



MATH13217 *Linear Algebra and Vectors*

Term 1 - 2024

Profile information current as at 29/07/2024 03:19 pm

All details in this unit profile for MATH13217 have been officially approved by CQU University 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 linear algebra, vectors and complex numbers. You will study matrices and operations, systems of linear equations, and different techniques to solve linear systems. You will also study vectors and operations in the 2D plane and 3D space, and applications in scientific analysis and modelling. Complex numbers and applications will be investigated in this unit too. A focus of this unit is to link linear algebra, vectors and complex numbers to contexts in science and engineering subjects in schools.

Details

Career Level: *Undergraduate*

Unit Level: *Level 3*

Credit Points: 6

Student Contribution Band: 7

Fraction of Full-Time Student Load: 0.125

Pre-requisites or Co-requisites

Prerequisite: MATH12224 Anti-requisite: MATH12172

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 - 2024

- Online

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 Unit evaluation

Feedback

Students were pleased with all aspects of the unit.

Recommendation

Continue to offer a positive supported learning experience.

Feedback from Unit evaluation

Feedback

Unit content is aligned to the Australian curriculum with relevance for students' future teaching career.

Recommendation

Continue to ensure unit content matches the latest Australian mathematics curriculum standards.

Feedback from Discipline Leader (Mathematics and Statistics)

Feedback

Update the unit Moodle site.

Recommendation

Add detailed weekly study instructions and supporting resources to the unit Moodle site.

Unit Learning Outcomes

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

1. Represent and solve mathematical and scientific problems using matrices and matrix operators
2. Solve systems of linear equations using different techniques of linear algebra
3. Analyse geometric relationships and kinematic behaviours of motion using vectors
4. Solve geometric and scientific problems using complex numbers
5. 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
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
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

MATH13217

Prescribed

Advanced Mathematics for Engineering and Applied Sciences

4th edition (2019)

Authors: William Guo and Yucang Wang

Pearson Australia

Melbourne , Victoria , Australia

ISBN: 9780655700579

Binding: Paperback

MATH13217

Prescribed

Essentials and Examples of Applied Mathematics

Edition: 2nd Ed (2021)

Authors: William Guo

Pearson Australia

Melbourne , Victoria , Australia

ISBN: 9780655703624

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)

Referencing Style

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

For further information, see the Assessment Tasks.

Teaching Contacts

Dushyant Tanna Unit Coordinator

d.tanna@cqu.edu.au

Schedule

Week 1 - 04 Mar 2024

Module/Topic	Chapter	Events and Submissions/Topic
Unit introduction Fundamentals of matrices	Textbook - Advanced Mathematics for Engineering and Applied Sciences (4th Ed.): Sections 2.1.1-2.1.2.1	Read Sections 2.1.1-2.1.2.1 Complete Week 1 exercises

Week 2 - 11 Mar 2024

Module/Topic	Chapter	Events and Submissions/Topic
Matrix multiplications	Textbook - Advanced Mathematics for Engineering and Applied Sciences (4th Ed.): Section 2.1.2.2	Read Section 2.1.2.2 Complete Week 2 exercises

Week 3 - 18 Mar 2024		
Module/Topic	Chapter	Events and Submissions/Topic
Determinants and basic operations	Textbook - Advanced Mathematics for Engineering and Applied Sciences (4th Ed.): Section 2.1.3	Read Section 2.1.3 Complete Week 3 exercises
Week 4 - 25 Mar 2024		
Module/Topic	Chapter	Events and Submissions/Topic
The inverse of a matrix	Textbook - Advanced Mathematics for Engineering and Applied Sciences (4th Ed.): Section 2.1.4	Read Section 2.1.4 Complete Week 4 exercises
Week 5 - 01 Apr 2024		
Module/Topic	Chapter	Events and Submissions/Topic
Linear systems and Cramer's rule	Textbook - Advanced Mathematics for Engineering and Applied Sciences (4th Ed.): Sections 2.2.1-2.2.3	Read Sections 2.2.1-2.2.3 Complete Week 5 exercises
Vacation Week - 08 Apr 2024		
Module/Topic	Chapter	Events and Submissions/Topic
Vacation Week (no class)		
Week 6 - 15 Apr 2024		
Module/Topic	Chapter	Events and Submissions/Topic
Gauss elimination and the method of inverse matrix	Textbook - Advanced Mathematics for Engineering and Applied Sciences (4th Ed.): Sections 2.2.4-2.2.5	Read Sections 2.2.4-2.2.5 Complete Week 6 exercises
Week 7 - 22 Apr 2024		
Module/Topic	Chapter	Events and Submissions/Topic
Concepts and properties of vectors	Textbook for MATH11246 (used in 2021/2022) - Essentials and Examples of Applied Mathematics (2nd Ed.): Sections 8.1.1-8.1.2	Read Sections 8.1.1-8.1.2 Complete Week 7 exercises Assignment 1 Due: Week 7 Wednesday (24 Apr 2024) 5:00 pm AEST
Week 8 - 29 Apr 2024		
Module/Topic	Chapter	Events and Submissions/Topic
Multiplications of vectors	Textbook for MATH11246 (used in 2021/2022) - Essentials and Examples of Applied Mathematics (2nd Ed.): Section 8.1.3	Read Section 8.1.3 Complete Week 8 exercises
Week 9 - 06 May 2024		
Module/Topic	Chapter	Events and Submissions/Topic
Applications of vectors	Textbook for MATH11246 (used in 2021/2022) - Essentials and Examples of Applied Mathematics (2nd Ed.): Sections 8.2	Read Section 8.2 Complete Week 9 exercises
Week 10 - 13 May 2024		
Module/Topic	Chapter	Events and Submissions/Topic
Complex numbers in rectangular systems and applications	Textbook for MATH11246 (used in 2021/2022) - Essentials and Examples of Applied Mathematics (2nd Ed.): Sections 9.1 & 9.4.1-9.4.2	Read Sections 9.1 & 9.4.1-9.4.2 Complete Week 10 exercises
Week 11 - 20 May 2024		
Module/Topic	Chapter	Events and Submissions/Topic

Complex numbers in other systems	Textbook for MATH11246 (used in 2021/2022) - Essentials and Examples of Applied Mathematics (2nd Ed.): Sections 9.2-9.3	Read Sections 9.2-9.3 Complete Week 11 exercises
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Week 12 - 27 May 2024

Module/Topic	Chapter	Events and Submissions/Topic
Unit review and examination preparation		Assignment 2 Due: Week 12 Wednesday (29 May 2024) 5:00 pm AEST

Review/Exam Week - 03 Jun 2024

Module/Topic	Chapter	Events and Submissions/Topic
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Exam Week - 10 Jun 2024

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

Unit Coordinator: Dushyant Tanna

email: d.tanna@cqu.edu.au

Telephone (Office): 07 4930 9821

Office: School of Engineering and Technology, CQUniversity Australia, Building 30/G0.10, Bruce Highway, North Rockhampton Qld, 4701.

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. This assignment is to test student's learning outcomes of topics studied in Weeks 1-6. The assignment details are provided on the Moodle website.

Assessment Due Date

Week 7 Wednesday (24 Apr 2024) 5:00 pm AEST

Return Date to Students

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.
- Due to the increasing number of cases where mathematical solutions can be obtained from software packages, the working that does not follow the approaches taught in this unit will not attract any credit against the question even the solution is correct.

Referencing Style

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

Submission

Online

Submission Instructions

Submit one PDF or word file through the Moodle website.

Learning Outcomes Assessed

- Represent and solve mathematical and scientific problems using matrices and matrix operators
- Solve systems of linear equations using different techniques of linear algebra
- Communicate results, concepts and ideas in context using mathematics as a language.

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 7-11. The assignment details are provided on the Moodle website.

Assessment Due Date

Week 12 Wednesday (29 May 2024) 5:00 pm AEST

Return Date to Students

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.
- Due to the increasing number of cases where mathematical solutions can be obtained from software packages, the working that does not follow the approaches taught in this unit will not attract any credit against the question even the solution is correct.

Referencing Style

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

Submission

Online

Submission Instructions

Submit one PDF or word file through the Moodle website.

Learning Outcomes Assessed

- Analyse geometric relationships and kinematic behaviours of motion using vectors
- Solve geometric and scientific problems using complex numbers
- Communicate results, concepts and ideas in context using mathematics as a language.

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

20 (40% of 50 marks)

Exam Conditions

Open Book.

Materials

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

Calculator - non-programmable, no text retrieval, silent only

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