

MATH1510: Discrete Mathematics

Callaghan

Semester 2 - 2017



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

OVERVIEW

Course Description

Discrete mathematics is the study of mathematical structures that are discrete, separated or distinct; in contrast with calculus which deals with continuous change. It is an important area of pure and applied mathematics, as well as providing the mathematical basis for the understanding of computers and modern computation. Discrete Mathematics is important in the sciences, where it has increasing application in many areas, an exemplar of which is the understanding of DNA sequences in molecular biology. The Discrete Mathematics course introduces first year students to the basic concepts of discrete mathematics, covering topics such as sets, logic, enumeration methods, probability, recurrence relations, induction and graph theory. The course provides important background for students pursuing a BMath degree. It covers much of the mathematics essential for students majoring in Computer Science or Software Engineering, and is a compulsory course in those degree programs.

Assumed Knowledge

HSC Mathematics (Bands 5 or 6), or equivalent.

Contact Hours

Callaghan

Lecture

Face to Face On Campus

4 hour(s) per Week for Full Term

Workshop

Face to Face On Campus

2 hour(s) per Week for Full Term

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.

COURSE OUTLINE

CONTACTS

Course Coordinator	Callaghan Dr Andrew Morris V125 Andrew.Morris@newcastle.edu.au Consultation: Wednesday and Thursday 2-4pm
Teaching Staff	Other teaching staff will be advised on the course Blackboard site.
School Office	School of Mathematical and Physical Sciences V123, Mathematics Building Callaghan +61 2 4921 5513 (STATISTICS) +61 2 4921 5513 (PHYSICS) +61 2 4921 5515 (MATHS) 9am-5pm (Mon-Fri)

SYLLABUS

Course Content	<ul style="list-style-type: none">• Elementary set theory• Relations and functions• Graph theory• Modular arithmetic• Logic and proofs• Enumeration techniques• Elementary probability theory• Recurrence relations
Course Learning Outcomes	<p>On successful completion of this course, students will be able to:</p> <ol style="list-style-type: none">1. Be able to read, interpret and write some basic mathematical notation2. Be able to recognise and/or construct examples of mathematical objects introduced during the course, such as sets and functions3. Have been introduced to several mathematical models, (e.g. propositional logic, trees) including some of those underlying computing and information technology4. Have had the opportunity to develop capacity in knowing what constitutes a valid argument, and in constructing valid arguments/proofs5. Have had opportunity to develop problem solving skills; and been introduced to ways of thinking useful for simplifying complex situations
Course Materials	<p>Lecture Materials:</p> <ul style="list-style-type: none">- Students enrolled in the course can login http://uonline.newcastle.edu.au/ to access the UoNline site used to support this course. You need to visit the UoNline site on a regular basis for announcements, lecture notes, and assignments. <p>Recommended Texts:</p> <ul style="list-style-type: none">- Discrete Mathematics, Richard Johnsonbaugh. Prentice Hall.- A Course in Combinatorics, J.H. van Lint, R.M Wilson, Cambridge University Press.

SCHEDULE

Week	Week Begins	Topic	Learning Activity	Assessment Due
1	24 Jul	Monday: Sets Tuesday: Graphs	Lecture	
2	31 Jul	Monday: Logic and Proofs Tuesday: Graphs	Lecture and workshop	Assignment 1
3	7 Aug	Monday: Logic and Proofs Tuesday: Graphs	Lecture and workshop	Assignment 2
4	14 Aug	Monday: Sets and Relations Tuesday: Graphs	Lecture and workshop	Assignment 3
5	21 Aug	Monday: Sets and Relations Tuesday: Trees	Lecture and workshop	Assignment 4
6	28 Aug	Monday: Modulo Arithmetic Tuesday: Trees	Lecture and workshop	Assignment 5
7	4 Sep	Monday: Counting Tuesday: Trees	Lecture and workshop	Assignment 6
8	11 Sep	Monday: Counting Tuesday: Algorithms	Lecture and workshop	Assignment 7
Mid Semester Break				
Mid Semester Break				
9	2 Oct	Monday: Public Holiday Tuesday: Algorithms	Lecture	
10	9 Oct	Monday: Counting Tuesday: Recurrence Relations	Lecture and workshop	Assignment 8
11	16 Oct	Monday: Probability Tuesday: Recurrence Relations	Lecture and workshop	Assignment 9
12	23 Oct	Monday: Probability Tuesday: Overflow, additional topics or revision	Lecture and workshop	Assignment 10
13	30 Oct	Monday: Revision Tuesday: Revision	Lecture	
Semester 2 Examinations Week 1				
Semester 2 Examinations Week 2				
Semester 2 Examinations Week 3				

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	Quiz	End of workshops in weeks 2-12	Individual	40%	1, 2, 3, 4, 5
2	Formal examination	Exam Period	Individual	50%	1, 2, 3, 4, 5
3	Written Assignments	In the workshops weeks 2-12	Individual	10%	1, 2, 3, 4, 5

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 - Quiz

Assessment Type	Quiz
Purpose	The purpose and benefit of the quizzes is to provide the students with regular feedback on student learning. These quizzes highlight areas of concern and may stimulate discussion with tutors and lecturers.
Description	One or two questions testing the basic understanding of the concepts introduced in the lectures, and the skills practised in the workshop.
Weighting	40%
Length	20 minutes per quiz
Due Date	End of workshops in weeks 2-12
Submission Method	In Class
Assessment Criteria	The solutions will be assessed according to mathematical correctness and clarity of presentation.
Return Method	In Class
Feedback Provided	In Class - One week after due date. Problematic areas will be discussed in the workshop.

Assessment 2 - Formal examination

Assessment Type	Formal Examination
Purpose	The final formal examination is designed to test the individual student's knowledge of the course material and their ability to describe, analyse and hypothesise from this material.
Description	
Weighting	50%
Length	120 minutes
Due Date	Exam Period
Submission Method	Formal Exam
Assessment Criteria	Marks are awarded in accordance with Table 1 from the Grading Scales in the 2015 Course Management and Assessment Procedure Manual (Policy 000996) at http://www.newcastle.edu.au/policy/000996.html
Return Method	Not Returned
Feedback Provided	No Feedback

Assessment 3 - Written Assignments

Assessment Type	Written Assignment
Purpose	Assignments give students more time to reflect on problems, develop problem-solving skills and help students to study during the week.
Description	Each assignment contains 4 to 5 problems to assess and support the understanding of the material in the corresponding section of the course. The problems contain components that require the application of concepts from the lectures in nontrivial way.
Weighting	10%
Length	4 to 5 questions
Due Date	In the workshops weeks 2-12
Submission Method	In Class Online The Online submission is a record of submission. Students are required to submit a hard copy In Class.
Assessment Criteria	The solutions will be assessed according to mathematical correctness and clarity of presentation.
Return Method	In Class
Feedback Provided	In Class - One week after due date. Problematic areas will be discussed in the workshop.

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:

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.

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 <http://www.newcastle.edu.au/policy/000608.html>.

Adverse Circumstances

You are entitled to apply for special consideration because adverse circumstances have had an impact on your performance in an assessment item. This includes applying for an extension of time to complete an assessment item. Prior to applying you must refer to the Adverse Circumstances Affecting Assessment Items Procedure, available at <http://www.newcastle.edu.au/policy/000940.html>. All applications for Adverse Circumstances must be lodged via the online Adverse Circumstances system, along with supporting documentation.

Important Policy Information

The 'HELP for Students' tab in UoNline contains important information that all students should be familiar with, including various systems, policies and procedures.

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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