

THE UNIVERSITY OF SYDNEY  
Semester 2, 2009

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Information Sheet for **MATH1003 Integral Calculus and Modelling**

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**Web Site**

It is important that you check the Junior Mathematics web site regularly.

It may be found through WebCT, by following links from the University of Sydney front page, or by going directly to

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

Important announcements relating to Junior Mathematics are posted on the site, and there is a link to the MATH1003 page. On the MATH1003 page you will find on-line resources and other useful links. Announcements regarding assessment tasks will be made on this page at various times throughout the semester. Make sure you check the page weekly.

**Lectures**

There are 3 different lecture streams. You should attend one stream (that is, two lectures per week), as shown on your personal timetable.

Times	Location	Lecturer	Consultation
8am Thu & Fri	E Ave Aud	Weeks 1-6: A/Prof T Gagen, Carslaw room 815 Weeks 7-13: A/Prof C Macaskill, Carslaw room 627	Thur, 1-2pm Mon, 1-2pm
11 am Thu & Fri	Carslaw LT 157	Dr F Cirstea, Carslaw room 719	Fri, 1-2pm
11am Thu & Fri	E Ave Aud	Weeks 1-6: Mr A Crisp, Carslaw room 807 Weeks 7-13: Dr C Cosgrove, Carslaw room 716	Mon, 1-2pm in Carslaw 453 Tues, 1-2pm

Lectures run for 13 weeks. The last lecture will therefore be on Friday 30 October.

**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 are printed in the back of the course notes. **You should take the notes to your tutorial, since you will need to have the current week's sheet with you at your tutorial.** The tutorial sheets for a given week will also be available on the MATH1003 web page by the Friday of the previous week.

Solutions to tutorial exercises for week  $n$  will usually be posted on the web by the afternoon of the Friday of week  $n$ .

### Course notes

NR O'Brian, CJ Durrant and DJ Galloway. *Integral Calculus and Modelling*. School of Mathematics and Statistics, University of Sydney, Sydney, NSW, Australia, 2009. Available from KOPYSTOP.

### Reference book

James Stewart. *Calculus*. Brooks/Cole Publishing Company. ISBN 053459493. Available from the *CO-OP BOOKSHOP*.

### 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 7** (beginning 7 September) and **week 11** (beginning 12 October).

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 **Thursday 27 August**. Please see page 26 of the Junior Mathematics Handbook for details relating to the submission of assignments.

### 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, or your tutor. Lecturers guarantee to be available during their indicated office hour, but may well be available at other times as well.

If you are having difficulties with mathematics due to insufficient background, you should go to the Mathematics Learning Centre (Carslaw room 441).

### Week-by-week outline

Week	Topic	Content
1	Riemann sums	Upper and lower Riemann sums Definition of definite integral Non-positive functions Difference between upper and lower sums
2	Definite integral: Theory & applications	Evaluation of integrals Estimation of integrals and sums Properties of the definite integral Fundamental Theorem Part II
3	Further applications	Areas and volumes by slicing Integration by substitution I Volumes by shells
4	Further applications Indefinite integral	Integration by parts Fundamental Theorem Part I Functions defined by integrals
5	Log & exp functions	Natural logarithm Natural exponential General forms
6	Introduction to models and DEs	Properties of models Direction fields Visualization of solution curves
7	First-order DEs I	Classification of differential equations Separable equations Integration by substitution II
8	First-order DEs II	Models including growth and decay Partial fractions
9	First-order DEs III	Linear equations Examples and models
10	Further examples and models	Radioactive dating Flow and mixing problems
11	Higher-order equations	Second-order homogeneous linear Boundary conditions Factorization, equal root case
12	Systems of equations	Reduction to second-order Predator-prey systems SHM, growing and damped oscillations