



MATH1000

Introduction to Mathematical Modelling

Session 1, In person-scheduled-weekday, North Ryde 2024

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>	4
<u>Delivery and Resources</u>	6
<u>Unit Schedule</u>	7
<u>Policies and Procedures</u>	8
<u>Changes from Previous Offering</u>	10
<u>Changes since First Published</u>	10

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

Christopher Gordon

chris.gordon@mq.edu.au

The Bui

the.bui@mq.edu.au

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

TWO LEVEL ASSESSMENT: Each module's initial test/quiz will be online, via the iLearn page. Multiple attempts are allowed; the highest mark counts towards the student's grade. Unlimited attempts are allowed, with a 6-hour wait between attempts. For Modules 2-6 inclusive, any student who achieves a sufficiently high mark in the initial test/quiz will be eligible to sit the distinction level assessment, which will take place on in the time slot labelled "Lecture 2" on your timetable (see iLearn). Passing these distinction level assessments is required for a grade of D or HD, but not for grades of P or Cr.

Requirements to Pass this unit

To pass this unit you must:

- To pass the online module's quiz for each of 1 to 6 modules, and
- Achieve a total mark equal to or greater than 50%, and
- Participate in a minimum of 10 of the 12 weekly SGTA classes.

Hurdle Assessments

Assessment 1: Passing of all online quizzes for each of 1 to 6 modules is a hurdle requirement to pass this unit. Details of the hurdle mark will be provided on the iLearn page of the unit.

Assessment 2: Practice-based task (0%)

Development of knowledge and skills requires continual practice. During SGTAs you will practice a range of mathematical techniques. To pass this hurdle assessment, you must be able to demonstrate your progress in developing and communicating knowledge and skills in 10 of the 12 SGTAs. This is a hurdle assessment meaning that failure to meet this requirement may result in a **fail** grade for the unit. Students are permitted up to two absences: **additional absences will require a Special Consideration to be applied for** (see below).

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 ask.mq.edu.au.

Modules' Tests/Quizzes: 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 ask.mq.edu.au.

Participation in SGTA classes: To pass the unit you need to demonstrate ongoing development of skills and application of knowledge in 10 out of 12 of the weekly SGTA classes. 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. If it is not possible to attend another class, you should still contact your convenor for access to class material to review in your own time. Note that a Special Consideration should only be applied for if you miss more than two of the weekly practical classes.

Assessment Tasks

Name	Weighting	Hurdle	Due
Foundation module test	0%	Yes	Week 4
Module tests	100%	Yes	At the conclusion of each module for modules 2 through 6
Participation in SGTA classes	0%	Yes	Weekly

Foundation module test

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 5 hours

Due: **Week 4**

Weighting: **0%**

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

This unit begins with a module containing foundational material. Students are required to demonstrate mastery of this material, which the remainder of the unit will build upon.

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.

Module tests

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 25 hours

Due: **At the conclusion of each module for modules 2 through 6**

Weighting: **100%**

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

This unit consists of modules. At the end of each module there is a Module test, in which the student is required to demonstrate mastery of the material covered in that module.

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.

Participation in SGTA classes

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 0 hours

Due: **Weekly**

Weighting: **0%**

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

Development of knowledge and skills requires continual practice. During SGTAs you will practice a range of mathematical techniques. To pass this hurdle assessment, you must be able to demonstrate your progress in developing and communicating knowledge and skills in 10 out of 12 SGTAs.

On successful completion you will be able to:

- Demonstrate foundational learning skills including active engagement in the learning process.

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
- the [Writing Centre](#) 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

Delivery and Resources

Classes

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

SGTA classes (beginning in Week 1): Students must register in and attend one two-hour class per week. This is a hurdle requirement. Participation in 10 of the SGTAs is a hurdle requirement for the unit.

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.

'Main textbook (highly recommended but not compulsory) *Calculus - single & multi variable*, Hughes-Halley, Gleason & McCallum (7th edition), John Wiley. The library allow you to download a significant portion of the book. On the advanced search link for multi search, put in the title "calculus" and the author "Hughes-Hallett", and it is the first result. (You will see "7 versions of this record exist."). Choosing the seventh edition takes you to where you can obtain online access, and download or view pdfs.

As indicated in the title, the text is predominantly calculus. However, Chapter 1 contains excellent material for the algebra part of the unit, covering exponential, logarithms, trigonometry, and polynomials. Later sections in the text cover geometric series.

COVID Information

For the latest information on the University's response to COVID-19, please refer to the Coronavirus infection page on the Macquarie website: <https://www.mq.edu.au/about/coronavirus-faqs>. Remember to check this page regularly in case the information and requirements change during semester. If there are any changes to this unit in relation to COVID, these will be communicated via iLearn.

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 ask.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/>

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 [AskMQ](#), 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/.

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

SGTAs are running from week 1 in 2024 S1.

Changes since First Published

Date	Description
09/02/2024	SGTAs are running from week 1.

Unit information based on version 2024.02 of the [Handbook](#)