

This is an important document. It contains all of the information that you need to know about MATHS 108 in the Second Semester 2011. Please keep it and refer to it regularly.

## Welcome

MATHS 108 (General Mathematics 1) is a general entry to mathematics for commerce and the social sciences, following year 13 mathematics. It presents selected topics in algebra and calculus and their applications including: sets, real numbers, integers; linear algebra including matrices, linear functions, linear equations; functions, equations and inequalities; limits and continuity; differential calculus of one and two variables; integral calculus of one variable. These are studied in general settings using applications from science, commerce and information systems.

MATHS 108 is one of two courses designed for students continuing in Mathematics after Year 13 mathematics courses. It is for students who have achieved 12 credits in NCEA level 3 Mathematics with Calculus, or 18 credits in NCEA level 3 Mathematics with Statistics. Students with 18 or more credits in NCEA level 3 Mathematics with Calculus (including some Merit credits) should instead enrol in MATHS 150 (Advancing Mathematics 1).

## Lecturers

MATHS 108 will be taught by a team of lecturers this semester. The course coordinator is Julia Novak and the teaching team is as follows:

Lecturer	Office	Ext	Email
Jianbei An	439.L0	88773	an@math.auckland.ac.nz
Graham Donovan	439.L0	88780	g.donovan@auckland.ac.nz
Anna McHardy	810-301	88783	j.mchardy@auckland.ac.nz
Julia Novak	810-317	84747	j.novak@auckland.ac.nz
Wiremu Solomon	439.L0	88771	w.solomon@auckland.ac.nz

Office hours will be announced in class and posted on our doors. Please visit your lecturers in their office hours if you have any questions or problems; we want to help you to succeed!

## Timetable — Lectures and Tutorials

The course is taught at 9am, 12pm and 3pm. For the 9am and 3pm streams the lectures are on Mondays, Wednesdays and Fridays, and for the 12pm stream the lectures are on Mondays, Wednesdays and Thursdays. To avoid overcrowding, please attend the stream that you enrolled for. The lecture rooms will be advised before lectures start through Student Services Online ([www.studentservices.auckland.ac.nz](http://www.studentservices.auckland.ac.nz)).

Additionally, you will have chosen a tutorial time on Student Services Online; tutorials run throughout the week. You **must** attend the tutorial that you chose on Student Services Online. Tutorials start in week 2 of the semester (the week beginning Monday 25th July). If you have somehow NOT chosen a tutorial, please see Julia Novak as soon as possible. If you do not attend tutorials, you will miss out on participation marks worth 5% of the course. Any questions about missing marks for tutorials should be directed to the student resource centre in room G16 on the ground floor of building 303.

## Prerequisites & Restrictions

The expected background of a student enrolling in MATHS 108 is 12 credits in NCEA level 3 Mathematics with Calculus or 18 credits in NCEA level 3 Mathematics with Statistics, or equivalent background, such as: a pass in MATHS 102, a D or better in Cambridge A2 Mathematics, a C or better in AS Mathematics, or a pass in International Baccalaureate Mathematics.

Students who are not prepared for MATHS 108 are strongly advised to enrol in MATHS 102 instead. Past results indicate that students without the expected background are likely to fail.

You can enrol in MATHS 150 after any pass in MATHS 108 and both courses can be credited towards your degree. This path is particularly useful for those students who wish to continue studying mathematics at university but do not have the background to enrol in MATHS 150 immediately.

## Repeating

Departmental and Faculty approval is required for students to take any course a third time. Approval for a 3rd attempt at MATHS 108 will not be given unless you have passed MATHS 102.

## Aims of MATHS 108

- To introduce students to learning mathematics at university level.
- To set a mathematical platform that can be relied upon in all undergraduate courses, including:
  - accepted conventions of mathematical notation and representation;
  - algebraic manipulative skills; and
  - understanding of basic mathematical ideas.
- To build understanding of calculus by:
  - developing an understanding of the derivative;
  - developing an understanding of the anti-derivative and integration;
  - consolidating differentiation techniques;
  - consolidating and filling gaps in integration techniques.
- To develop understanding of algebra and linear algebra in a first course which includes:
  - the overall idea of linear algebra as sets of equations;
  - basic skills in matrices;
  - conceptualisation of matrices including vectors.

## Text Books

[1] *Calculus: Early Transcendentals*, 8th Edition, by H. Anton, I. Bivens, S. Davis (Wiley).  
(Web appendices are available at [www.wiley.com/college/anton](http://www.wiley.com/college/anton))

[2] *Contemporary Linear Algebra*, H. Anton, R. Busby (Wiley).

These books are sold packaged together at the University Book Shop (UBS), and are widely available second-hand.

## Old and New

MATHS 108 has changed over the years. Some of the topics covered in previous years differ from those currently taught. Take care when studying from past test and exam paper as you may find questions on topics not covered this year. If you are unsure about whether a topic is examinable, look for it in the lecture notes or ask your lecturer.

## Expectations & Workload

We expect students to spend 10 hours per week involved in each of their courses.

Expect this to involve 3 hours of lectures, a 1 hour tutorial, 3 hours of lecture preparation (reading and thinking about the content of the course), and 3 hours of work on assignments and/or preparing for the test and exam.

Stay on top of the course material as it is covered. If you get behind it can be difficult to catch up. Make use of the help available; ask for help as soon as you need it.

## Resources

All announcements made in class will also be made on Cecil ([www.cecil.auckland.ac.nz](http://www.cecil.auckland.ac.nz)). You can download the assignments and other resources from Cecil. Cecil is also used to generate the quizzes.

A course book containing the lecture slides for 2011 is available from UBS. The PDF files of this book are also available for download from Cecil.

Lectures may be recorded for you to access later. We cannot guarantee that the technology will behave itself, so some lectures may not be available. These should be used as an additional resource, not as a replacement for lectures. Past data shows that the more lectures you attend in person, the higher your final grade. Skipping lectures with the intention of watching the recordings is not a good idea.

## Matlab

The Department of Mathematics uses the software package Matlab for most undergraduate courses. Matlab knowledge will be useful for all subsequent mathematics courses. The basics of Matlab are easy to understand and a valuable skill to gain. Matlab is an important part of this course and a Matlab guide is available online at [www.math.auckland.ac.nz/matlab/guide/matlab.html](http://www.math.auckland.ac.nz/matlab/guide/matlab.html).

Matlab is available for use in the computer laboratories in building 303 and building 303S and also in the Student Commons (although the process to gain access is a little involved). Access Matlab via the Start Menu of the computer. The Mathematics and Statistics laboratories in the basement of building 303S (Computer Science) have tutors who are able to assist you.

## Calculators

You are permitted to use a calculator in the MATHS 108 test and examination. Any standard calculator is sufficient, but many students prefer a graphics calculator. In tests and examinations you must be able to show that the memory of your programmable calculator has been cleared.

## Getting Help

- Ask questions in class or in the tutorials.
- Visit your lecturers during their office hours.
- Get help and advice from the tutors in the Mathematics Assistance Room 303.G16. The Assistance Room is open daily (usually from the second week of semester) from 10am until 4pm.
- One to one assistance with mathematical concepts is available at the Student Learning Centre (3rd floor of the Kate Edgar Information Building). Topic related workshops are also run throughout the semester. Times and dates for these are listed in the SLC website ([www.cad.auckland.ac.nz](http://www.cad.auckland.ac.nz)) and in Cecil announcements at the beginning of the semester.
- Further one to one assistance is also available through the mathematics department. A sign up sheet is kept at the student resource centre in room G16 on the ground floor of building 303, from the second week of semester. The tutoring is free of charge and you can sign up for up to 30 minutes of one to one tutoring per week.

## Collaborating & Cheating

You are encouraged to discuss problems with one another and to work together on assignments, but you must not copy another person's assignment. Assignment and quiz marks contribute to the final mark you receive in this course, and must reflect your own work, not the work of others. We view cheating on assignment and quiz work as seriously as cheating in an examination.

Acceptable forms of collaboration are:

- getting help in understanding from staff and tutors;
- discussing assignments and methods of solution with other students.

Unacceptable forms of collaboration ('cheating') are:

- copying all or part of another student's assignment, or allowing someone else to do all or part of your assignment for you;
- completing a quiz with, or for, another student;
- allowing another student to copy all or part of your assignment, or doing all or part of an assignment for somebody else.

If you are unsure about whether your collaboration is OK please discuss it with your lecturer. If you think that your collaboration will be viewed as cheating, you are probably correct.

## Harassment & Complaints

Complaints about marking should be taken to your lecturers who are in a position to do something immediately. More general complaints can be taken up by your class representative. You may also approach the Head of Department or the Departmental Manager for Mathematics.

Harassment on any grounds, such as racial, sexual, religious and academic is totally unacceptable. Complaints about harassment are best taken to the University Mediator (extension 87478) or to any member of the Resolve Network whose names are displayed on posters around campus.

## Assessment

There is **no plussage** in MATHS 108. This means that all components of the assessment count towards your final grade. Attempt all of the assessments, even if what you submit is incomplete.

3 Assignments	9%	(3% each)
10 Tutorials	5%	(0.5% each)
4 Quizzes	4%	(1% each)
2 Matlab Worksheets	2%	(1% each)
Test	20%	
Exam	60%	

**Assignments** will be due on the following Tuesdays. They will be posted on Cecil at least 7 days before they are due. Assignments all require a Mathematics Department cover sheet (in blue) available from outside the student resource centre (room G16 on the ground floor of Building 303). They may require the use of Matlab and all assignments are due before **4pm**.

**A1** Tues Aug 16th

**A2** Tues Sept 27th

**A3** Tues Oct 18th

**Tutorials** are weekly. Tutorials start in week 2 of the semester (the week beginning Monday 25th July). You must attend the tutorial that you signed up for on Student Services Online.

**Quizzes** are run online through Cecil. Each quiz will start on the day that we finish a topic in lectures (Topics 1 to 4) and will run for two weeks. The quizzes will run as follows:

**Q1** Mon Aug 1st to  
Mon Aug 15th  
(Topic 1)

**Q2** Mon Aug 15th to  
Mon Aug 29th  
(Topic 2)

**Q3** Wed Sept 21st to  
Wed Oct 5th  
(Topic 3)

**Q4** Wed Oct 5th to  
Wed Oct 19th  
(Topic 4)

**Matlab Worksheets** are to be completed in the computer labs, at any time. The computer labs in the basement of building 303S (Computer Science) have tutors who are able to assist you. The first is due in week 4 of the course, and is an introduction to Matlab. The second is due in week 11 of the course, and covers the Matlab related to Topics 1 to 4. Both are due before **4pm**.

**M1** Weds Aug 10th (Introduction to Matlab)

**M2** Mon Oct 10th (Topics 1 to 4)

The **Test** is one hour long and will cover Topics 1 and 2. It is from **6:30pm to 7:30pm** on **Thursday August 18th**. You are strongly advised to arrive at your allocated room at least 15 minutes before the start of the test. Allocated rooms will be announced closer to the time.

The **Exam** is two hours long. The exact date of the exam is not available until around the middle of the semester. You must achieve at least 35% in the final exam in order to pass the course. In a change from previous years, both the test and the exam will be entirely multi-choice and machine marked.

Please note that Formulae Sheets are not provided in the test or exam. As noted previously, calculators are permitted in the test and exam with their memory cleared.

**Once more, please note that ALL components of the assessment will count toward your final grade.** Attempt all of the assessments, even if what you submit is incomplete.

**The assignment hand-in boxes are on the ground floor of building 303, outside G16, Sci-Space.** All assignments and Matlab worksheets should be handed in to the correct hand-in box before 4pm on the due date. Late assignments and those in the wrong box will not be marked. Assignments are returned to students using the white return boxes also located on the ground floor of building 303.

## Lecture Timetable & Assessment Plan

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Notes
1	July 18th LECTURE 1	July 19th	July 20th LECTURE 2	July 21st LECTURE 3 12pm	July 22nd LECTURE 3 9am & 3pm	No Tutorial
2	July 25th LECTURE 4	July 26th	July 27th LECTURE 5	July 28th LECTURE 6 12pm	July 29th LECTURE 6 9am & 3pm	Tutorial 1
3	August 1st LECTURE 7	August 2nd	August 3rd LECTURE 8	August 4th LECTURE 9 12pm	August 5th LECTURE 9 9am & 3pm	<b>Quiz 1</b> Tutorial 2
4	August 8th LECTURE 10	August 9th	August 10th LECTURE 11 <b>Matlab 1</b>	August 11th LECTURE 12 12pm	August 12th LECTURE 12 9am & 3pm	<b>Quiz 1</b> Tutorial 3
5	August 15th LECTURE 13	August 16th <b>Assignment 1</b>	August 17th TEST REVISION	August 18th <b>No Lecture</b> <b>TEST</b>	August 19th <b>No Lecture</b>	<b>Quiz 2</b> Tutorial 4
6	August 22nd LECTURE 14	August 23rd	August 24th LECTURE 15	August 25th LECTURE 16 12pm	August 26th LECTURE 16 9am & 3pm	<b>Quiz 2</b> Tutorial 5
Semester Break						
7	September 12th LECTURE 17	September 13th	September 14th LECTURE 18	September 15th LECTURE 19 12pm	September 16th LECTURE 19 9am & 3pm	Tutorial 6
8	September 19th LECTURE 20	September 20th	September 21st LECTURE 21	September 22nd LECTURE 22 12pm	September 23rd LECTURE 22 9am & 3pm	<b>Quiz 3</b> Tutorial 7
9	September 26th LECTURE 23	September 27th <b>Assignment 2</b>	September 28th LECTURE 24	September 29th LECTURE 25 12pm	September 30th LECTURE 25 9am & 3pm	<b>Quiz 3</b> Tutorial 8
10	October 3rd LECTURE 26	October 4th	October 5th LECTURE 27	October 6th LECTURE 28 12pm	October 7th LECTURE 28 9am & 3pm	<b>Quiz 3 &amp; 4</b> Tutorial 9
11	October 10th LECTURE 29 <b>Matlab 2</b>	October 11th	October 12th LECTURE 30	October 13th LECTURE 31 12pm	October 14th LECTURE 31 9am & 3pm	<b>Quiz 4</b> Tutorial 10
12	October 17th LECTURE 32	October 18th <b>Assignment 3</b>	October 19th LECTURE 33	October 20th EXAM REVISION 12pm	October 21st EXAM REVISION 9am & 3pm	<b>Quiz 4</b> No Tutorial

### Lecture Topics

LEC 1: Introduction and Motivations

#### Topic 1 — Functions and Limits

LEC 2: Relations and Functions

LEC 3: Using Functions

LEC 4: Trigonometric Functions

LEC 5: Limits Intuitively

LEC 6: Computing Limits

LEC 7: Continuity

#### Topic 2 — Vectors, Lines and Planes

LEC 8: Scalars and Vectors

LEC 9: Vector Arithmetic

LEC 10: Dot Product

LEC 11: Lines

LEC 12: Planes

LEC 13: Intersections

#### Topic 3 — Linear Systems and Matrices

LEC 14: Systems of Linear Equations

LEC 15: Reduced Row Echelon Form

LEC 16: Types of Solutions

LEC 17: Matrix Arithmetic

LEC 18: Matrix Inverses

LEC 19: Solving Systems with Matrices

LEC 20: Determinants

LEC 21: Cross Product

#### Topic 4 — Differentiation

LEC 22: Differentiation as a Limit

LEC 23: Differentiation Rules

LEC 24: Implicit Differentiation

LEC 25: Curve Sketching

LEC 26: First Derivative Test

LEC 27: Second Derivative Test

#### Topic 5 — Integration and Functions of 2 Variables

LEC 28: Indefinite Integrals

LEC 29: Integration by Substitution

LEC 30: Integration by Parts

LEC 31: Definite Integrals

LEC 32: Functions of 2 Variables

LEC 33: Tangent Planes