic basis of a Haemoglobinopathy/Thalassemia Syndrome. Revision. |

Vacation Week - 12 Aug 2024

| Module/Topic | Chapter | Events and Submissions/Topic |
|---------------------|----------------|-------------------------------------|
|---------------------|----------------|-------------------------------------|

Week 6 - Molecular basis of cancers - Colorectal, prostate and gynaecological cancers. - 19 Aug 2024

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|--|---|
| Molecular basis of colorectal, prostate and gynaecological cancers. | Pls review the lecture material and recordings available for week 6 in Moodle <u>prior</u> to your tutorial/lectorial as well as the peer-reviewed article indicated for Week 6. | Molecular basis of colorectal, prostate and gynaecological cancers. Analysis of a peer-reviewed article on a topic relevant to this week. Mid-semester assessment Due: Week 6 Monday (19 Aug 2024) 9:00 am AEST |

Week 7 - Liver and kidney diseases - 26 Aug 2024

| Module/Topic | Chapter | Events and Submissions/Topic |
|--|--|--|
| Molecular basis of liver and kidney disease. | Pls review the lecture material and recordings available for week 7 in Moodle <u>prior</u> to your tutorial/lectorial as well as the peer-reviewed article indicated for Week 7. | Molecular basis of liver and kidney disease. Analysis of a peer-reviewed article on a topic relevant to this week. |

Week 8 - Molecular basis of skin diseases - 02 Sep 2024

| Module/Topic | Chapter | Events and Submissions/Topic |
|-----------------------------------|--|---|
| Molecular basis of skin diseases. | Pls review the lecture material and recordings available for week 8 in Moodle <u>prior</u> to your tutorial/lectorial as well as the peer-reviewed article indicated for Week 8. | Molecular basis of skin diseases. Analysis of a peer-reviewed article on a topic relevant to this week. |

Week 9 - Musculoskeletal Diseases - 09 Sep 2024

| Module/Topic | Chapter | Events and Submissions/Topic |
|---------------------|----------------|-------------------------------------|
|---------------------|----------------|-------------------------------------|

| | | |
|---|--|--|
| Molecular basis of Musculoskeletal Diseases | Pls review the lecture material and recordings available for week 9 in Moodle prior to your tutorial/lectorial as well as the peer-reviewed article/other relevant resources indicated for Week 9. | Molecular basis of Musculoskeletal Diseases. Analysis of a peer-reviewed article/other relevant resources on a topic relevant to this week. Molecular testing design Due: Week 9 Friday (13 Sept 2024) 11:59 pm AEST |
|---|--|--|

Week 10 - Exocrine and Endocrine Systems - 16 Sep 2024

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|--|--|
| Molecular basis of Exocrine and Endocrine Systems | Pls review the lecture material and recordings available for week 10 in Moodle prior to your tutorial/lectorial as well as the peer-reviewed article/other relevant resources indicated for Week 10. | Molecular basis of Exocrine and Endocrine Systems. Analysis of a peer-reviewed article/other relevant resources on a topic relevant to this week. Laboratory/Practical Due: Week 10 Friday (20 Sept 2024) 4:00 pm AEST |

Week 11 - Clinical Laboratory and Personalised Medicine - 23 Sep 2024

| Module/Topic | Chapter | Events and Submissions/Topic |
|---|--|---|
| Clinical Laboratory and Personalised Medicine | Pls review the lecture material and recordings available for week 11 in Moodle prior to your tutorial/lectorial as well as the peer-reviewed article/other relevant resources indicated for Week 11. | Clinical Laboratory and Personalised Medicine. Analysis of a peer-reviewed article/other relevant resources on a topic relevant to this week. |

Week 12 - Revision - All topics - 30 Sep 2024

| Module/Topic | Chapter | Events and Submissions/Topic |
|----------------------|--|---|
| Revision- ALL topics | Pls review the lecture material and recordings available for week 12 in Moodle prior to your tutorial/lectorial. | Revision, going over the past exam papers |

Review/Exam Week - 07 Oct 2024

| Module/Topic | Chapter | Events and Submissions/Topic |
|--------------|---------|------------------------------|
|--------------|---------|------------------------------|

Exam Week - 10 Oct 2024

| Module/Topic | Chapter | Events and Submissions/Topic |
|--------------|---------|--|
| | | An invigilated examination will be scheduled in the scheduled examination period from 10 October 2024 - 18 October 2024. Students will be notified of the exact date once it has been scheduled. |

Term Specific Information

Unit Coordinator:

The unit coordinator is Dr. Jalal Jazayeri and can be contacted via email: j.jazayeri@cqu.edu.au or phone: 0404024023. Dr. Jazayeri is based in Melbourne, at 120 Spencer Street, level 4, Room number 4.02.

Textbook:

There is no prescribed textbook for this subject. However, whenever required published journal articles relevant to each topic will be provided. These articles are up-to-date with the latest advancements in the field, ensuring that you have access to the most current research and developments.

Study Guide:

As per Australian educational standards, you are expected to commit 150 hours of engagement to your study of this unit (~12.5hrs each week). Students are expected to spend time doing the following each week:

- 3 - 4 hours per week watching pre-recorded lectures and revising the content through study notes.
- 2 - 3 hours per week completing the weekly study questions and weekly revision quizzes on the unit's Moodle site.
- 2 - 3 hours per week attending the weekly tutorials and reflecting on your answers to the weekly revision worksheets.
- 3 - 4 hours per week preparing for your assessments and end of term invigilated exam.

This unit also has a compulsory laboratory component which will be completed during the CM18 Residential Schools held on 15-26th September 2024

Assessment Tasks

1 Mid-semester assessment

Assessment Type

Written Assessment

Task Description

This assessment will examine your comprehension of the learning objectives and activities carried out from weeks 1 - 5 inclusive in the unit, including any pre-tutorial/lectorial learning materials such as the weekly lecture notes and related resources, peer-reviewed articles and other relevant resources provided with the unit content and covered during scheduled classes. The assessment may include (but not be limited to) some short answer questions, terminology questions, process and arrangement questions. You may also be given a peer-reviewed article and required to provide a summary (in your own words) of the main points addressed, and/or be required to respond to questions pertaining to this article.

You will be provided with support and examples of the types of questions you are likely to encounter in this assessment during your scheduled classes; this will assist you in learning and understanding the expectations of this assessment. You are therefore strongly encouraged to regularly attend and actively participate in the weekly scheduled classes, ask questions where you are uncertain and ensure you come prepared for each class by having reviewed any pre-class learning material. If you still have questions or areas you do not understand following each weekly lectorial/tutorial class you will be encouraged to address these promptly by posting your questions on the Discussion forum and engaging in discussion on this/these topics with fellow students and academics, and the Unit coordinators. Doing this will ensure you 'arrive' to this assessment well prepared and give yourself the best possibilities of performing well in and from this assessment.

Assessment Due Date

Week 6 Monday (19 Aug 2024) 9:00 am AEST

Online submission via the subject Moodle site

Return Date to Students

Week 8 Monday (2 Sept 2024)

Two weeks after submission -online

Weighting

20%

Assessment Criteria

A detailed marking criteria and marks allocated for each questions will be provided with this assessment. Marks will range from 1-2 marks for short responses and 4-5 marks where more detailed information will be required. You will be provided with support and examples of the types of questions you are likely to encounter in this assessment during

your scheduled classes; this will assist you in learning and understanding the expectations of this assessment. You are therefore strongly encouraged to regularly attend and actively participate in the weekly scheduled classes, ask questions where you are uncertain and ensure you come prepared for each class by having reviewed any pre-class learning material. If you still have questions or areas you do not understand following each weekly lectional/tutorial class you will be encouraged to address these promptly by posting your questions on the Discussion forum and engaging in discussion on this/these topics with fellow students and academics, and the Unit coordinators. Doing this will ensure you 'arrive' to this assessment well prepared and give yourself the best possibilities of performing well in and from this assessment.

Referencing Style

- [Harvard \(author-date\)](#)
- [Vancouver](#)

Submission

Online

Learning Outcomes Assessed

- Critically discuss how gene mutations or rearrangements underpin the molecular aetiology of particular diseases
- Explain the process of identifying genetic modifications and their clinical significance
- Explain the use of molecular pathology in disease diagnosis, prevention and treatment, including the development of personalised medicines.

2 Molecular testing design

Assessment Type

Written Assessment

Task Description

Molecular testing, using genetic amplification, for disease detection has become commonplace in most pathology workplaces. Tests that used to take days can now be done in an hour or 2, making turn-around times shorter and clinical decision making easier. Understanding how and why these tests are done is vital for a Medical Laboratory Scientist. For this assessment you will be given a range of scenarios with different diseases and will be asked to design a molecular experiment to determine the status of the disease in a specific patient. Working in pairs you will research the disease and determine a specific genetic target to be tested. You and your student partner will then design a genetic amplification-based experiment, including describing specific primer sets, amplification conditions, reagents and equipment needed. Individually, you will then outline what you expect to see in terms of results and interpret what this means for the patient.

Assessment Due Date

Week 9 Friday (13 Sept 2024) 11:59 pm AEST
online via subject Moodle site

Return Date to Students

Week 11 Friday (27 Sept 2024)
Via Subject Moodle site

Weighting

30%

Assessment Criteria

Assessment Criteria

You will be assessed on the following criteria:

- Identification of the molecular etiology of the disease.
- Appropriate design of molecular primers/probes to determine the presence or absence of disease.
- Accurate description of the experimental conditions for the genetic amplification test.
- Clear identification of the experimental outcomes.
- Appropriate use of referencing of scientific literature.

A detailed marking rubric will be available on the Moodle site for this unit.

Referencing Style

- [Harvard \(author-date\)](#)
- [Vancouver](#)

Submission

Online Group

Learning Outcomes Assessed

- Demonstrate skills in the use of genetic techniques in molecular pathology, including genetic amplification

3 Laboratory/Practical

Assessment Type

Laboratory/Practical

Task Description

This is part of the Residential School. Attendance at the Residential School / Laboratory is mandatory to pass the unit. The residential school will be from the 15th -26th September inclusive.

Within the practical residential school, the students will have to show competence in the use and understanding of molecular biology techniques (such as LAMP and PCR) and safety protocols commonly used in the pathology setting. Students will be required to submit their laboratory workbook at the completion of the laboratory practical. The workbook will contain questions designed to assess an understanding of the experimental techniques being performed. Demonstrate skills in the use of genetic techniques in molecular pathology, including genetic amplification

Assessment Due Date

Week 10 Friday (20 Sept 2024) 4:00 pm AEST

Please submit towards the end of the residential school period

Return Date to Students

Weighting

Pass/Fail

Assessment Criteria

You will be assessed on the following criteria:

- completion of the experiments outlined in the laboratory manual
- an understanding and adherence to the safety protocols dealing with blood handling
- displaying sufficient understanding of the experimental techniques as assessed by answering workbook questions

Marks will be allocated within the Laboratory workbook for each section, and marking rubric will be available on the Moodle site for this unit.

Referencing Style

- [Harvard \(author-date\)](#)
- [Vancouver](#)

Submission

Offline

Learning Outcomes Assessed

- Demonstrate skills in the use of genetic techniques in molecular pathology, including genetic amplification

Examination

Outline

Complete an invigilated examination.

Date

During the examination period at a CQUniversity examination centre.

Weighting

50%

Length

180 minutes

Minimum mark or grade

50

Exam Conditions

Restricted.

Materials

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

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