SCHOOL of Information and Physical Sciences

MATH1120: Mathematics for Engineering, Science and Technology 2

Callaghan

Semester 2 - 2023

COURSE OUTLINE

OVERVIEW

Course Description

This course covers the mathematics necessary to perform calculations in, and create models for, the real world of Science and Engineering. Specifically, it will demonstrate how to do mathematics in a three-dimensional world. The course describes the fundamental ideas of calculus of functions of one and two variables, differential equations and linear algebra. It continues from MATH1110 to complete a first year of Mathematics suitable for Science and Engineering students, and others for whom Mathematics is a tool.

Students who wish to proceed to further mathematics studies at second year level are recommended to complete MATH2340 after MATH1120.

Requisites

Students must have successfully completed MATH1110 or MATH1210 before they can enrol in this course.

Contact Hours

Callaghan
Lecture
Face to Face On Campus
4 hour(s) per Week for Full Term
These contact hours are for delivery of the course in a semester term. For a summer or winter term the lectures may be delivered in a compressed mode as either face to face or online combined with face to face to face workshops.
Workshop *
Face to Face On Campus
2 hour(s) per Week for 11 Weeks

* This contact type has a compulsory requirement.

Unit Weighting Workload

10
Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

CONTACTS

Course Coordinator

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Teaching Staff

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SYLLABUS

Course Content

1. Sequences, series and approximation.
2. Introduction to functions of more than one variable and partial differentiation.
3. Elementary differential equations and applications.
4. Linear equations and matrices.
5. Eigenvectors and eigenvalues and applications.

Course Learning Outcomes

On successful completion of this course, students will be able to:
1. Apply methods of calculus to solve mathematical problems;

2. Use matrices and eigenvectors to solve problems in linear algebra;

3. Apply common mathematical themes such as linearity to solve problems across the different strands within this course.

Course Materials

Lecture Materials:

- Online lecture notes are available on Canvas

COMPULSORY REQUIREMENTS

In order to pass this course, each student must complete ALL of the following compulsory requirements:

Contact Hour Requirements:

- Workshop There is a compulsory attendance requirement in this course. Students must attend a minimum of 80% of workshops to meet course requirements.

ASSESSMENTS

This course has 4 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Quizzes	Weeks 2-5; 7-8; 10-12: At the end of each workshop (oral quizzes); 23.59pm on Sunday evenings of each week (online quizzes).	Individual	20%	1, 2, 3
2	Examinations	Formal exam period	Individual	40%	1, 2, 3
3	In Class Test 1 - Calculus	Week 6	Individual	20%	1, 2, 3
4	In Class Test 2 - Differential Equations	Week 9	Individual	20%	1, 2, 3

Late Submissions The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.
For logistical reasons, oral quizzes cannot be rescheduled. Students who miss their oral quiz for a legitimate reason will have their mark replaced by an estimate.

Assessment 1 - Quizzes

Assessment Type Quiz
Purpose Mostly formative. To encourage engagement in the workshop and provide weekly feedback on students' progress.
Description Brief Oral quizzes (10%) will be conducted during each workshop.
Online quizzes (10%) will be conducted through Canvas each workshop week. These online quizzes become available on Monday mornings and are due on Sunday evening of the same week. They consist of a combination of multiple-choice and written-answer questions and cover the same material as the workshop. The best 8 of 9 online quizzes will count towards the final score.
Weighting 20%
Length 5 minutes (oral); 30-45 minutes (online)
Due Date Weeks 2-5; 7-8; 10-12:
At the end of each workshop (oral quizzes);
23.59pm on Sunday evenings of each week (online quizzes).
Submission Method In Class
Online
Assessment Criteria Demonstrated engagement and coherent verbal explanations for oral quizzes.
Correct answers to multiple-choice questions and clear explanations for written-answer questions in online quizzes.
Return Method In Class
Online
Feedback Provided Returned Work - Oral quizzes: immediate
Online quizzes: multiple-choice results returned immediately, written-answer questions are returned within 2 weeks. Correctness of answers, formative comments.

Assessment 2 - Examinations

Assessment Type Formal Examination
Purpose Main summative assessment at end of course.
Description Formal invigilated exam, written in person. Contains both multiple-choice and written-answer questions.
Students may bring a non-programmable calculator and a 2-sided A4 sheet of written or typed notes (memory aid).
Weighting 40%
Length 120 minutes

Due Date	Formal exam period
Submission Method	Formal Exam
Assessment Criteria	Correct answers; clear explanations for written-answer questions
Return Method	Not Returned
Feedback Provided	No Feedback

Assessment 3 - In Class Test 1 - Calculus

Assessment Type	In Term Test
Purpose	Summative and formative assessment of the Calculus portion of the work.
Description	Invigilated test written in person during workshop period. Contains both multiple-choice and written-answer questions.
Weighting	20%
Length	90 minutes
Due Date	Week 6
Submission Method	In Class
Assessment Criteria	Correct answers; clear explanations for written-answer questions
Return Method	Online
Feedback Provided	Returned Work - Within 2 weeks. Correctness of answers, sometimes formative comments.

Assessment 4 - In Class Test 2 - Differential Equations

Assessment Type	In Term Test
Purpose	Summative and formative assessment of the Differential Equations portion of the work.
Description	Invigilated test written in person during workshop period. Contains both multiple-choice and written-answer questions.
Weighting	20%
Length	90 minutes
Due Date	Week 9
Submission Method	In Class
Assessment Criteria	Correct answers; clear explanations for written-answer questions
Return Method	Online
Feedback Provided	Returned Work - Within 2 weeks. Correctness of answers, sometimes formative comments.

ADDITIONAL INFORMATION

Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

Attendance	*Skills are those identified for the purposes of assessment task(s). Attendance/participation will be recorded in the following components: - Workshop (Method of recording: myUON app or completion of oral quiz.)
Communication Methods	Communication methods used in this course include: - Canvas Course Site: Students will receive communications via the posting of content or announcements on the Canvas course site. - Email: Students will receive communications via their student email account. - Face to Face: Communication will be provided via face to face meetings or supervision.
Course Evaluation	Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.
Oral Interviews (Vivas)	As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the Oral Examination (viva) Procedure. In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the Student Conduct Rule.
Academic Misconduct	All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to https://policies.newcastle.edu.au/document/view-current.php?id=35.
Adverse Circumstances	The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where: 1. the assessment item is a major assessment item; or 2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system; 3. you are requesting a change of placement; or 4. the course has a compulsory attendance requirement. Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at: https://policies.newcastle.edu.au/document/view-current.php?id=236
Important Policy Information	The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at https://www.newcastle.edu.au/current-students/no-room-for/policies-and-procedures that support a safe and respectful environment at the University.

This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.