



MATH1020

Calculus and Linear Algebra II

Session 2, In person-scheduled-weekday, North Ryde 2026

School of Mathematical and Physical Sciences

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	2
<u>General Assessment Information</u>	3
<u>Assessment Tasks</u>	3
<u>Delivery and Resources</u>	6
<u>Unit Schedule</u>	6
<u>Policies and Procedures</u>	7
<u>Changes from Previous Offering</u>	9

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General Information

Unit convenor and teaching staff

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Convenor, calculus lecturer

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Credit points

10

Prerequisites

MATH1010 or MATH1015

Corequisites

Co-badged status

Unit description

The foundations of linear algebra and calculus introduced in MATH1010 are further explored and extended. Topics covered in algebra include: inverse matrices, determinants, vector spaces & subspaces, eigenvalues and eigenvectors and linear transformations. In calculus the topics include: the further development of the concepts of limits, continuity and the derivative, numerical integration, polynomials, and sequences & series. In addition, complex numbers are introduced. Students utilise mathematical software throughout the course to support and enhance problem solving for a variety of theoretical and practical problems.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

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

ULO1: Apply matrix inversion and decomposition methods to determine solutions to systems of linear equations.

ULO2: Analyse vectors and linear maps in spaces of arbitrary dimension, developing concepts such as vector spaces and eigenspaces.

ULO3: Utilise complex numbers and techniques of differentiation and integration to determine and compare properties of single variable and multivariable functions.

ULO4: Analyse the convergence of a wide range of infinite series, including Taylor series.

ULO5: Evaluate problems from a wide variety of applications and apply appropriate algorithmic techniques to obtain solutions.

General Assessment Information

Requirements to Pass This Unit To pass this unit, you must achieve a total mark equal to or greater than 50% across all assessments.

Attendance and participation Regular engagement in all learning activities of the unit is crucial for your success. These activities provide opportunities to deepen your understanding of the material, collaborate with peers, and receive valuable feedback from instructors, to assist in completing the unit assessments. Your active participation not only enhances your own learning experience but also contributes to a vibrant and dynamic learning environment for everyone.

Late Assessment Submission

Late assessments are not accepted in this unit unless a [Special Consideration](#) has been submitted and approved.

Special Consideration

Special Consideration is not necessary for SGTA classes, except those classes in which an assessment is taking place. However, if you miss a weekly SGTA class due to a serious, unavoidable and significant disruption, contact your convenor ASAP as you may be able to attend another class that week.

Assessment Tasks

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
<u>Skills exercise 1</u>	15%	No	In Week 5, during the SGTA for which you are registered	Individual	No	Observed

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
Skills Exercise 2	35%	No	In Week 12, during the SGTA for which you are registered	Individual	No	Observed
Final exam	50%	No	Final Examination Period	Individual	No	Observed

Skills exercise 1

Assessment Type ¹: Problem-based task

Indicative Time on Task ²: 12 hours

Due: **In Week 5, during the SGTA for which you are registered**

Weighting: **15%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

You will undertake exercises designed to develop and assess mathematical skills, reinforcing theoretical knowledge through consistent practice to promote mastery of essential concepts.

On successful completion you will be able to:

- Apply matrix inversion and decomposition methods to determine solutions to systems of linear equations.
- Analyse vectors and linear maps in spaces of arbitrary dimension, developing concepts such as vector spaces and eigenspaces.
- Utilise complex numbers and techniques of differentiation and integration to determine and compare properties of single variable and multivariable functions.
- Analyse the convergence of a wide range of infinite series, including Taylor series.
- Evaluate problems from a wide variety of applications and apply appropriate algorithmic techniques to obtain solutions.

Skills Exercise 2

Assessment Type ¹: Problem-based task

Indicative Time on Task ²: 18 hours

Due: **In Week 12, during the SGTA for which you are registered**

Weighting: **35%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

You will undertake exercises designed to develop and assess mathematical skills, reinforcing

theoretical knowledge through consistent practice to promote mastery of essential concepts.

On successful completion you will be able to:

- Apply matrix inversion and decomposition methods to determine solutions to systems of linear equations.
- Analyse vectors and linear maps in spaces of arbitrary dimension, developing concepts such as vector spaces and eigenspaces.
- Utilise complex numbers and techniques of differentiation and integration to determine and compare properties of single variable and multivariable functions.
- Analyse the convergence of a wide range of infinite series, including Taylor series.
- Evaluate problems from a wide variety of applications and apply appropriate algorithmic techniques to obtain solutions.

Final exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 20 hours

Due: **Final Examination Period**

Weighting: **50%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

You will undertake a final examination during the formal examination period.

On successful completion you will be able to:

- Apply matrix inversion and decomposition methods to determine solutions to systems of linear equations.
- Analyse vectors and linear maps in spaces of arbitrary dimension, developing concepts such as vector spaces and eigenspaces.
- Utilise complex numbers and techniques of differentiation and integration to determine and compare properties of single variable and multivariable functions.
- Analyse the convergence of a wide range of infinite series, including Taylor series.
- Evaluate problems from a wide variety of applications and apply appropriate algorithmic techniques to obtain solutions.

¹ If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment

- [Academic Success](#) for academic skills support.

² Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation.

³ An automatic short extension is available for some assessments. Apply through the [Service Connect Portal](#).

Delivery and Resources

Classes • Lectures (beginning in Week 1): There are two one-hour lectures each week. • SGTA classes (beginning in Week 2): There is one two-hour SGTA each week.

The timetable for classes can be found on the University website at: <https://publish.mq.edu.au/>. Enrolment can be managed using eStudent at: <https://students.mq.edu.au/support/technology/systems/estudent>

Suggested Textbooks

The following textbooks are useful as supplementary resources, for additional questions and explanations. They are available from the Macquarie University library:

- Algebra - *Lay*, Linear Algebra and its Applications.
- Calculus - *Stewart*, Calculus (Metric Version).

Methods of Communication

We will communicate with you via your university email or through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent to your lecturers from your university email address.

Unit Schedule

Indicative weekly schedule

Week	
	Stream 1 -Algebra
1	Matrices (Review), Vectors, Linear Combinations, Elementary Matrices
2	Inverse Matrices, Matrices, LU Decomposition, Determinants
3	Linear Dependence, Vector Spaces & Subspaces, Bases
4	Dimension, Eigenvalues & Eigenvectors, Eigenspaces
5	Diagonalisation, Linear Transformations
6	Matrix of a Linear Transformations, Composition of Linear Transformations
	Stream 2 - Calculus

7	Limits, Improper Integrals, Continuity
8	IVT, Newton's Method, Rolle's Theorem, MVT, Numerical Integration, Complex Numbers
9	Argand Plane, Polar Form, De Moivre's Theorem, Polynomials
10	Polynomials, Taylor Polynomials, Infinite Series
11	Functions of Several Variables, Partial Derivatives
12	Directional Derivatives, Extrema, 2nd order ODEs, Systems of ODEs

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://policies.mq.edu.au) (<https://policies.mq.edu.au>). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies](https://students.mq.edu.au/support/study/policies) (<https://students.mq.edu.au/support/study/policies>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central](https://policies.mq.edu.au) (<https://policies.mq.edu.au>) and use the [search tool](#).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit connect.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

Academic Success

[Academic Success](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Ask a Study Coach](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via the [Service Connect Portal](#), or contact [Service Connect](#).

IT Help

For help with University computer systems and technology, visit <https://students.mq.edu.au/support/technology/service-desk>.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

Changes from Previous Offering

The assessments have been modified so that students and other stakeholders can have greater confidence in the assurance of learning.

Unit information based on version 2026.04 of the [Handbook](#)