

**Mathematical Structures– 6543
Unit Outline 2009**

Faculty of Information Sciences and Engineering

University of Canberra

Australian Government Higher Education (CRICOS)

Registered Provider number: #00212K

This Unit Outline must be read in conjunction with:

- a) *Studying at the University of Canberra: A Guide to Policies and Procedures*, which sets out University-wide policies and procedures, including information on matters such as plagiarism, grade descriptors, moderation, feedback and deferred exams, and is available at <http://www.canberra.edu.au/student-services>
- b) *Guide to Student Services at the University of Canberra*, and is available at <http://www.canberra.edu.au/student-services>
- c) Any additional information specified in section 6f.

1: General Information

1a Unit title: **Mathematical Structures**

1b Unit number: **6543**

1c Semester and year offered: **Semester 1, 2009**

1d Credit point value: **3**

1e Unit level: **2**

1f Name of Unit Convenor and Lecturer and contact details

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Name of Unit Moderator and contact details

Ian Lisle Room 11C9 ph: 6201 2389

Email: Ian.Lisle@canberra.edu.au

1g Administrative contact details

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2: Academic Content

2a Unit description and learning outcomes

Unit description: This unit is concerned with the mathematics behind numerous aspects of modern computing including cryptography, and data communication, compression, storage and retrieval. It covers material chosen from elementary number theory, combinatorics, abstract algebra and information theory, and develops this material as a tool for application in the above areas. The unit lays the foundation for the level-3 unit Coding Theory. It is also relevant to students of secondary mathematics education, as much of the material may be viewed as background for the college curriculum.

Learning outcomes: Students will be expected to be able to demonstrate proficiency in combinatorial reasoning; to appreciate the importance of mathematical proof and be able to devise proofs of their own; to understand the applications of mathematics to real problems in modern computing and be able to apply this understanding to related areas; and to gain a deeper understanding of the important mathematical constructions that are basic to mathematical computation.

2b Prerequisites and/or co-requisites

Students should have passed 0576 Mathematics 2 or 4471 Computing Mathematics 2 or 6698 Discrete Mathematics or the equivalent. Students who don't satisfy these conditions should speak to the unit convenor for further advice.

2c Generic Skills

This unit contributes to the development of skills such as the ability to think analytically and critically about mathematics and its applications.

3: Delivery of Unit and Timetable

3a Delivery mode

The unit will be taught in the standard face-to-face manner over the thirteen teaching weeks of semester. There are three lectures each week. There is one tutorial each week except for week 1. Tutorials will commence in week 2.

Timetable: **Wednesday** 9:30-11:30, 11C43; **Thursday** 14:30-16:30, 11C43.

3b Schedule of topics/lectures/tutorials/practicals/field classes by week

Elementary number theory and public key cryptography will occupy weeks 1-5, approximately. Weeks 6-15 will be concerned with building up to the theory of finite fields with applications to coding theory, cryptography and (possibly) geometry.

4: Unit Resources

4a Lists of required texts/readings

There is no single text. I will be posting and/or handing out detailed notes and other course material as the semester progresses.

4b Materials and equipment

Students will require a basic (non-programmable) scientific calculator.

4c Unit website

The unit website is <http://learnonline.canberra.edu.au/>

In this website I will place course material such as lecture notes, tutorial questions and tutorial solutions. This resource supplements but certainly does **not** replace face-to-face teaching. Please do not use this website as a replacement

5: Assessment

5a Assessment overview

Assessment Item (including exams held in the exam period)	Date	Weighting (to equal 100%)
Class Test 1	Thursday, April 9 – Wk7	20% or 15% or 25%
Class Test 2	Thursday, May 21 –Wk13	20% or 15% or 25%
Final Exam	Exam period	60%

5b Details of each assessment item

In each class test you will be permitted to take ½ a side of A4 original handwritten notes and a standard calculator with no alphabetic keypad. For the final exam you will be permitted 1 A4 side of original handwritten notes and a standard calculator with no alphabetic keypad.

Class Tests: If your class test 1 mark is higher than your class test 2 mark then your class test 1 will be scaled to a mark out of 25 and your class test 2 will be scaled to a mark out of 15 to give an overall class test mark out of 40 for the semester. If your class test 1 mark is lower than your class test 2 mark then these weightings will be reversed. In effect, if you do poorly on one of the class tests you have an excellent opportunity to recover in the other.

The class test mark and the final exam mark will form your composite score. The numerical grade for the unit will be based on your composite score. Once this is done, the grade cut-offs for numerical scores will be: Pass 50, Credit 65, Distinction 75, High Distinction 85. That is, grades will be distributed according to the following table.

Grade	Numerical Grade Equivalent
HD	85 and above
DI	75 - 84
CR	65 – 74
P	50 – 64
Fail	0 – 49

5c Special assessment requirements

None

5d Supplementary assessment

For the University policy on supplementary assessments refer to <http://www.canberra.edu.au/student-services>

If students miss an assessment item due to illness or misadventure and wish to apply for deferred assessment then the unit convenor must be informed within three working days of the missed assessment item. Please refer to the document on the front page of this guide in relation to deferred examinations.

5e Text-matching software

This is not relevant to Mathematical Structures.

6: Student Responsibility

6a Workload

The amount of time you will need to spend on study in this Unit will depend on a number of factors including your prior knowledge, learning skill level and learning style. Nevertheless, in planning your time commitments you should note that for a 3cp Unit the total notional workload over the fifteen week semester is assumed to be 150 hours or an average of 10 hours per week. These hours include time spent in classes. The total workload for Units of different credit point value should vary proportionally. For example, for a 6cp Unit the total notional workload over a fifteen week semester is assumed to be 300 hours or an average of 20 hours per week.

6b Special needs

Students who need assistance in undertaking the unit because of disability or other circumstances should inform the unit convener.

6c Attendance requirements

It is expected that students will attend all lectures and participate in the tutorial. The website is only there to supplement and facilitate lectures and tutorials and does not replace them. In all assessment items the unit convenor will assume close to 100% attendance at all classes.

6d Required IT skills

It is expected that students have some familiarity with the use of a computer.

6e Costs

A suitable non-programmable scientific calculator will be useful. There may be some printing costs.

6f Additional Information

Any material posted on the unit website, including announcements, will be deemed to have been received by the whole class. It is your responsibility to ensure that you are fully informed. Also, it is your responsibility to ensure that you bring a working, non-programmable scientific calculator to tests and the final exam. We will not be supplying these and no consideration can be given to those who come to tests without one. Also, it is your responsibility to read email sent to your student account. If you do not read your student account email it is your responsibility to ensure that email to that address is forwarded to an email address that you do read. Once again, if email is sent to your student account I will assume that you've read it. No consideration can be given for unread email.

7: Student Feedback

All students enrolled in this Unit will have an opportunity to provide anonymous feedback on the Unit at the end of the Semester via the Unit Satisfaction Survey which will be presented to you on OSIS. Your lecturer or tutor may also invite you to provide more detailed feedback through an anonymous questionnaire administered through the University's Teaching and Learning Centre.

8: Authority of this Unit Outline
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Any change to the information contained in Section 2 (Academic content), Section 3 (Delivery of Unit and timetable) and Section 5 (Assessment) of this document, will only be made by the Unit Convener if the written agreement of staff and a majority of students has been obtained; and if written advice of the change is then forwarded to each student enrolled in the Unit at their registered term address. Any individual student who believes him/herself to be disadvantaged by a change is encouraged to discuss the matter with the Unit Convener.