



# MATH1000

## Introduction to Mathematical Modelling

Session 1, In person-scheduled-weekday, North Ryde 2025

*School of Mathematical and Physical Sciences*

### Contents

---

<a href="#"><u>General Information</u></a>	2
<a href="#"><u>Learning Outcomes</u></a>	2
<a href="#"><u>General Assessment Information</u></a>	3
<a href="#"><u>Assessment Tasks</u></a>	4
<a href="#"><u>Delivery and Resources</u></a>	6
<a href="#"><u>Unit Schedule</u></a>	7
<a href="#"><u>Policies and Procedures</u></a>	8

---

#### **Disclaimer**

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

## General Information

Unit convenor and teaching staff

Unit convenor

Christopher Gordon

[chris.gordon@mq.edu.au](mailto:chris.gordon@mq.edu.au)

Contact via email

12WW618

See iLearn

Lecturer

Elena Vynogradova

[elena.vynogradova@mq.edu.au](mailto:elena.vynogradova@mq.edu.au)

Contact via email

12WW709

See iLearn

Credit points

10

Prerequisites

Corequisites

Co-badged status

Unit description

This unit is an elementary unit designed for Engineering, Mathematics and Physics students whose mathematics background has not met the recommended standard for students entering these programs. One half of the unit provides an introduction to the ideas and techniques of differentiation and integration which are pervasive in the theoretical and practical models that underpin areas of science, engineering, economics and technology. The other half of the unit develops the algebraic skills and techniques including exponential, logarithmic, and trigonometric functions.

## 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:** Perform calculations, including rates of changes and integrals, of elementary functions used in science and economics (including linear, polynomial, exponential, logarithmic, and trigonometric) and interpret results of these calculations.

**ULO2:** Communicate mathematical concepts, pertaining to foundation level science topics, in a variety of forms including graphically, numerically, in writing and by using equations.

**ULO3:** Apply mathematical reasoning to simple problem solving in the context of elementary algebra and calculus.

**ULO4:** Test mathematical conjectures involving elementary functions.

**ULO5:** Demonstrate foundational learning skills including active engagement in the learning process.

**ULO6:** Create, communicate and interpret the content of mathematical models relevant to foundation level science topics.

## General Assessment Information

### Requirements to Pass this Unit

To pass this unit you need to achieve a total mark equal to or greater than 50% across all assessments.

### Attendance and participation

We strongly encourage all students to actively participate in all learning activities. Regular engagement is crucial for your success in this unit, as 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 Penalty

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark of the task) will be applied for each day a written report or presentation assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. The submission time for all uploaded assessments is 11:55 pm. A 1-hour grace period will be provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, assignments, performance assessments/presentations, and/or scheduled practical assessments/labs, please apply for Special Consideration: <https://connect.mq.edu.au> Assessments where Late Submissions will be accepted:

- Assignment – YES, Standard Late Penalty applies
- Online module exercises - NO, unless Special Consideration is granted
- Final examination - NO, unless Special Consideration is granted

## Special Consideration

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through <https://connect.mq.edu.au>.

Written Assessments/Quizzes/Tests: If you experience circumstances or events that affect your ability to complete the written assessments in this unit on time, please inform the convenor and submit a Special Consideration request through <https://connect.mq.edu.au>.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Assignment</a>	24%	No	18/05/2025
<a href="#">Online module exercises</a>	50%	No	06/06/2025
<a href="#">Final examination</a>	26%	No	Exam Period

## Assignment

Assessment Type <sup>1</sup>: Problem set  
Indicative Time on Task <sup>2</sup>: 15 hours  
Due: **18/05/2025**  
Weighting: **24%**

The assignment will test the ability of students to solve mathematical problems using concepts and techniques learnt in the unit.

On successful completion you will be able to:

- Perform calculations, including rates of changes and integrals, of elementary functions used in science and economics (including linear, polynomial, exponential, logarithmic, and trigonometric) and interpret results of these calculations.
- Communicate mathematical concepts, pertaining to foundation level science topics, in a variety of forms including graphically, numerically, in writing and by using equations.

- Apply mathematical reasoning to simple problem solving in the context of elementary algebra and calculus.
- Test mathematical conjectures involving elementary functions.
- Demonstrate foundational learning skills including active engagement in the learning process.
- Create, communicate and interpret the content of mathematical models relevant to foundation level science topics.

## Online module exercises

Assessment Type <sup>1</sup>: Practice-based task

Indicative Time on Task <sup>2</sup>: 40 hours

Due: **06/06/2025**

Weighting: **50%**

In the online exercises the student will demonstrate mastery of skills and techniques in the module work at the pass and credit level.

On successful completion you will be able to:

- Perform calculations, including rates of changes and integrals, of elementary functions used in science and economics (including linear, polynomial, exponential, logarithmic, and trigonometric) and interpret results of these calculations.
- Apply mathematical reasoning to simple problem solving in the context of elementary algebra and calculus.
- Test mathematical conjectures involving elementary functions.
- Demonstrate foundational learning skills including active engagement in the learning process.

## Final examination

Assessment Type <sup>1</sup>: Examination

Indicative Time on Task <sup>2</sup>: 20 hours

Due: **Exam Period**

Weighting: **26%**

The exam will test the ability of students to utilize concepts and techniques learnt in the unit at the distinction and high distinction level.

On successful completion you will be able to:

- Perform calculations, including rates of changes and integrals, of elementary functions used in science and economics (including linear, polynomial, exponential, logarithmic, and trigonometric) and interpret results of these calculations.
- Communicate mathematical concepts, pertaining to foundation level science topics, in a variety of forms including graphically, numerically, in writing and by using equations.
- Apply mathematical reasoning to simple problem solving in the context of elementary algebra and calculus.
- Test mathematical conjectures involving elementary functions.
- Demonstrate foundational learning skills including active engagement in the learning process.
- Create, communicate and interpret the content of mathematical models relevant to foundation level science topics.

---

<sup>1</sup> 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
- the [Writing Centre](#) for academic skills support.

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

## Delivery and Resources

### Classes

- Lectures (beginning in Week 1): There is one one-hour lecture each week. • SGTA classes (beginning in Week 1)

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

No single book covers the content of MATH1000 precisely. Each of the following books (see links on the unit iLearn page) contains material useful and relevant to the unit.

\* Boelkins, Matthew Active Prelude to Calculus <https://activecalculus.org/prelude/book-1.html>

\* Boelkins, Matthew Active Calculus <https://activecalculus.org/single/book-1.html>

\* Hughes-Hallett, Deborah Calculus Seventh edition (or any other edition) Available online through the library

## 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

### Module 1 (Weeks 1-2)

- Sets
- Algebra skills

### Module 2 (Weeks 3-4)

- Common functions
- Domain and range
- Transformations
- Compositions
- Linear functions
- Quadratics
- Polynomials Inequalities

### Module 3 (Weeks 5-6)

- Degrees and radians
- Unit circle definition
- Special triangles
- Trig functions
- Inverse trig functions
- Applications

### Module 4 (Weeks 7-8)

- Rates of change
- Derivative rules
- The second derivative
- Curve sketching
- Applications

### Module 5 (Weeks 9-10)

- Proportionality
- Exponentials
- Logarithms
- Series and Sequences
- Applications

### Module 6 (Weeks 11-12)

- Numerical integration
- Fundamental theorem of calculus
- Integration by substitution
- Applications

## 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](http://connect.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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/>

### The Writing Centre

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

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [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 [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/).

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.

---

Unit information based on version 2025.04 of the [Handbook](#)