



# MATH12223 Calculus and Linear Algebra A

## Term 1 - 2018

Profile information current as at 12/05/2024 01:11 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

The unit covers topics in single variable differential calculus and linear algebra. The emphasis is on a conceptual understanding of calculus through a visual, verbal, numerical and algebraic approach with particular focus on the practical power of calculus. Topics covered include functions, mathematical models of real world processes, complex numbers, vectors, matrices and systems of linear equations. However the main focus is on limits, continuity and derivatives which are studied extensively, and are used to derive the rules of differentiation like the product, quotient and chain rules as well as implicit differentiation. Applications of differentiation are discussed like l'Hospital's rule and Newton's method, and differentiation is applied to the areas of optimisation and determining the shape of curves. Mathematical software is also used to investigate and solve most problems studied in the unit. Note: if you have completed unit MATH11163 then you cannot take this unit.

#### 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 Technology Mathematics

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 - 2018

- Distance

#### 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. **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](#).



## Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes								
	1	2	3	4	5	6	7	8	9
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 - Written Assessment - 20%	•	•	•	•		•		•		
3 - Examination - 60%	•	•	•	•				•		

## Textbooks and Resources

### Textbooks

MATH12223

#### Prescribed

##### Calculus: concepts and contexts

Edition: 4th edn (2018)

Authors: Stewart, J

Cengage

ISBN: 9781337687669

Binding: Hardcover

#### Additional Textbook Information

This is a new edition of the Stewart Calculus textbook that has some minor changes over the previous edition. The previous edition is out of stock and the new Student Solutions Manual seems not available yet. This text for MATH12223 will also be used for MATH12224 in Term 2 2018 and MATH13217 in Term 1 2019 for some students.

[View textbooks at the CQUniversity Bookshop](#)

### IT Resources

**You will need access to the following IT resources:**

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- WolframAlpha on the internet

## 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](mailto:w.guo@cqu.edu.au)

## Schedule

### Week 1 - 05 Mar 2018

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture 1</b> - Course Info & Preview	<b>Textbook</b> - Preview plus Appendix A & Appendix C	Do week 1 tutorial exercises.
<b>Lecture 2</b> - Appendix A		
<b>Lecture 3</b> - Appendix C		

### Week 2 - 12 Mar 2018

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture 1</b> - Section 1.1 & 1.2	<b>Textbook</b> - Sections 1.1 to 1.5 inclusive	Do week 2 tutorial exercises.
<b>Lecture 2</b> - Section 1.3 & 1.4		
<b>Lecture 3</b> - Section 1.5		

### Week 3 - 19 Mar 2018

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

<b>Lecture 1</b> - Section 1.6	<b>Textbook</b> - Sections 1.6 to 2.1 inclusive & Appendix I	Do week 3 tutorial exercises.
<b>Lecture 2</b> - Section 1.7 & Appendix I		
<b>Lecture 3</b> - Appendix I & Section 2.1		

**Week 4 - 26 Mar 2018**

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture 1</b> - Section 2.2	<b>Textbook</b> - Sections 2.2 to 2.5 inclusive	Do week 4 tutorial exercises.
<b>Lecture 2</b> - Section 2.3		
<b>Lecture 3</b> - Section 2.4 & 2.5		

**Week 5 - 02 Apr 2018**

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture 1</b> - Section 2.6	<b>Textbook</b> - Sections 2.6 to 2.8 inclusive	Do week 5 tutorial exercises.
<b>Lecture 2</b> - Section 2.7		
<b>Lecture 3</b> - Section 2.8		

**Vacation Week - 09 Apr 2018**

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

**Week 6 - 16 Apr 2018**

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture 1</b> - Section 3.1	<b>Textbook</b> - Sections 3.1 to 3.5 inclusive	Do week 6 tutorial exercises.
<b>Lecture 2</b> - Section 3.2 & 3.3		
<b>Lecture 3</b> - Section 3.4 & 3.5		
		<b>Assignment 1</b> Due: Week 6 Friday (20 Apr 2018) 11:00 pm AEST

**Week 7 - 23 Apr 2018**

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture 1</b> - Section 3.6	<b>Textbook</b> - Sections 3.6 to 3.9 inclusive	Do week 7 tutorial exercises.
<b>Lecture 2</b> - Section 3.7		
<b>Lecture 3</b> - Section 3.8 & 3.9		

**Week 8 - 30 Apr 2018**

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture 1</b> - Section 4.1	<b>Textbook</b> - Sections 4.1 to 4.3 inclusive	Do week 8 tutorial exercises.
<b>Lecture 2</b> - Section 4.2		
<b>Lecture 3</b> - Section 4.3		

**Week 9 - 07 May 2018**

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture 1</b> - Section 4.5	<b>Textbook</b> - Sections 4.5 to 4.8 inclusive	Do week 9 tutorial exercises.
<b>Lecture 2</b> - Section 4.6		
<b>Lecture 3</b> - Section 4.7 & 4.8		

**Week 10 - 14 May 2018**

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture 1</b> - Section 9.1 & 9.2	<b>Textbook</b> - Sections 9.1 to 9.5 inclusive	Do week 10 tutorial exercises.
<b>Lecture 2</b> - Section 9.3 & 9.4		
<b>Lecture 3</b> - Section 9.5		
		<b>Assignment 2</b> Due: Week 10 Friday (18 May 2018) 11:00 pm AEST

**Week 11 - 21 May 2018**

Module/Topic	Chapter	Events and Submissions/Topic
<b>Lecture 1</b> - Euclidean m-space	Lecture notes available on Moodle website	Do week 11 tutorial exercises.
<b>Lecture 2</b> - Systems of linear equations		
<b>Lecture 3</b> - Row reduction of linear systems		

**Week 12 - 28 May 2018**

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

**Lecture 1** - Introduction to matrices

**Lecture 2** - Matrices equations and inverses

**Lecture 3** - Revision

Lecture notes available on Moodle website

Do week 12 tutorial exercises.

#### Review/Exam Week - 04 Jun 2018

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

#### Exam Week - 11 Jun 2018

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

## Assessment Tasks

### 1 Assignment 1

#### Assessment Type

Written Assessment

#### Task Description

Submit full worked solutions to twenty even-numbered exercises selected from the Stewart Calculus textbook. The exercises cover topics from Weeks 1 to 5 of this unit. The selected exercises and other assignment 1 details are given on the Moodle website.

#### Assessment Due Date

Week 6 Friday (20 Apr 2018) 11:00 pm AEST

Submit in Week 6 by 11pm on Friday.

#### Return Date to Students

Week 8 Friday (4 May 2018)

Results will be available to students in two weeks after the submission date.

#### Weighting

20%

#### Assessment Criteria

Marks for each assignment question will be awarded for the setting out, showing the correct steps in the solution as well as finding the correct answer. Full details about the assessment criteria for assignment 1 are available on the Moodle website.

#### Referencing Style

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

#### Submission

Online

#### Submission Instructions

Assignment 1 must be submitted online as a PDF document through the upload facility on the MATH12223 Moodle website.

#### Learning Outcomes Assessed

- Formulate and apply mathematical functions and graphs to model typical applied scenarios.
- Apply the concepts of limit, continuity and derivative of a function to solve problems.
- Analyse and solve problems using complex numbers and trigonometry.
- Use mathematical software to visualise, analyse and solve problems in single variable differential calculus and linear algebra.

#### Graduate Attributes

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

## 2 Assignment 2

### Assessment Type

Written Assessment

### Task Description

Submit full worked solutions to twenty even-numbered exercises selected from the Stewart Calculus textbook. The exercises cover topics from Weeks 6 to 9 of this unit. The selected exercises and other details are given on the Moodle website.

### Assessment Due Date

Week 10 Friday (18 May 2018) 11:00 pm AEST

Submit in Week 10 by 11 pm on Friday.

### Return Date to Students

Week 12 Friday (1 June 2018)

Results will be available to students in two weeks after the submission date.

### Weighting

20%

### Assessment Criteria

Marks for each assignment question will be awarded for the setting out, showing the correct steps in the solution as well as finding the correct answer. Full details about the assessment criteria for assignment 2 are available on the Moodle website.

### Referencing Style

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

### Submission

Online

### Submission Instructions

Assignment 2 must be submitted online as a PDF document through the upload facility on the MATH12223 Moodle website.

### Learning Outcomes Assessed

- Apply the rules of differentiation like the product, quotient and chain rules, as well as implicit differentiation in appropriate situations.
- Apply differentiation to solve problems involving rates of change including optimisation, determining the shape of curves, l'Hospital's rule and Newton's method.
- Analyse and solve problems using complex numbers and trigonometry.
- Use mathematical software to visualise, analyse and solve problems in single variable differential calculus and linear algebra.

### 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

60%

### Length

180 minutes

### Minimum mark or grade

40% (or 24 marks out of the 60 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