School of Information and Physical Sciences

MATH1110: Mathematics for Engineering, Science and Technology 1

Callaghan
Semester 1 - 2024

OVERVIEW

Course Description

This course covers the parts of calculus and algebra which are fundamental to all of mathematics and its applications. In algebra, students learn concepts and symbolic manipulation when calculating with large numbers of variables. In calculus, they learn concepts used when working with continuously changing variables. Both ways of thinking are essential in the mathematics met by students in the Sciences, Engineering and Commerce. These concepts will be further explored in MATH1120.

Academic Progress Requirements

Nil

Requisites

Students must have completed the specified previous studies to enrol in this course.

To enrol in this course, you must meet one of the following requirements

1. Passed MATH1002 or FNMT1002

2. Within two years before the commencement of the course, have achieved one of the following
- A Band 5 or better in the NSW HSC course Mathematics Advanced
- Completion of Extension 1 or Extension 2 Mathematics in the NSW HSC
- a pass in both FMTH001 and FMTH002 (NIC courses)

3. Within 12 months before the commencement of the course, take an invigilated sitting of the Mathematics Placement Test and achieved a mark of 10/20 or better

4. Within 12 months before the commencement of the course, have enrolled in either MATH1110 or MATH1210 but obtained an FF Grade

5. Immediately before the commencement of the course, have obtained approval from the Head of the School of Mathematical and Physical Sciences, on the grounds that you have equivalent qualifications. If you believe you have an equivalent qualification please email the details of your qualification to CESE-SIPS-Admin@newcastle.edu.au.

Contact Hours	**Callaghan** **Lecture** Face to Face On Campus 4 hour(s) per week(s) for 13 week(s) starting Week 1 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(s) for 12 week(s) starting Week 1 Hours indicated are for a semester offering. The Summer offering may be in a F2F compressed mode. * This contact type has a compulsory requirement.
Unit Weighting	10
Workload	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	**Callaghan** Prof Natalie Thamwattana Natalie.Thamwattana@newcastle.edu.au (02) 498 54081 Consultation: by email appointment
Teaching Staff	Other teaching staff will be advised on the course Canvas site.
School Office	**School of Information and Physical Sciences** SR233, Social Sciences Building Callaghan CESE-SIPS-Admin@newcastle.edu.au +61 2 4921 5513 9am-5pm (Mon-Fri)

SYLLABUS

Course Content	1. Differential and integral calculus of functions of one variable 2. Geometry of curves 3. Complex numbers 4. Vectors and their products
Course Learning Outcomes	**On successful completion of this course, students will be able to:** 1. Demonstrate mathematical knowledge and skills in the areas of calculus, functions, vectors and complex numbers. 2. Demonstrate improved analytical ability as compared with level of such in prerequisite subject MATH1002, in particular skills at problem-solving. 3. Apply appropriate techniques of differentiation and integration to various real life problems in engineering, science and technology.
Course Materials	**Other Resources:** - Course notes and task book exercises will be available on the course Canvas site **Recommended Reading:** - James STEWART, Calculus, 7th edn, Brooks Cole, ISBN 9780538497817 - Glynn JAMES, Modern Engineering Mathematics, 4th edn, Pearson, ISBN 9780132391443

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.

SCHEDULE

Week	Week Begins	Topic	Learning Activity	Assessment Due
1	26 Feb	Announcements, Language of mathematics & Functions I	No workshop	No quiz
2	4 Mar	Functions II & Complex numbers I	Workshop topic: Language of Math & Functions I	Quiz on same topic as workshop. Oral quiz due in workshop. Online quiz due at the end of the week.
3	11 Mar	Complex numbers II & Complex numbers III	Workshop topic: Functions II & Complex numbers I	Quiz on same topic as workshop. Oral quiz due in workshop. Online quiz due at the end of the week.
4	18 Mar	Complex numbers IV & Vectors I	Workshop topic: Complex numbers II & Complex numbers III	Quiz on same topic as workshop. Oral quiz due in workshop. Online quiz due at the end of the week.
5	25 Mar	Vectors II & Vectors III	Workshop topic: Complex numbers IV & Vectors I	Quiz on same topic as workshop. Online quiz due at the end of the week. No oral quiz in workshop.
6	1 Apr	Optional Q&A	Workshop topic: Vectors II & Vectors III	Quiz on same topic as workshop. Online quiz due at the end of the week. No oral quiz in workshop.
7	8 Apr	Vectors IV & Vectors V	Midterm test during workshop time	Midterm test during workshop time. No quiz
Mid-Semester Recess				
Mid-Semester Recess				
8	29 Apr	Limits & Differentiation I	Workshop topic: Vectors IV & Vectors V	Quiz on same topic as workshop. Oral quiz due in workshop. Online quiz due at the end of the week.
9	6 May	Differentiation II & III	Workshop topic: Limits & Differentiation I	Quiz on same topic as workshop. Oral quiz due in workshop. Online quiz due at the end of the

				week.
10	13 May	Differentiation IV & V	Workshop topic: Differentiation II & III	Quiz on same topic as workshop. Oral quiz due in workshop. Online quiz due at the end of the week.
11	20 May	Integration I & Integration II	Workshop topic: Differentiation IV & V	Quiz on same topic as workshop. Oral quiz due in workshop. Online quiz due at the end of the week.
12	27 May	Integration III & Integration IV	Workshop topic: Integration I & Integration II	Quiz on same topic as workshop. Oral quiz due in workshop. Online quiz due at the end of the week.
13	3 Jun	Optional Q&A	Workshop topic: Integration III & Integration IV	Quiz on same topic as workshop. Oral quiz due in workshop. Online quiz due at the end of the week.
Examination Period				
Examination Period				

ASSESSMENTS

This course has 3 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Examination	Formal examination period	Individual	40%	1, 2, 3
2	Quizzes	Canvas quiz (20%): End of the week, Weeks 2-6 and 8-13 (see schedule). Oral quiz (10%): During workshop time in Weeks 2-4 and 8-13 (no time limit).	Individual	30%	1, 2, 3
3	Mid Semester Test	Week 7 during workshops.	Individual	30%	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.

Assessment 1 - Examination

Assessment Type	Formal Examination
Purpose	To test individual student's knowledge of the course material and their analytical and problem-solving ability
Description	A formal test covers content from Week 1 to Week 12. No calculators are permitted. A double-sided A4 summary sheet is permitted.
Weighting	40%
Length	120 minutes
Due Date	Formal examination period
Submission Method	Formal Exam
Assessment Criteria	Mathematical correctness and clarity of presentation.
Return Method	Not Returned
Feedback Provided	No Feedback

Assessment 2 - Quizzes

Assessment Type	Quiz
Purpose	To provide regular work and feedback for student learning
Description	Each quiz covers the material covered in the lectures of the preceding week.
	Canvas quiz (20%): 11 online quizzes in total in weeks 2-6 and 8-13, each quiz covers the material covered in the lectures of the preceding week. All quizzes are open book.
	Oral quiz (10%): During workshops of weeks 2-4 and 8-13. Students are required to complete a particular set of questions from the workshop sheet on the white board to be marked by workshop demonstrators immediately.
Weighting	30%
Length	30 minutes for each Canvas quiz
Due Date	Canvas quiz: End of the week, Weeks 2-6 and 8-13 (see schedule).
	Oral quiz: During workshop time in Weeks 2-4 and 8-13 (no time limit).
Submission Method	In Class
	Online
	In Canvas for online quiz and in class for oral quiz
Assessment Criteria	Mathematical correctness and students' understanding of mathematical contents
Return Method	In Class
	Online
Feedback Provided	Online in Canvas for online quiz and in class for oral quiz.

Assessment 3 - Mid Semester Test

Assessment Type	In Term Test
Purpose	To test individual student's knowledge of the course material as well as their analytical problem-solving ability
Description	A formal test held during Week 7 workshop time. The multiple choice and written answer questions cover content from Week 1 to Week 5. No calculators are permitted. A double-sided A4 summary sheet is permitted.
Weighting	30%
Length	90 minutes
Due Date	Week 7 during workshops.
Submission Method	In Class
	The midterm test is paper based and submitted to the workshop demonstrator.
Assessment Criteria	Mathematical correctness and clarity of presentation.
Return Method	In Class
Feedback Provided	In Class - Workshop Week 9.

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.

*Skills are those identified for the purposes of assessment task(s).

Attendance

Attendance/participation will be recorded in the following components:
- Workshop (Method of recording: UON Attendance check-in App and manual check-in by demonstrator)

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.

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.

As a result of student feedback, the following changes have been made to this offering of the course:
- Extended time to complete online quizzes.

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/respect-at-uni/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.