WMAT135

Mathematics 1A

MUIC Term 4 2016

Macquarie University International College

Contents

General Information

Unit convenor and teaching staff
Teacher
Matthew Tydd
matthew.tydd@mq.edu.au
Contact via Email

Onur Ates
onur.ates@mq.edu.au

Credit points
3

Prerequisites

Corequisites

Co-badged status

Unit description
This unit is essential for students in science and technology. Part of the unit includes a brief discussion on complex numbers and congruences, with the main topic being linearity and the interplay between algebra and geometry. Plane geometry is used to motivate the study of systems of linear equations. Algebraic techniques involving matrices and determinants are then developed to study these problems further. Students then go on to study geometrical problems in 3-dimensional space. The notion of a limit is developed to a more detailed level than in secondary school mathematics, and this is used to study the differential and integral calculus involving functions of one real variable to a far greater depth.

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:

Demonstrate a well-developed knowledge of the elementary principles, concepts and techniques of calculus, using a range of relevant algebraic techniques, and an understanding of the behaviour of the standard elementary mathematical functions under these operations.

Demonstrate an understanding of the key concepts of limit and continuity, and be able to

compute a wide range of limits.

Demonstrate an understanding of the key concept of derivative as a rate of change, and be able to calculate derivatives for a wide range of functions, using the relevant methods. Be able to solve a broad range of mathematical problems involving differentiation.

Demonstrate an understanding of the key concept of integral as accumulated change, and be able to calculate integrals of a wide range of functions, using the relevant methods. Be able to solve a broad range of mathematical problems involving integration.

Demonstrate an understanding and constructing elementary mathematical arguments, using the concepts and techniques studied in this unit.

Demonstrate a reasonable understanding of the applications of the above concepts and techniques in other disciplines, in particular in Physics and Engineering.

Express mathematical ideas clearly and logically and provide appropriate justification for your conclusions.

Use discipline specific terminology to communicate concepts and ideas relevant to this unit

General Assessment Information

Grading

Students will receive a Standardised Numerical Grade (SNG) that reflects the extent to which student attainment matches the descriptors as per the Macquarie University Grading Policy.. This unit will use the following grades which will be aligned with the listed numerical range:

- HD - High Distinction (85-100)
- D - Distinction (75-84)
- Cr - Credit (65-74)
- P - Pass (50-64)
- F - Fail (0-49)

Requirements to Pass

In order to pass this unit a student must:

- Pass the final examination or final assessment task
- Achieve a Standard Numerical Grade (SNG) of 50 or more in the unit
- Attend at least 80% of scheduled classes
- Attempt all assessment tasks in unit

For further details about grading, please refer to the Grading Policy.

Submission of Assessment Tasks

Assessments must be submitted following instructions provided in class. Assessment tasks which have not been submitted as required will not be marked. They will be considered a non-submission and zero marks will be awarded.

Turnitin

Turnitin compares electronically submitted papers to a database of academic publications, internet sources and other papers that have been submitted into the system to identify matching text. It then produces an Originality Report which identifies text taken from other sources and generates a similarity percentage to judge whether plagiarism has occurred (see Academic Honesty section below).

Multiple submissions may be possible via Turnitin prior to the due date of an assessment and originality reports may be made available to students. In such cases they should be used to check work for plagiarism prior to a final submission.

Where there is a requirement for assessment tasks to be submitted through Turnitin, it is the student's responsibility to ensure that work is submitted correctly prior to the due date. Hard copies will not be accepted unless indicated otherwise by a teaching staff member. Records in Turnitin will be taken as records of submission. For assistance submitting through Turnitin, you may approach your teacher, lodge a OneHelp Ticket, refer to the IT help page or seek assistance from Student Connect.

Students should note that for a first time submission the Originality Report will be available immediately post submission but for any subsequent submissions it may take 24 hours or longer for the report to be generated. This may be after the due date so students should plan their submission carefully.

Missed Assessments

The University recognises that students may experience unexpected events and circumstances that adversely affect their academic performance in assessment activities, for example illness. In order to support students who have experienced a serious and unavoidable disruption, the University will provide affected students with an additional opportunity to demonstrate that they have met the learning outcomes of a unit. An additional opportunity provided under such circumstances is referred to as special consideration.

The Disruption to Studies Policy applies only to *serious and unavoidable* disruptions that arise after a study period has commenced. Students with a pre-existing disability/health condition or prolonged adverse circumstances may be eligible for ongoing assistance and support. Such support may be sought through Campus Wellbeing and Support Services.

Serious and Unavoidable Disruption The University classifies a disruption as **serious and unavoidable** if it:

- could not have reasonably been anticipated, avoided or guarded against by the student; and
- was beyond the student's control; and

- caused substantial disruption to the student's capacity for effective study and/or completion of required work; and

- occurred during an event critical study period and was at least three (3) consecutive days duration, and / or

- prevented completion of a final examination.

To be eligible for Special Consideration, a student must notify the University of a *serious and unavoidable* disruption within five (5) working days of the commencement of the disruption (Disruption to Studies notification).   All Disruption to Studies notifications are to be made online via the University's Ask MQ system. A Disruption to Studies notification must be supported by documentary evidence.

In submitting a Disruption to Studies notification, a student is acknowledging that they may be required to undertake additional work. The time and date, deadline or format of any required extra assessable work as a result of a disruption to studies notification is not negotiable and in submitting a disruption to studies notification, a student is agreeing to make themselves available to complete any extra work as required.

Please refer to the Disruption to Studies Policy for further details.

Extensions & Late Submissions

To apply for an extension of time for submission of an assessment item, students must submit a Disruptions to Studies notification via ask.mq.edu.au.

Late submissions without an approved extension are possible but will be penalised at 20% per day up to 4 days (weekend inclusive). If a student submits an assessment task 5 or more days after the due date without grounds for special consideration (See Disruptions to Studies Policy) a record or submission will be made but the student will receive zero marks for the assessment task.

Final Examinations and Final Assessment Tasks

Final exams and final assessments will typically take place in Week 6 or Monday of Week 7. All students enrolled in a teaching session are expected to ensure they are available up until and including Monday of Week 7 to undertake examinations. Passing the final exam or final assessment task is a requirement to pass this unit.

Details of teaching session dates can be found on the Important Dates calendar. Due dated for assessments will be available in the unit guide and final examination timetables will be released to students prior to Week 5.

Planning for an exam is very important. All students should be familiar with the Exam Rules. In addition, students should refer to the below links for other important examination related information.

- Talk to your lecturer
- Revision tips
- What to bring with you

- What not to bring with you
- Where to get help
- Tips for Success

It is not uncommon for students to have two examinations in one day.

Conduct During Assessments and Examinations

Students must adhere to the Student Code of Conduct and Academic Honesty Policy at all times.

Students will be provided with instructions relating to conduct during in-class assessment tasks. For all examinations, students will be required to:

- provide photographic proof of identity for the duration of the examination. This must be visible at all times during the examination.
- leave mobile phones, electronic devices, bags, computers, notes, books and similar items outside a final examination venue or in a designated space
- ensure any water brought into the examination room is in a clear and unmarked bottle
- obey all instructions provided by an Examination Supervisor
- refrain from communicating in any way with another student once they have entered the examination venue.

Students are NOT permitted:

- into an examination venue once one hour from the time of commencement (excluding any reading time) has elapsed
- to leave an examination venue *before* one hour from the time of commencement (excluding any reading time) has elapsed
- to be readmitted to an examination venue unless they were under approved supervision during the full period of their absence
- to obtain or attempt to obtain assistance in undertaking or completing the examination script
- to receive or attempt to receive assistance in undertaking or completing the examination script.

Students should also ensure they follow all requirements of the Final Examination Policy.

Supplementary Examinations

Supplementary final examinations are held during the scheduled Supplementary Final exam Period. This may fall in Week 7 or within the first week of the subsequent teaching term. Results for supplementary exams may not be available for up to two weeks following the supplementary examination. Students in their final term of study who undertake supplementary final exams should note that formal completion of their Diploma Program will not be possible until

supplementary results are released and this may impact on their ability to enrol in subsequent units or programs of study on time.

Retention of Originals

It is the responsibility of the student to retain a copy of any work submitted and produce another copy of all work submitted if requested. Copies should be retained until the end of the grade appeal period each term.

In the event that a student is asked to produce another copy of work submitted and is unable to do so, they may be awarded zero (0) for that particular assessment task.

The University may request and retain the originals of any documentation or evidence submitted to support notifications of disruptions to studies. Requests for original documentation will be sent to the applicant's student email address within six (6) months of notification by the student. Students must retain all original documentation for the duration of this six (6) month period and must supply original documents to the University within ten (10) working days of such a request being made.

Contacting Teaching Staff and Obtaining Help and Feedback

Students may contact teaching staff at any time during the term by using the contact details provided in this guide.

For all university related correspondence, students are required to use their official Macquarie University student email account which may be accessed via the Macquarie University Student Portal. Inquiries from personal email accounts will not be attended to.

Students may seek additional feedback at any time during the term and general feedback about their performance in a unit up to 6 months following results release.

Assessment Tasks

Name	Weighting	Due
Assignments	30%	Last lesson of Week 1, 3 and 5
Class work	15%	Ongoing
Quizzes	25%	Week 1, 2, 3, 4 and 5
Exam	30%	MUIC Examination Period

Assignments

Due: **Last lesson of Week 1, 3 and 5**
Weighting: **30%**

Three assignments.

These are due in the last lesson of weeks 1, 3 and 5.

On successful completion you will be able to:

- Demonstrate a well-developed knowledge of the elementary principles, concepts and techniques of calculus, using a range of relevant algebraic techniques, and an understanding of the behaviour of the standard elementary mathematical functions under these operations.
- Demonstrate an understanding of the key concepts of limit and continuity, and be able to compute a wide range of limits.
- Demonstrate an understanding of the key concept of derivative as a rate of change, and be able to calculate derivatives for a wide range of functions, using the relevant methods. Be able to solve a broad range of mathematical problems involving differentiation.
- Demonstrate an understanding of the key concept of integral as accumulated change, and be able to calculate integrals of a wide range of functions, using the relevant methods. Be able to solve a broad range of mathematical problems involving integration.
- Demonstrate an understanding and constructing elementary mathematical arguments, using the concepts and techniques studied in this unit.
- Demonstrate a reasonable understanding of the applications of the above concepts and techniques in other disciplines, in particular in Physics and Engineering.
- Express mathematical ideas clearly and logically and provide appropriate justification for your conclusions.
- Use discipline specific terminology to communicate concepts and ideas relevant to this unit

Class work

Due: **Ongoing**
Weighting: **15%**

This will consist of:

1 vodcast (video) on a class question. Filmed in class. Minimal editing.

3 written solutions to allocated class exercises.

On successful completion you will be able to:

- Demonstrate a well-developed knowledge of the elementary principles, concepts and techniques of calculus, using a range of relevant algebraic techniques, and an understanding of the behaviour of the standard elementary mathematical functions under these operations.

- Demonstrate an understanding of the key concepts of limit and continuity, and be able to compute a wide range of limits.
- Demonstrate an understanding of the key concept of derivative as a rate of change, and be able to calculate derivatives for a wide range of functions, using the relevant methods. Be able to solve a broad range of mathematical problems involving differentiation.
- Demonstrate an understanding of the key concept of integral as accumulated change, and be able to calculate integrals of a wide range of functions, using the relevant methods. Be able to solve a broad range of mathematical problems involving integration.
- Demonstrate an understanding and constructing elementary mathematical arguments, using the concepts and techniques studied in this unit.
- Demonstrate a reasonable understanding of the applications of the above concepts and techniques in other disciplines, in particular in Physics and Engineering.
- Express mathematical ideas clearly and logically and provide appropriate justification for your conclusions.
- Use discipline specific terminology to communicate concepts and ideas relevant to this unit

Quizzes

Due: **Week 1, 2, 3, 4 and 5**
Weighting: **25%**

5 weekly online quizzes.

These are due at the end of week 1,2,3,4, and 5 and must be completed by the beginning of the last lesson of that week.

On successful completion you will be able to:
- Demonstrate a well-developed knowledge of the elementary principles, concepts and techniques of calculus, using a range of relevant algebraic techniques, and an understanding of the behaviour of the standard elementary mathematical functions under these operations.
- Demonstrate an understanding of the key concepts of limit and continuity, and be able to compute a wide range of limits.
- Demonstrate an understanding of the key concept of derivative as a rate of change, and be able to calculate derivatives for a wide range of functions, using the relevant methods. Be able to solve a broad range of mathematical problems involving differentiation.
- Demonstrate an understanding of the key concept of integral as accumulated change, and be able to calculate integrals of a wide range of functions, using the relevant

methods. Be able to solve a broad range of mathematical problems involving integration.

Exam

Due: **MUIC Examination Period**
Weighting: **30%**

End of session exam, covering the entire unit.

Final exams and final assessments will typically take place in Week 6 or Monday of Week 7. All students enrolled in a teaching session are expected to ensure they are available up until and including Monday of Week 7 to undertake examinations. Passing the final exam or final assessment task is a requirement to pass this unit.

On successful completion you will be able to:

• Demonstrate a well-developed knowledge of the elementary principles, concepts and techniques of calculus, using a range of relevant algebraic techniques, and an understanding of the behaviour of the standard elementary mathematical functions under these operations.

• Demonstrate an understanding of the key concepts of limit and continuity, and be able to compute a wide range of limits.

• Demonstrate an understanding of the key concept of derivative as a rate of change, and be able to calculate derivatives for a wide range of functions, using the relevant methods. Be able to solve a broad range of mathematical problems involving differentiation.

• Demonstrate an understanding of the key concept of integral as accumulated change, and be able to calculate integrals of a wide range of functions, using the relevant methods. Be able to solve a broad range of mathematical problems involving integration.

• Demonstrate an understanding and constructing elementary mathematical arguments, using the concepts and techniques studied in this unit.

• Demonstrate a reasonable understanding of the applications of the above concepts and techniques in other disciplines, in particular in Physics and Engineering.

• Express mathematical ideas clearly and logically and provide appropriate justification for your conclusions.

• Use discipline specific terminology to communicate concepts and ideas relevant to this unit

Delivery and Resources

Scheduled Class Time & Timetables

Weekly face to face contact for this unit will be 12 hours per week consisting of 4 lessons of varying duration. (72 hours per term).

Students will be able to enrol in their classes and view their personal timetable via eStudent and may also view general timetable information via Macquarie University's Timetable page.

If any scheduled class falls on a public holiday a make-up lesson may be scheduled. Where appropriate, the instructor may instead organise an online make-up lesson or require students to complete activities outside of class. Scheduled make-up days will be announced in class and attendance will be taken taken where relevant.

Attendance Requirements - All students

All students are required to attend at least 80% of scheduled class time to pass this unit.

Attendance will be monitored in each lesson & students will be able to see their attendance records for a unit via iLearn.

Where a student is present for a part of a lesson (for example arrives late, leaves early, leaves the class frequently or for lengthy periods, engages in inappropriate or unrelated activities or does not participate actively in the majority of the lesson) the teacher reserves the right to mark a student absent for that part of the lesson.

Because of the intensive nature of this program, students should be aware that their attendance in this unit may fall below 80% relatively quickly.

In cases of unavoidable non-attendance due to illness or circumstances beyond control, students should lodge a Disruption to Studies Notification via ask.mq.edu.au within 5 working days and supply relevant supporting documentation, even if they have not missed a formal assessment task. This will ensure that that appropriate records of unavoidable absences can be made.

For further information on attendance, please refer to the Attendance and Study Load Policy.

iLearn

iLearn is Macquarie's online learning management system and a principal resource which will be used throughout the term. Students should access iLearn at least 3 times per week as it will contain important information including:

- Announcements - Teaching staff will communicate to the class using

  iLearn announcements.
- A link to the unit guide for the unit and staff contact details
- Lecture notes and recordings where available
- Learning and teaching activities and resources
- Assessment information
- Tutorial questions and solutions
- Assessment submission tools such as Turnitin
- Other relevant material

For any technical or support issues using iLearn, please contact the IT helpdesk (Ph. 02 9850 4357) or lodge a ticket using OneHelp.

Required and Recommended Texts and Materials

Required:

Calculus, Stewart, 2015 (8th edition). Publisher - Brooks Cole

https://cengage.com.au/product/division/university/title/calculus/isbn/9781285740621

Recommended (for a small portion of the unit):

Linear Algebra and its Applications, Lay, 2015 (5th edition). Publisher: Pearson

http://www.pearson.com.au/9781488688416

Technology Used and Required

- Access to internet (Available on Campus using Macquarie OneNet)
- Access to iLearn
- Access to Macquarie University Library catalogue
- Access to Microsoft Office Word and Excel (available in Labs)
- Cengage online resources for the required textbook

Support Workshops

The Numeracy Centre provides additional workshops for MATH135 students wanting to see more examples and ask further questions while the University is in session. A support workshop may be provided for WMAT135 students in certain sessions, details will be provided on iLearn. Attendance is strongly recommended.

Unit Schedule

Week 1

  1.1 Revision

  1.2 Functions

  1.3 Trigonometry

  1.4 Trigonometry

Week 2

  2.1 Limits

  2.2 Continuity

  2.3 Differentiation

  2.4 Differentiation

Week 3

  3.1 Implicit differentiation

3.2 Mean Value Theorem

3.3 Integration

3.4 Integration

Week 4

4.1 Integration

4.2 Integration

4.3 Vectors

4.4 Systems of Linear Equations

Week 5

5.1 ODEs, Separation

5.2 Linear first order DEs

5.3 Counting

5.4 Counting

Week 6

6.1 Induction

6.2 Revision

6.3 Revision

FINAL EXAM

Final exams and final assessments will typically take place in Week 6 or Monday of Week 7. All students enrolled in a teaching session are expected to ensure they are available up until and including Monday of Week 7 to undertake examinations. Passing the final exam or final assessment task is a requirement to pass this unit.

Learning and Teaching Activities

MATH135 Workshop

There is a weekly optional workshop provided by the Numeracy Centre when the University is in session.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

New Assessment Policy in effect from Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy_2016.html. For more information visit http://students.mq.edu.au/events/2016/07/19/ne

w_assessment_policy_in_place_from_session_2/

Assessment Policy prior to Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy.html

Grading Policy prior to Session 2 2016 http://mq.edu.au/policy/docs/grading/policy.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, 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.

Student Support

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

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

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.

Graduate Capabilities

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- Demonstrate an understanding and constructing elementary mathematical arguments, using the concepts and techniques studied in this unit.
- Demonstrate a reasonable understanding of the applications of the above concepts and techniques in other disciplines, in particular in Physics and Engineering.

Assessment tasks

- Assignments
- Class work
- Exam

Learning and teaching activities

- There is a weekly optional workshop provided by the Numeracy Centre when the University is in session.

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcomes

- Demonstrate a reasonable understanding of the applications of the above concepts and

techniques in other disciplines, in particular in Physics and Engineering.

- Express mathematical ideas clearly and logically and provide appropriate justification for your conclusions.

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcome

- Use discipline specific terminology to communicate concepts and ideas relevant to this unit

Learning and teaching activities

- There is a weekly optional workshop provided by the Numeracy Centre when the University is in session.

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Demonstrate a well-developed knowledge of the elementary principles, concepts and techniques of calculus, using a range of relevant algebraic techniques, and an understanding of the behaviour of the standard elementary mathematical functions under these operations.
- Demonstrate an understanding of the key concepts of limit and continuity, and be able to compute a wide range of limits.
- Demonstrate an understanding of the key concept of derivative as a rate of change, and be able to calculate derivatives for a wide range of functions, using the relevant methods. Be able to solve a broad range of mathematical problems involving differentiation.

- Demonstrate an understanding of the key concept of integral as accumulated change, and be able to calculate integrals of a wide range of functions, using the relevant methods. Be able to solve a broad range of mathematical problems involving integration.
- Use discipline specific terminology to communicate concepts and ideas relevant to this unit

Assessment tasks

- Assignments
- Class work
- Quizzes
- Exam

Learning and teaching activities

- There is a weekly optional workshop provided by the Numeracy Centre when the University is in session.

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Demonstrate a well-developed knowledge of the elementary principles, concepts and techniques of calculus, using a range of relevant algebraic techniques, and an understanding of the behaviour of the standard elementary mathematical functions under these operations.
- Demonstrate an understanding of the key concepts of limit and continuity, and be able to compute a wide range of limits.
- Demonstrate an understanding of the key concept of derivative as a rate of change, and be able to calculate derivatives for a wide range of functions, using the relevant methods. Be able to solve a broad range of mathematical problems involving differentiation.
- Demonstrate an understanding of the key concept of integral as accumulated change, and be able to calculate integrals of a wide range of functions, using the relevant methods. Be able to solve a broad range of mathematical problems involving integration.
- Demonstrate an understanding and constructing elementary mathematical arguments,

using the concepts and techniques studied in this unit.

- Demonstrate a reasonable understanding of the applications of the above concepts and techniques in other disciplines, in particular in Physics and Engineering.
- Express mathematical ideas clearly and logically and provide appropriate justification for your conclusions.

Assessment tasks

- Assignments
- Class work
- Quizzes
- Exam

Learning and teaching activities

- There is a weekly optional workshop provided by the Numeracy Centre when the University is in session.

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Demonstrate a well-developed knowledge of the elementary principles, concepts and techniques of calculus, using a range of relevant algebraic techniques, and an understanding of the behaviour of the standard elementary mathematical functions under these operations.
- Demonstrate an understanding of the key concepts of limit and continuity, and be able to compute a wide range of limits.
- Demonstrate an understanding of the key concept of derivative as a rate of change, and be able to calculate derivatives for a wide range of functions, using the relevant methods. Be able to solve a broad range of mathematical problems involving differentiation.
- Demonstrate an understanding of the key concept of integral as accumulated change, and be able to calculate integrals of a wide range of functions, using the relevant methods. Be able to solve a broad range of mathematical problems involving integration.
- Demonstrate an understanding and constructing elementary mathematical arguments,

using the concepts and techniques studied in this unit.

- Demonstrate a reasonable understanding of the applications of the above concepts and techniques in other disciplines, in particular in Physics and Engineering.

- Express mathematical ideas clearly and logically and provide appropriate justification for your conclusions.

Assessment tasks

- Assignments
- Class work
- Quizzes
- Exam

Learning and teaching activities

- There is a weekly optional workshop provided by the Numeracy Centre when the University is in session.

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Demonstrate an understanding and constructing elementary mathematical arguments, using the concepts and techniques studied in this unit.

- Demonstrate a reasonable understanding of the applications of the above concepts and techniques in other disciplines, in particular in Physics and Engineering.

- Express mathematical ideas clearly and logically and provide appropriate justification for your conclusions.

- Use discipline specific terminology to communicate concepts and ideas relevant to this unit

Assessment tasks

- Assignments
- Class work
- Exam

Learning and teaching activities

- There is a weekly optional workshop provided by the Numeracy Centre when the University is in session.

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcome

- Express mathematical ideas clearly and logically and provide appropriate justification for your conclusions.

Assessment tasks

- Assignments
- Class work

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcome

- Express mathematical ideas clearly and logically and provide appropriate justification for your conclusions.

Assessment tasks

- Assignments
- Class work