



# MATH11218 Applied Mathematics

## Term 1 - 2022

Profile information current as at 24/04/2024 08:09 am

All details in this unit profile for MATH11218 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 fundamental mathematical concepts, processes and techniques that are necessary to support subsequent studies in applied calculus. You will investigate the properties and applications of linear, quadratic, logarithmic and exponential functions. You will use trigonometry to solve triangles and determine solutions to problems involving algebraic techniques. Complex numbers, vectors and matrix algebra will be used to develop solutions to problems. Other important elements of this unit are the communication of results, concepts and ideas using mathematics as a language. This unit will develop your software skills in WolframAlpha to visualise, analyse, validate and solve problems.

#### Details

Career Level: *Undergraduate*

Unit Level: *Level 1*

Credit Points: 6

Student Contribution Band: 7

Fraction of Full-Time Student Load: 0.125

#### Pre-requisites or Co-requisites

Anti-requisite: MATH12223 or MATH12224.

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 - 2022

- Bundaberg
- Cairns
- Gladstone
- Mackay
- 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: 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](#).

## 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 2021 Engineering Curriculum Review.

**Feedback**

Strategically optimise the unit topics taught.

**Recommendation**

Update the lectures and tutorials to match the revised unit curriculum.

#### Feedback from Unit coordinator reflection.

**Feedback**

Review and optimise communication strategies used to promote the MATH11247 Foundation Mathematics unit to first-year engineering students, as preparation for MATH11218.

**Recommendation**

Continue to implement optimal strategies to ensure enrolled MATH11218 students have the required mathematics entry skills.

#### Feedback from Student Unit and Teaching Evaluation (SUTE).

**Feedback**

Positive student feedback was received that the unit was well structured, provided a good learning experience with clear and well-explained lectures.

**Recommendation**

Continue to offer a positive learning experience.

## Unit Learning Outcomes

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

1. Determine solutions to problems involving algebraic techniques and vectors
2. Solve problems by applying the properties of linear, quadratic, logarithmic and exponential functions
3. Model periodic phenomena using trigonometric functions
4. Solve geometric and engineering problems using complex numbers
5. Represent and solve problems using matrices and matrix operators
6. Communicate results, concepts and ideas in context using mathematics as a language
7. Apply mathematical software to visualise, analyse, validate and solve problems.

**The Learning Outcomes for this unit are linked with the Engineers Australia Stage 1 Competency Standards for Professional Engineers in the areas of 1. Knowledge and Skill Base, 2. Engineering Application Ability and 3. Professional and Personal Attributes at the following levels:**

### **Introductory**

**1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline. (LO: 1N 2N 3N 4N 5N 6N 7N)**

**2.1 Application of established engineering methods to complex engineering problem-solving. (LO: 1N 2N 3N 4N 5N 7N)**

**2.2 Fluent application of engineering techniques, tools and resources. (LO: 1N 2N 3N 4N 5N 7N)**

**3.2 Effective oral and written communication in professional and lay domains. (LO: 6N)**

**3.3 Creative, innovative and pro-active demeanour. (LO: 1N 2N 3N 4N 5N)**

**3.4 Professional use and management of information. (LO: 6N)**

***Note: LO refers to the Learning Outcome number(s) which link to the competency and the levels: N - Introductory, I - Intermediate and A - Advanced.***

**Refer to the Engineering Undergraduate Course Moodle site for further information on the Engineers Australia's Stage 1 Competency Standard for Professional Engineers and course level mapping information <https://moodle.cqu.edu.au/course/view.php?id=1511>**

## 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	7
1 - Written Assessment - 20%	•					•	•
2 - Written Assessment - 20%		•	•	•		•	•
3 - Examination - 60%	•	•	•	•	•		

### Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes						
	1	2	3	4	5	6	7
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							

## Textbooks and Resources

### Textbooks

MATH11218

#### Prescribed

#### Engineering Mathematics

5th edition (2017)

Authors: Croft, Davison, Flint & Hargeaves

Pearson

Harlow, Essex, UK

ISBN: 9781292146652

Binding: Paperback

[View textbooks at the CQUniversity Bookshop](#)

### IT Resources

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

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Access to a document scanner and/or pdf converter (all assessment submitted electronically as pdf file)
- Access to a printer (for printing assessment and tutorial materials)
- Access to a webcam, speaker and microphone or a headset (for participating in Zoom lectures and tutorials)

## Referencing Style

All submissions for this unit must use the referencing style: [Harvard \(author-date\)](#)

For further information, see the Assessment Tasks.

## Teaching Contacts

**Roland Dodd** Unit Coordinator

[r.dodd@cqu.edu.au](mailto:r.dodd@cqu.edu.au)

## Schedule

### Week 1 - 07 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Textbook Sections 1.1, 1.2, 1.4 to 1.5	Chapter 1: Review of algebraic techniques	Textbook Exercises 1.2, 1.4 to 1.5 and Week 1 Tutorial Exercises

### Week 2 - 14 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Textbook Sections 1.6 to 1.8	Chapter 1: Review of algebraic techniques	Textbook Exercises 1.6 to 1.8 and Week 2 Tutorial Exercises

### Week 3 - 21 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Textbook Sections 4.1 to 4.4, 7.1 to 7.7	Chapter 4: Coordinate systems, and Chapter 7: Vectors	Textbook Exercises 4.2 to 4.4, 7.2, 7.3, 7.5 to 7.7 and Week 3 Tutorial Exercises

### Week 4 - 28 Mar 2022

Module/Topic	Chapter	Events and Submissions/Topic
Textbook Sections 2.1 to 2.3, 2.4.1, 2.4.2, 2.4.6 to 2.4.9	Chapter 2: Engineering functions	Textbook Exercises 2.3, 2.4.1, 2.4.2, 2.4.6, 2.4.8, 2.4.9 and Week 4 Tutorial Exercises  <b>Assignment 1</b> Due: Week 4 Friday (1 Apr 2022) 5:00 pm AEST

#### Week 5 - 04 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
Textbook Sections 2.4.3 to 2.4.5	Chapter 2: Engineering functions	Textbook Exercises 2.4.3, 2.4.4, 2.4.5 and Week 5 Tutorial Exercises

#### Vacation Week - 11 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
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#### Week 6 - 18 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
Textbook Sections 3.1 to 3.6	Chapter 3: The trigonometric functions	Textbook Exercises 3.3, 3.4, 3.6 and Week 6 Tutorial Exercises

#### Week 7 - 25 Apr 2022

Module/Topic	Chapter	Events and Submissions/Topic
Textbook Sections 3.7 to 3.8	Chapter 3: The trigonometric functions	Textbook Exercises 3.7 to 3.8 and Week 7 Tutorial Exercises

#### Week 8 - 02 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Textbook Sections 9.1 to 9.8	Chapter 9: Complex numbers	Textbook Exercises 9.2 to 9.5, 9.7 and Week 8 Tutorial Exercises

#### Week 9 - 09 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Textbook Sections 9.9 to 9.10	Chapter 9: Complex numbers	Textbook Exercises 9.9 to 9.10 and Week 9 Tutorial Exercises

#### Week 10 - 16 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Textbook Sections 8.1 to 8.8	Chapter 8: Matrix algebra	Textbook Exercises 8.3, 8.5, 8.6, 8.7, 8.8 and Week 10 Tutorial Exercises  <b>Assignment 2</b> Due: Week 10 Friday (20 May 2022) 5:00 pm AEST

#### Week 11 - 23 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Textbook Sections 8.9 to 8.13	Chapter 8: Matrix algebra	Textbook Exercises 8.9 to 8.11, 8.13 and Week 11 Tutorial Exercises

#### Week 12 - 30 May 2022

Module/Topic	Chapter	Events and Submissions/Topic
Revision		Revision and Week 12 Tutorial Exercises

#### Review/Exam Week - 06 Jun 2022

Module/Topic	Chapter	Events and Submissions/Topic
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#### Exam Week - 13 Jun 2022

Module/Topic	Chapter	Events and Submissions/Topic
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## Term Specific Information

Unit Coordinator: Dr Roland Dodd

Email: r.dodd@cqu.edu.au

Phone: (07) 4923 2877

Office location: CQUniversity, North Rockhampton Campus, Building 30, Floor 1, Room 1.18

If you have any individual queries, please do not hesitate to email me and I will get back to you within two working days.

## Assessment Tasks

### 1 Assignment 1

#### Assessment Type

Written Assessment

#### Task Description

This is an individual assignment. Students are reminded that all aspects of work submitted are to be the efforts of their own personal studies.

Please see the unit Moodle site for the questions in this assignment. Assignment 1 will be available for download under the "Assessment" tile on the unit Moodle website, together with complete instructions for online submission of your solutions to the assignment questions.

Marks will be deducted for assignments that are submitted late without an extension request.

Assignments will receive NO marks if submitted after the solutions have been released.

#### Assessment Due Date

Week 4 Friday (1 Apr 2022) 5:00 pm AEST

#### Return Date to Students

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

Solutions to this assignment will be made available to students 2 weeks after the due date. Consequently, extension requests greater than 14 days will be denied except under exceptional circumstances.

#### Weighting

20%

#### Assessment Criteria

The final Assignment 1 mark is scaled to an assessment weighting out of maximum of 20%. Questions are awarded full marks if they are error-free, partial marks if there are some errors, and no marks if not attempted or contain so many errors as to render the attempt to be without value.

Answers to all questions should be neatly and clearly presented and full working is required to obtain maximum credit for solutions.

#### Referencing Style

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

#### Submission

Online

#### Submission Instructions

Assignment 1 is uploaded as a single PDF document to the unit Moodle site for MATH11218. Full details are provided on the unit Moodle site.

#### Learning Outcomes Assessed

- Determine solutions to problems involving algebraic techniques and vectors
- Communicate results, concepts and ideas in context using mathematics as a language
- Apply mathematical software to visualise, analyse, validate and solve problems.

### 2 Assignment 2

#### Assessment Type

Written Assessment

**Task Description**

This is an individual assignment. Students are reminded that all aspects of work submitted are to be the efforts of their own personal studies.

Please see the unit Moodle site for the questions in this assignment. Assignment 2 will be available for download under the "Assessment" tile on the unit Moodle website, together with complete instructions for online submission of your solutions to the assignment questions.

Marks will be deducted for assignments that are submitted late without an extension request. Assignments will receive NO marks if submitted after the solutions have been released.

**Assessment Due Date**

Week 10 Friday (20 May 2022) 5:00 pm AEST

**Return Date to Students**

It is envisaged that feedback will be available within two weeks, or as soon as the marking process is completed. Solutions to this assignment will be made available to students 2 weeks after the due date. Consequently, extension requests greater than 14 days will be denied except under exceptional circumstances.

**Weighting**

20%

**Assessment Criteria**

The final Assignment 2 mark is scaled to an assessment weighting out of maximum of 20%. Questions are awarded full marks if they are error-free, partial marks if there are some errors, and no marks if not attempted or contain so many errors as to render the attempt to be without value.

Answers to all questions should be neatly and clearly presented and full working is required to obtain maximum credit for solutions.

**Referencing Style**

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

**Submission**

Online

**Submission Instructions**

Assignment 2 is uploaded as a single PDF document to the unit Moodle site for MATH11218. Full details are provided on the unit Moodle site.

**Learning Outcomes Assessed**

- Solve problems by applying the properties of linear, quadratic, logarithmic and exponential functions
- Model periodic phenomena using trigonometric functions
- Solve geometric and engineering problems using complex numbers
- Communicate results, concepts and ideas in context using mathematics as a language
- Apply mathematical software to visualise, analyse, validate and solve problems.

## 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**

Students must score a minimum of 50% of the marks available on the final examination.

**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