



MATH12223 *Calculus and Linear Algebra A*

Term 1 - 2021

Profile information current as at 20/04/2024 01:14 pm

All details in this unit profile for MATH12223 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

In this unit, you will study vectors, complex numbers, single variable differential calculus and linear algebra. Through a visual, verbal, numerical and algebraic approach, with particular focus on the practical power of calculus, you will develop a conceptual understanding of calculus and apply differentiation to solve problems in scientific engineering and other disciplines. You will use linear operations to determine the inverse and determinants of matrices. You will use vectors and complex numbers to solve relevant problems, formulate and apply functions and graphs in modelling applied mathematics problems. Other important elements of this unit are the communication of results, concepts and ideas using mathematics as a language.

Details

Career Level: *Undergraduate*

Unit Level: *Level 2*

Credit Points: 6

Student Contribution Band: 7

Fraction of Full-Time Student Load: 0.125

Pre-requisites or Co-requisites

Prerequisite: MATH11160 or MATH11246 Anti-Requisite: MATH11163

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

- 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. **Written Assessment**

Weighting: 25%

2. **Written Assessment**

Weighting: 25%

3. **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 Disciplinary requirement

Feedback

Refine alignment with the new QLD senior math syllabus

Recommendation

Continue the refining work started from 2019 in line with other math units

Feedback from Student feedback from the unit evaluation

Feedback

Students commented very favorably upon the lecturing approach; provision of annotated lecture slides; availability of supporting learning materials; the level of support provided by staff; and prompt attention to queries.

Recommendation

Continue to offer a positive, supported learning experience

Unit Learning Outcomes

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

1. Solve problems requiring the use of vectors and complex numbers
2. Apply linear operations to determine the inverse and determinants of matrices
3. Formulate and apply functions and graphs in modelling applied mathematics problems
4. Solve problems using the concepts of limit, continuity and derivative, and rules of differentiation of functions
5. Determine solutions to problems involving rates of change, optimisation and approximate computation through differentiation
6. Communicate results, concepts and ideas in context using mathematics as a language.

Alignment of Learning Outcomes, Assessment and Graduate Attributes



Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes					
	1	2	3	4	5	6
1 - Written Assessment - 25%	•	•				•
2 - Written Assessment - 25%			•	•	•	•
3 - Examination - 50%	•	•	•	•	•	

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes					
	1	2	3	4	5	6
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 - 25%	•	•	•	•		•		•		
2 - Written Assessment - 25%	•	•	•	•		•		•		
3 - Examination - 50%	•	•	•	•		•		•		

Textbooks and Resources

Textbooks

MATH12223

Prescribed

ESSENTIALS AND EXAMPLES OF APPLIED MATHEMATICS

Edition: 1st edn (2018)

Authors: Guo, WW

Pearson Australia

Melbourne , VIC , Australia

ISBN: 9781488623820

Binding: Paperback

Additional Textbook Information

The textbook was used by students for MATH11246 in previous year, who can keep using the same textbook for MATH12223 and MATH12224 in 2021.

[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

William Guo Unit Coordinator

w.guo@cqu.edu.au

Schedule

Week 1 - 08 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
Functions and Graphs	Textbook: Sections 4.1-4.2	Read Sections 4.1-4.2; Complete Week 1 exercises

Week 2 - 15 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
Multivariable Functions and the Cartesian System Linear Functions	Textbook: Section 4.3 Textbook: Section 5.1	Read Sections 4.3 & 5.1; Complete Week 2 exercises

Week 3 - 22 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
Quadratic Functions and Higher Order Polynomials	Textbook: Sections 5.2-5.3	Read Sections 5.2-5.3; Complete Week 3 exercises

Week 4 - 29 Mar 2021

Module/Topic	Chapter	Events and Submissions/Topic
Exponential and Logarithmic Functions	Textbook: Chapter 6	Read Chapter 6; Complete Week 4 exercises

Week 5 - 05 Apr 2021

Module/Topic	Chapter	Events and Submissions/Topic
Trigonometric and Hyperbolic Functions	Textbook: Chapter 7	Read Chapter 7; Complete Week 5 exercises

Vacation Week - 12 Apr 2021

Module/Topic	Chapter	Events and Submissions/Topic
Mid-Term Break		

Week 6 - 19 Apr 2021

Module/Topic	Chapter	Events and Submissions/Topic
Limits and Continuities of Continuous Functions	Section 10.1	Read Section 10.1; Complete Week 6 exercises Assignment 1 Due: Week 6 Friday (23 Apr 2021) 11:59 pm AEST

Week 7 - 26 Apr 2021

Module/Topic	Chapter	Events and Submissions/Topic
Derivatives of Continuous Functions	Section 10.2	Read Section 10.2; Complete Week 7 exercises

Week 8 - 03 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Advanced Techniques of Differentiation, and Higher Order Derivatives	Sections 10.3 and 10.5	Read Sections 10.3 and 10.5; Complete Week 8 exercises

Week 9 - 10 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Critical Points and Extreme Values of Functions	Section 11.2	Read Section 11.2; Complete Week 9 exercises

Week 10 - 17 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Applications of Differentiation	Sections 11.1 and 11.4	Read Sections 11.1 and 11.4; Complete Week 10 exercises

Week 11 - 24 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Differentials and Approximation	Sections 11.3.1 and 11.3.3	Read Sections 11.3.1 and 11.3.3; Complete Week 11 exercises Assignment 2 Due: Week 11 Friday (28 May 2021) 11:59 pm AEST

Week 12 - 31 May 2021

Module/Topic	Chapter	Events and Submissions/Topic
Unit review and examination preparation		

Review/Exam Week - 07 Jun 2021

Module/Topic	Chapter	Events and Submissions/Topic

Exam Week - 14 Jun 2021

Module/Topic	Chapter	Events and Submissions/Topic

Assessment Tasks

1 Assignment 1

Assessment Type

Written Assessment

Task Description

This is an individual assignment.

This assignment is to test student's learning outcomes of topics studied in Weeks 1-5. The assignment details are provided on the Moodle website.

Assessment Due Date

Week 6 Friday (23 Apr 2021) 11:59 pm AEST

Extension request must be lodged before the assignment due. No extension can be granted to this assignment once the solution is released.

Return Date to Students

Week 8 Friday (7 May 2021)

It is envisaged that feedback and solutions will be available in two weeks, or as soon as the marking process is completed.

Weighting

25%

Assessment Criteria

The final mark is out of 25. Questions are awarded the full marks allocated if they are error-free, partial marks if there are some problems, and no marks if not attempted or contain so many errors as to render the attempt to be without value. To ensure maximum benefit, answers to all questions should be neatly and clearly presented and all appropriate working should be shown. Assignments will receive NO marks if submitted after the solutions are released.

Referencing Style

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

Submission

Online

Submission Instructions

Submit one PDF file through the Moodle website.

Learning Outcomes Assessed

- Solve problems requiring the use of vectors and complex numbers
- Apply linear operations to determine the inverse and determinants of matrices
- Communicate results, concepts and ideas in context using mathematics as a language.

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Ethical practice

2 Assignment 2

Assessment Type

Written Assessment

Task Description

This is an individual assignment.

This assignment is to test student's learning outcomes of topics studied in Weeks 6-10. The assignment details are provided on the Moodle website.

Assessment Due Date

Week 11 Friday (28 May 2021) 11:59 pm AEST

Extension request must be lodged before the assignment due. No extension can be granted to this assignment once the

solution is released.

Return Date to Students

Review/Exam Week Wednesday (9 June 2021)

It is envisaged that the feedback and solutions will be available before the exam if all students submitted this assignment on time.

Weighting

25%

Assessment Criteria

The final mark is out of 25. Questions are awarded the full marks allocated if they are error-free, partial marks if there are some problems, and no marks if not attempted or contain so many errors as to render the attempt to be without value. To ensure maximum benefit, answers to all questions should be neatly and clearly presented and all appropriate working should be shown. Assignments will receive NO marks if submitted after the solutions are released.

Referencing Style

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

Submission

Online

Submission Instructions

Submit one PDF file through the Moodle website.

Learning Outcomes Assessed

- Formulate and apply functions and graphs in modelling applied mathematics problems
- Solve problems using the concepts of limit, continuity and derivative, and rules of differentiation of functions
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- Communicate results, concepts and ideas in context using mathematics as a language.

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Ethical practice

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

40% (20 marks or higher out of the 50 marks available in the exam)

Exam Conditions

Open Book.

Materials

Dictionary - non-electronic, concise, direct translation only (dictionary must not contain any notes or comments).
Calculator - all non-communicable calculators, including scientific, programmable and graphics calculators are authorised

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