Science

MATHS 208 : General Mathematics 2 (15 POINTS)

Course Prescription

This sequel to MATHS 108 features applications from the theory of multi-variable calculus, linear algebra and differential equations to real-life problems in statistics, economics, finance, computer science, and operations research. Matlab is used to develop analytical and numerical methods of solving problems.

Course Overview

The course content is split into three major topics: calculus, linear algebra, and differential equations. Each of these is explored in depth, and the connections between the areas are indicated. The course is designed to provide an understanding of many of the mathematical concepts and methods involved in more advanced subjects in Economics, Finance, Statistics, Operations Research, Computer Science, and many other areas. The course also serves as suitable preparation for MATHS 120/130, and thus can be used as a pathway into the mathematics major.

This course could be of interest to students majoring in Economics, Finance, Statistics, Computer Science, Data Science, Operations Research, Chemistry, and other science and commerce majors. Skills and knowledge gained after completion of this course could be beneficial to professionals from a variety of sectors, in particular those that experience fast growth driven by the new technological advances.

Course Requirements

Prerequisite: 15 points from MATHS 108, 150, 153, ENGSCI 111, ENGGEN 150, or MATHS 120 and MATHS 130, or B- or higher in MATHS 110 Restriction: Cannot be taken, concurrently with, or after MATHS 250, 253

Capabilities Developed in this Course

Capability 1:   Disciplinary Knowledge and Practice
Capability 2:   Critical Thinking
Capability 3:   Solution Seeking
Capability 4:   Communication and Engagement
Capability 5:   Independence and Integrity
Capability 6:   Social and Environmental Responsibilities

Graduate Profile: Bachelor of Science

Learning Outcomes

By the end of this course, students will be able to:

1. Compute partial derivatives, directional derivatives, and gradients and use them to solve problems in multivariable calculus. (Capability 1, 2, 3, 4 and 5)
2. Apply convergence tests to study sequences, series, and power series; compute and manipulate Taylor series and Taylor polynomials. (Capability 1, 2, 3, 4 and 5)
3. Use the theory of vector spaces to solve problems involving linear algebra. (Capability 1, 2, 3, 4 and 5)
4. Use integration techniques; use separation of variables, integrating factors, and characteristic equations to solve differential equations and systems of differential equations; apply numerical and qualitative techniques to study first order differential equations. (Capability 1, 2, 3, 4 and 5)
5. Use mathematical notation and terminology logically and correctly. (Capability 1, 2 and 4)
6. Engage in group discussions and critical interactions. (Capability 3, 4 and 6)

Assessments

Assessment Type	Percentage	Classification
Assignments	12%	Individual Coursework
Tutorials	5%	Individual Coursework
Test	20%	Individual Test
Quizzes	13%	Individual Coursework
Final Exam	50%	Individual Examination
5 types	100%	

Assessment Type	Learning Outcome Addressed					
	1	2	3	4	5	6
Assignments	✔	✔	✔	✔	✔	
Tutorials	✔	✔	✔	✔		✔
Test	✔	✔	✔	✔	✔	
Quizzes	✔	✔	✔	✔		
Final Exam	✔	✔	✔	✔	✔	

A minimum mark of 35% on the exam is required to pass the course.

Tuākana

The Tuākana maths programme supports courses in our department. For information please visit https://www.auckland.ac.nz/en/science/study-with-us/maori-and-pacific-at-the-faculty/tuakana-programme/tu_kana-maths.html

Key Topics

This course is split into three broad topics: calculus, linear algebra, and differential equations.

Special Requirements

The course has an evening test which is conducted on campus.

Workload Expectations

This course is a standard 15 point course and students are expected to spend 10 hours per week involved in each 15 point course that they are enrolled in.

For this course, you can expect 3 hours of lectures, a 1 hour tutorial, 3 hours of reading and thinking about the content and 3 hours of work on assignments, quizzes and/or test preparation.

Delivery Mode

Campus Experience

Attendance is expected at tutorials to receive credit for this component of the course.
Lectures will be available as recordings. Other learning activities including tutorials will not be available as recordings.
The course will not include live online events.
Attendance on campus is required for the test.
The activities for the course are scheduled as a standard weekly timetable.

Learning Resources

The MATHS 208 coursebook is available on CANVAS as a pdf, or may be purchased from ubiq, the on-campus bookstore.

Student Feedback

During the course Class Representatives in each class can take feedback to the staff responsible for the course and staff-student consultative committees.

At the end of the course students will be invited to give feedback on the course and teaching through a tool called SET or Qualtrics. The lecturers and course co-ordinators will consider all feedback.

Your feedback helps to improve the course and its delivery for all students.

Digital Resources

Course materials are made available in a learning and collaboration tool called Canvas which also includes reading lists and lecture recordings (where available).

Please remember that the recording of any class on a personal device requires the permission of the instructor.

Academic Integrity

The University of Auckland will not tolerate cheating, or assisting others to cheat, and views cheating in coursework as a serious academic offence. The work that a student submits for grading must be the student's own work, reflecting their learning. Where work from other sources is used, it must be properly acknowledged and referenced. This requirement also applies to sources on the internet. A student's assessed work may be reviewed against online source material using computerised detection mechanisms.

Copyright

The content and delivery of content in this course are protected by copyright. Material belonging to others may have been used in this course and copied by and solely for the educational purposes of the University under license.

You may copy the course content for the purposes of private study or research, but you may not upload onto any third party site, make a further copy or sell, alter or further reproduce or distribute any part of the course content to another person.

Inclusive Learning

All students are asked to discuss any impairment related requirements privately, face to face and/or in written form with the course coordinator, lecturer or tutor.

Student Disability Services also provides support for students with a wide range of impairments, both visible and invisible, to succeed and excel at the University. For more information and contact details, please visit the Student Disability Services' website http://disability.auckland.ac.nz

Special Circumstances

If your ability to complete assessed coursework is affected by illness or other personal circumstances outside of your control, contact a member of teaching staff as soon as possible before the assessment is due.

If your personal circumstances significantly affect your performance, or preparation, for an exam or eligible written test, refer to the University's aegrotat or compassionate consideration page https://www.auckland.ac.nz/en/students/academic-information/exams-and-final-results/during-exams/aegrotat-and-compassionate-consideration.html.

This should be done as soon as possible and no later than seven days after the affected test or exam date.

Learning Continuity

In the event of an unexpected disruption we undertake to maintain the continuity and standard of teaching and learning in all your courses throughout the year. If there are unexpected disruptions the University has contingency plans to ensure that access to your course continues and your assessment is fair, and not compromised. Some adjustments may need to be made in emergencies. You will be kept fully informed by your course co-ordinator, and if disruption occurs you should refer to the University Website for information about how to proceed.

Level 1: Delivered normally as specified in delivery mode
Level 2: You will not be required to attend in person. All teaching and assessment will have a remote option.
Level 3 / 4: All teaching activities and assessments are delivered remotely

Student Charter and Responsibilities

The Student Charter assumes and acknowledges that students are active participants in the learning process and that they have responsibilities to the institution and the international community of scholars. The University expects that students will act at all times in a way that demonstrates respect for the rights of other students and staff so that the learning environment is both safe and productive. For further information visit Student Charter https://www.auckland.ac.nz/en/students/forms-policies-and-guidelines/student-policies-and-guidelines/student-charter.html.

Disclaimer

Elements of this outline may be subject to change. The latest information about the course will be available for enrolled students in Canvas.

In this course you may be asked to submit your coursework assessments digitally. The University reserves the right to conduct scheduled tests and examinations for this course online or through the use of computers or other electronic devices. Where tests or examinations are conducted online remote invigilation arrangements may be used. The final decision on the completion mode for a test or examination, and remote invigilation arrangements where applicable, will be advised to students at least 10 days prior to the scheduled date of the assessment, or in the case of an examination when the examination timetable is published.