

MATH3120: Algebra

Callaghan

Semester 1 - 2024



OVERVIEW

Course Description	Extends the application of the familiar algebraic laws for adding and multiplying numbers, matrices and vectors to other contexts. Depending on just which laws are satisfied, the algebraic structures studied are called groups, rings and fields. These concepts underlie much of modern mathematics, and are essential background for research in any area of pure mathematics.
Academic Progress Requirements	Nil
Assumed Knowledge	MATH2340 or MATH2320
Contact Hours	Callaghan Lecture Face to Face On Campus 3 hour(s) per week(s) for 13 week(s) starting Week 1
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.

COURSE OUTLINE

CONTACTS

Course Coordinator **Callaghan**
Dr Stephan Tornier
Stephan.Tornier@newcastle.edu.au
Consultation: e-mail for 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

- Groups and subgroups
- Homomorphisms and factor groups
- Permutation groups
- Groups acting on sets
- Abelian groups
- Rings and modules
- Integral domains
- Fields
- Homomorphisms and factor rings
- Prime ideals and maximal ideals
- Unique factorisation domains

Course Learning Outcomes **On successful completion of this course, students will be able to:**

1. critically evaluate mathematical proofs for correctness and explain their underlying mathematical ideas;
2. devise correct, rigorous mathematical proofs of propositions involving abstract concepts;
3. solve a variety of problems within the field of Algebra;
4. communicate mathematical concepts verbally and in writing

Course Materials

SCHEDULE

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	Examination	Formal Examination Period	Individual	50%	1, 2, 3, 4
2	Oral Presentations	Week 13	Group	15%	1, 4
3	Short Answer Questions	Approximately every two weeks, see Canvas site	Individual	25%	1, 2, 3
4	Mid-Semester Take Home Test	Week 7	Individual	10%	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	Assess your skills at writing short answers and small proofs
Description	Formal examination Covers weeks 1-12 Written short answers
Weighting	50%
Length	120 minutes
Due Date	Formal Examination Period
Submission Method	Formal Exam
Assessment Criteria	Correct solutions, clear and carefully written proofs and explanations
Return Method	Not Returned
Feedback Provided	No Feedback - .

Assessment 2 - Oral Presentations

Assessment Type	Presentation
Purpose	Correct solutions, clear and carefully written proofs and explanations
Description	See Canvas site
Weighting	15%
Length	20
Due Date	Week 13
Submission Method	In Class
Assessment Criteria	Clear, confident and concise writing, speaking and fielding audience questions
Return Method	Not Returned
Feedback Provided	Online - .

Assessment 3 - Short Answer Questions

Assessment Type	Written Assignment
Purpose	Practice writing short answers and small proofs
Description	Regular homework assignments Covers a specific topic, see Canvas site Written short answers
Weighting	25%
Due Date	Approximately every two weeks, see Canvas site
Submission Method	In Class
Assessment Criteria	Correct solutions, clear and carefully written proofs and explanations
Return Method	In Class
Feedback Provided	Returned Work - .

Assessment 4 - Mid-Semester Take Home Test

Assessment Type	In Term Test
Purpose	Assess your skills at writing short answers and small proofs
Description	Take home test Covers weeks 1-6 Written short answers
Weighting	10%
Due Date	Week 7
Submission Method	
Assessment Criteria	Correct solutions, clear and carefully written proofs and explanations
Return Method	In Class
Feedback Provided	Returned Work - .

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).

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/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.

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