THE UNIVERSITY OF SYDNEY
Semester 2, 2011

Information Sheet for **MATH1004 Discrete Mathematics**

Web Sites
It is important that you regularly check both the Junior Mathematics web site

`http://www.maths.usyd.edu.au/u/UG/JM/`

and the MATH1004 web site

`http://www.maths.usyd.edu.au/u/UG/JM/MATH1004`

Lectures

Times	Location	Lecturer
1 pm Wed & Thurs	New Law 101	A/Prof A Molev, Carslaw room 707

Lectures run for 13 weeks. The last lecture will therefore be on Thursday 27 October.

Consultation times
A/Prof Molev will be available for consultation on Wednesdays 12 noon - 1pm.
(If you are unable to make this scheduled consultation hour, other times may be possible by appointment.)
Duty tutors will also be available. Check the MATH1004 webpage.

Tutorials
Tutorials (one per week) start in week 2. You should attend the tutorial given on your personal timetable. Attendance at tutorials will be recorded. Your attendance will not be recorded unless you attend the tutorial in which you are enrolled.

Tutorial sheets
The tutorial sheets will be available on the MATH1004 webpage. **You must take the current week's sheet to your tutorial.** The sheet must be printed from the web.
Solutions to tutorial exercises for week n will usually be posted on the web by the end of week n.

Assessment
Your final raw mark for this unit will be calculated as follows:

65%:	Exam at end of semester 2.
30%:	Quiz mark.
5%:	Assignment mark.

Your final raw mark is then scaled to produce your final mark. Marks are scaled so that the distribution of grades is consistent with the quality of the class, and the difficulty of the unit, as required by the University.

Examination
There is one examination of 1.5 hours' duration during the examination period at the end of semester 2. Further information about the exam will be made available at a later date.

Quizzes
There are two quizzes, each worth 15% of your final raw mark. Quizzes are held during tutorials, in

week 5 (beginning 22 August) and **week 9** (beginning 19 September).

You should put those dates in your diary now! You must sit for the quiz during the tutorial in which you are enrolled. Your quiz mark will not be recorded if you sit for the quiz in a tutorial in which you are not enrolled (unless you have made an arrangement with the Student Office). If you miss a quiz, then you must go to the Student Office as soon as possible afterwards.

Assignments
One assignment will be marked, and will be worth 5% of your final raw mark. The assignment will be due on **Tuesday 11 October**. Please see page 26 of the Junior Mathematics Handbook for details relating to the submission of assignments.

Text book
KG Choo and DE Taylor. *Introduction to Discrete Mathematics*. Addison Wesley Longman Australia, Melbourne, Vic, Australia, 1998. Available from the Co-op Bookshop.

Any questions?
Before you contact us with any enquiry, please check the FAQ page:

`http://www.maths.usyd.edu.au/u/UG/JM/FAQ.html`

Where to go for help
For administrative matters, go to the **Mathematics Student Office, Carslaw room 520.**
For help with mathematics, see your lecturer, your tutor or a duty tutor.
If you are having difficulties with mathematics due to insufficient background, you should go to the Mathematics Learning Centre (Carslaw room 441).

Objectives

The objectives of this course are:

- to introduce basic concepts of combinatorics - permutations, selections and arrangements;
- to introduce basic operations on Boolean functions and to illustrate how they apply in switching circuit theory and mathematical logic;
- to introduce the concept of generating functions;
- to illustrate how to find solutions of linear recurrence relations.

Outcomes

Students who successfully complete this course should be able to:

- identify combinatorial objects involved in counting problems;
- understand how to find minimal digital or switching circuits representing Boolean functions;
- solve linear recurrence relations by using generating functions or characteristic equations.

Week-by-week outline

The unit follows the textbook fairly closely.
The chapter references in the following table
refer to the textbook by Choo and Taylor.

Week	**Topics**
1	Introduction to the unit. Chapter 1. The Catalan numbers.
2	Chapter 2. Sets.
3	Chapter 3. Functions.
4	Chapter 4. Counting principles. Chapter 5. Ordered selections.
5	Chapter 6. Unordered selections. Chapter 8. Multinomial coefficients.
6	Chapter 7. The inclusion-exclusion principle.
7	Chapter 9. Boolean expressions.
8	Chapter 10. Karnaugh maps. Chapter 12. Digital logic.
9	Chapter 11. Logic.
10	Chapter 13. Mathematical induction.
11	Chapter 14. Generating functions.
12	Chapter 15. Linear recurrence relations.
13	Chapter 19. Catalan numbers (again). Revision.