THE UNIVERSITY OF SYDNEY
Semester 2, 2017

Information Sheet for **MATH1004 Discrete Mathematics**

Websites: It is important that you check both the Junior Mathematics website and the MATH1004 website regularly.

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

Both sites may be accessed through the Learning Management System (Blackboard):

`https://elearning.sydney.edu.au`.

Important announcements relating to Junior Mathematics are posted on the Junior Mathematics page. On the MATH1004 page you will find online resources and other useful links. Announcements regarding assessment tasks will be made on this page at various times throughout the semester.

Lectures: There are 2 different lecture streams. You should attend one stream (that is, two lectures per week), as shown on your personal timetable.

Times	Location	Lecturer	Office
1pm Wed & Thu	New Law LT101	Jacqui Ramagge	Carslaw 523
3pm Wed & 2pm Thu	Merewether LT1	Ruibin Zhang/Ross Ogilvie	Carslaw 722

Lectures run for 13 weeks. The first lecture will be on Wednesday 2nd August. The last lecture will be on Thursday 2nd November.

Consultation times: Consultation times will be posted on 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 and exercise sheets: The question sheets for a given week will be available on the MATH1004 webpage. Solutions to tutorial exercises for week n will usually be posted on the web by the afternoon of the Friday of week n.

Textbook: K. G. Choo and D. E. Taylor. *Introduction to Discrete Mathematics.* Addison Wesley Longman Australia, Melbourne, Vic, Australia, 1998. Available from the Co-op Bookshop.

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

65%:	Exam at end of Semester 2.
15%:	Quiz 1 mark (using the better mark principle).
15%:	Quiz 2 mark (using the better mark principle).
2.5%:	Assignment 1 mark.
2.5%:	Assignment 2 mark.

The *better mark principle* means that for each quiz, the quiz counts if and only if it is better than or equal to your exam mark. If your quiz mark is less than your exam mark, the exam mark will be used for that portion of your assessment instead. For example, if your quiz 1 mark is better than your exam mark while your quiz 2 mark is worse than your exam mark, then the exam will count for 80%, quiz 1 will count for 15%, and the assignments will count for 5% of your overall mark. The assignment marks count for 5% regardless of whether they are better than your exam mark or not.

Final grades are returned within one of the following bands:

> **High Distinction (HD), 85–100:** representing complete or close to complete mastery of the material; **Distinction (D), 75–84:** representing excellence, but substantially less than complete mastery; **Credit (CR), 65–74:** representing a creditable performance that goes beyond routine knowledge and understanding, but less than excellence; **Pass (P), 50–64:** representing at least routine knowledge and understanding over a spectrum of topics and important ideas and concepts in the course.

A student with a passing or higher grade should be well prepared to undertake further studies in mathematics which are dependent on this unit of study.

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 on the website.

Quizzes: Quizzes will be held during tutorials. You must sit for the quiz during the tutorial in which you are enrolled, unless you have a Permission Slip from the Student Services Office, issued only for verifiable reasons. Otherwise, your quiz mark may not be recorded. Quizzes will only be returned in the tutorial you sat the quiz and must be collected by week 13.

Assignments: There are two assignments, which must be submitted electronically, **as PDF files only**, in Turnitin (an internet-based plagiarism-prevention service), via the Learning Management System (Blackboard) website by the deadline. Note that your assignment will not be marked if it is illegible or if it is submitted sideways or upside down. It is your responsibility to check that your assignment has been submitted correctly (check that you can view each page).

Assessment and feedback schedule:

Task	Available	Deadline/date	Latest extension*	Feedback
Assignment 1	Mon 14 Aug	5pm Thu 24 Aug	5pm Thu 31 Aug	9am Mon 4 Sep
Quiz 1		4–5 Sep (Week 6)		11–12 Sep (Week 7)
Quiz 2		9–10 Oct (Week 10)		16–17 Oct (Week 11)
Assignment 2	Mon 9 Oct	5pm Thu 19 Oct	5pm Thu 26 Oct	9am Mon 30 Oct

* Extensions for assignments are only possible for students registered with Disability Services or for approved Special Consideration or Special Arrangements applications.

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 *Student Services Office, Carslaw 520*. For help with mathematics, see your lecturer, your tutor, a duty tutor, or use the Ed discussion forum (`https://edstem.com.au`). Lecturers guarantee to be available during their indicated office hours, but may be available at other times as well. If you are having difficulties with mathematics due to insufficient background, you may seek help from the *Mathematics Learning Centre, Carslaw 177*. You may also email questions about the subject to `MATH1004@sydney.edu.au`. Ensure that any emails that you send to this address contain your name and SID, because anonymous emails will be ignored.

Special consideration and special arrangements: While studying at the University of Sydney, you may need to apply for special consideration or special arrangements as follows:

> Special consideration may be granted to students where well-attested illness, injury, or misadventure occurs to them (or someone they have carer's responsibility for) during the semester or the exam period. Special arrangements may be granted for essential community commitments. Further information on eligibility, document requirements, and how to apply is available at `http://sydney.edu.au/students/special-consideration-and-arrangements.html`. Applications must be made using the University's formal online application process.

Final examinations will be held in the formal examination period. Students affected by illness, injury or misadventure may lodge a request for Special Consideration to sit a replacement examination in the formal Replacement Examination period.

If you are registered with Disability Services and would like to have adjustments applied to the replacement examination, you are required to amend your Academic Plan with Disability Services specifically for this replacement examination. This needs to be done as soon as you are notified of award of the replacement opportunity. If you have not done so, you will be allowed to sit the replacement, but under unadjusted conditions.

You should *not* submit an application of either type

- if you are absent from a tutorial and there is no assessment associated with the missed tutorial, or
- if you miss a quiz, since the better mark principle applies.

The assessment category for the assignments is "Submitted Work".

If you are granted a "mark adjustment" for a quiz or an assignment, any marks obtained will not count and the weighting will be added to the examination weighting.

Objectives: The objectives of this unit are to:

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

Outcomes: Students who successfully complete this unit should be able to:

- identify combinatorial objects involved in counting problems;
- understand how to construct switching circuits representing Boolean functions;
- factor numbers using sieve methods and use the Euclidean algorithm to compute greatest common divisors;
- solve linear recurrence relations by using generating functions or characteristic equations.

Proposed 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. Multimodal coefficients.
6	Chapter 7. The inclusion–exclusion principle.
7	Chapter 9. Boolean expressions.
8	Chapter 11. Logic.
9	Chapter 13. Mathematical induction.
10	Course notes. Introduction to prime numbers.
11	Chapter 14. Generating functions.
12	Chapter 15. Linear Recurrence relations.
13	Chapter 18. Catalan numbers (again). Revision.