

THE UNIVERSITY OF SYDNEY  
Semester 1, 2011

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Information Sheet for **MATH1111 Introduction to Calculus**

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### Websites

It is important that you check both the MATH1111 website and the Junior Mathematics website regularly. Both sites may be accessed through WebCT, or directly.

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

MATH1111 webpage: <http://www.maths.usyd.edu.au/u/UG/JM/MATH1111>

Important announcements relating to Junior Mathematics are posted on the Junior Mathematics page.

On the MATH1111 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

| Times           | Location | Lecturer         | Lunchtime Consultation |
|-----------------|----------|------------------|------------------------|
| 1 pm Tues       | E Ave LT | Dr C. Cresswell  | Wednesdays, 1-2pm      |
| 2pm Wed & Thurs |          | Carslaw room 711 |                        |

Lectures run for 13 weeks, and the last lecture will be on Thursday 2 June.

### Tutorials

You should attend two tutorials per week, as shown on your personal timetable. Your first tutorial will be on either Thursday or Friday in **week 1**. Attendance at tutorials is essential as your participation in the tutorials will contribute to your assessment. You must attend the tutorial given on your personal timetable, since your participation cannot be recorded in a tutorial in which you are not enrolled.

### Tutorial sheets

The tutorial exercise sheets will be available from the MATH1111 website. Tutorial sheet  $n$  consists of questions to be worked on during the Thursday or Friday tutorial in week  $n$  and the Monday or Tuesday tutorial in week  $n + 1$ . **You must print out and take the appropriate tutorial exercise sheet to each of your tutorials.**

Solutions to tutorial  $n$  exercises will usually be posted on the web by Tuesday of week  $n + 1$ .

## Assessment

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

- 60%: Exam at end of semester 1.
- 30%: Quiz mark.
- 5%: Assignment mark.
- 5%: Tutorial participation 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 2 hours duration during the examination period at the end of semester 1. Further information about the exam will be made available at a later date.

## Assignments

One assignment will be marked, and will be worth 5% your final raw mark. The assignment will be due on **Thursday 7 April**. Please see page 25 of the Junior Mathematics Handbook for details relating to the submission of assignments.

Another set of assignment questions will be made available, but these will not be marked, and will not count towards your final mark. Solutions and a marking scheme will be provided, and you are encouraged to mark the questions yourself, or ask a friend to mark it for you (using the marking scheme provided). This will provide you with valuable feedback on how you are handling the material, and help you prepare for the exam.

## Quizzes

Two quizzes will be held during tutorials on **Monday 18 April or Tuesday 19 April** and **Thursday 26 May or Friday 27 May**. Each quiz is worth 15% of your final raw mark. 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.

## Tutorial participation mark

Rolls will be kept in tutorials, and you will receive 0.25 marks for each tutorial (up to a maximum of 5 marks) for participation (that is, *working*, not just attending). Your tutor will award the mark when he or she is satisfied that you have participated appropriately. In some tutorials you may be asked to hand in some work.

## Text book

Hughes-Hallett et al. *Calculus: Single variable*. 5th edition, Wiley, 2005.  
Available from the Co-op Bookshop.

## Where to go for help

For administrative matters, go to the **Student Office, Carslaw room 520**.  
For help with mathematics, go to the Mathematics Learning Centre (Carslaw level 4) or see the lecturer. The lecturer guarantees to be available during her indicated consultation hour, but may well be available at other times as well.

## Objectives

The objectives of this course are:

- to introduce the concept of a function and to familiarise with the elementary functions;
- to introduce the concept of the derivative function, its derivation and interpretations;
- to introduce the concept of the integral, its derivation and interpretations;
- to show how both the concepts of the derivative and integral solve certain real world problems;
- to introduce coordinate geometry in 3 dimensions;
- to enhance logical, analytical and abstract thinking;
- to enhance problem-solving skills.

## Outcomes

Students who successfully complete this unit should:

- be comfortable with basic operations involving elementary functions such as associated curve sketching, function evaluation and interpretation as well as solving equations involving such functions;
- be able to differentiate and integrate elementary functions and compositions thereof;
- be able to interpret the meaning of the derivatives and integrals studied;
- be able to solve certain real world problems using differentiation or integration as required;
- know how to identify and sketch lines and planes within the framework of 3 dimensional coordinate geometry;
- have a better appreciation for the role of mathematics in all of the sciences.

### Proposed week-by-week outline

| Week | Topics  |
|------|---|
| 1    | Assumed Knowledge Overview<br>Assumed Knowledge Overview<br>Functions   |
| 2    | The Exponential Function<br>New Functions From Old<br>The Logarithmic Function  |
| 3    | The Logarithmic Function<br>Trigonometric Functions<br>Trigonometric Functions  |
| 4    | Parametric Equations<br>Polynomials<br>Rational Functions   |
| 5    | Measuring Speed & The Derivative at a Point<br>The Derivative Function & Interpretations of the Derivative<br>The Second Derivative |
| 6    | Differentiating Powers and Polynomials<br>Differentiating the Exponential Function<br>Product and Quotient Rules                    |
| 7    | The Chain Rule<br>The Chain Rule<br>Differentiating Logarithmic Functions   |
| 8    | Differentiating Trigonometric Functions<br>Using the First and Second Derivatives<br>Using the First and Second Derivatives         |
| 9    | Applications: Optimization<br>Applications: Modelling<br>Applications: Modelling  |
| 10   | Coordinate Geometry in 3 Dimensions<br>The Definite Integral<br>Properties About Definite Integrals                                 |
| 11   | Anti-differentiation (graphically & numerically)<br>Anti-differentiation (analytically)<br>Integration by Substitution              |
| 12   | Integration by Substitution<br>Applications to Geometry<br>Applications to Geometry   |
| 13   | Revision  |