

Welcome to MATHS 208.

In the Mathematics Department we like to think of our students as a community of people working together to better understand quantitative and relational ways to interact with our world. We welcome you warmly, whether mathematics is your first love or whether it plays a supporting role in your other studies. We believe that the more mathematics everyone knows, the better any discipline will be and so we are committed to supporting all students as best we can.

MATHS 208 is the follow-on Mathematics course from MATHS 108, continuing topics in Linear Algebra and Calculus for students who are not mathematical majors. The recommended preparation for this course is C+ or better in MATHS 108 or equivalent.

The Coursebook contains the material comprising the basic lecture slides used in this course. Lecturers may use occasional extra slides not provided here. Note that slides will contain references to the Textbook(s) that material is regarded as an integral (and examinable) part of the course. When the course is taught in multiple streams, all streams will cover the same material on the same day.

The Coursebook is not a stand-alone resource for studying MATHS 208. It must be read together with the following texts:

Calculus: Early Transcendentals, 8th edition, H Anton, I Bivens, S Davis (Wiley).

Contemporary Linear Algebra, H Anton, R Busby (Wiley).

These are the same texts used for MATHS 108, 150, 250 and 253.

Web appendices and other text book related resources are at: <http://www.wiley.com/college/anton/>.

Please note that the Coursebook is usually re-written and re-printed each year for Semester 1. Please do not use an old Coursebook as the course does change.

PDF files of the course book (by topic) are available for download from Cecil for enrolled students (<http://www.cecil.auckland.ac.nz>). All learning resources will be available through Cecil.

For more information about MATHS 208, contact the course coordinator for 2011:

Alastair McNaughton
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Email: a.mcnaughton@auckland.ac.nz
Phone: 3737599 xt 85244

MATHS 208 is a 15-point sequel to MATHS 108, consisting of three parts:

Algebra: Linear and matrix algebra, vector spaces, orthogonality, least-squares and eigenproblems.

Calculus: Multivariable calculus and optimisation, integration techniques, sequences, series,

Differential equations: An introduction to 1st and 2nd-order differential equations

It is designed to provide an understanding of many of the mathematical principles and methods involved in more advanced subjects in Commerce, Operations Research, Computer Science (graphics) and Physics.

Pre-requisites and Restrictions: Students entering this course should have a pass in one of MATHS 108, MATHS 150, MATHS 151, MATHS 153, ENGSCI 111 and PHYSICS 111.

Note: Students who have passed MATHS 108 with a A or better and who intend to advance in Mathematics are advised to take MATHS 250 rather than MATHS 208.

Aims After successfully completing the course, a student should be able to:

- calculate partial derivatives using the chain rule and implicit differentiation,
- classify critical points via the positive definiteness properties of the Hessian,
- use the method of Lagrange multipliers to solve constrained extrema problems,
- apply convergence tests to sequences and series, manipulate power series, and estimate functions using Taylor polynomials,
- use substitution and integration by parts to evaluate integrals,
- understand the basic theory of vector spaces, including the notions of linear independence, span, basis, dimension and subspace,
- identify the subspaces of \mathbb{R}^n defined by a matrix,
- use the Gram-Schmidt algorithm to obtain an orthonormal basis from any given basis for a vector space,
- calculate least-squares solutions of over-determined linear systems,
- calculate eigenvalues and eigenvectors of small matrices, and apply them in the analysis of discrete dynamical systems,
- classify ordinary 1st- and 2nd-order differential equations and solve them using an appropriate method,
- use eigenvalues and eigenvectors to solve a 2nd-order linear homogeneous DE as a system of first-order equations.

Lecturers & Contacts

Lecturer	Office	Phone	email	office hours
Alastair McNaughton	311.810 Short St	85244	a.mcnaughton@auckland.ac.nz	M 2 W 10 Th 11
Wiremu Solomon	209 stats	88771	w.solomon@auckland.ac.nz	to be announced
Wendy Stratton	70 Symonds St	85757	w.stratton@auckland.ac.nz	to be announced
Shixiao Wang	70 Symonds St	87316	sh.wang@auckland.ac.nz	M 2, Tu 2, W 4

Stream 1 will be lectured by Wiremu Solomon (weeks 1-6), and Wendy Stratton (weeks 7-12).

Stream 2 will be taught by Alastair McNaughton (weeks 1-6) and Shixiao Wang (weeks 7-12).

Weekly schedule: There are 3 hours of lectures and 1 hour of tutorial per week. There are 2 streams of lectures. You are recommended to consistently attend just 1 stream, the one you enrolled for. However, we do understand that circumstances may force you to attend some lectures in one stream and some in another. We will try hard to ensure that the material covered in both streams is the same for each lecture, but in practice some of the examples chosen may be slightly different of course.

For stream 1 the lectures will be: Mon 9 (MLT1) Wed 9 (LIB B10) Thur 9 (Eng 1439).

For stream 2 the lectures will be: Mon 1 (MLT1) Tue 1 (MLT1) Wed 3 (Lib B15).

Tutorials are held on Mon 9am, 11, 2pm, 3, 4, Tue 10am, 4pm, Wed 9am and Thur 3pm.

Tutorials will start week 2 of the semester. There will be a possibility of changing your tutorial time during the first 2 weeks. Do NOT attempt to do this through the university enrolment website. Updated tutorial rolls will be on cecil from the end of week 1.

For the Lecture Schedule refer lecture notes.

MATHS 208 Planner Sem 2, 2011.

Mon	Tue	Wed	Thur	Fri
18-7 lecture 1 no tut this week	19-7 lecture 2(stream 2)	20-7 lecture 2(stream 1) lecture 3(stream 2)	21-7 lecture 3 (stream 1)	22-7
25-7 lecture 4 tut 1 this week	26-7 lecture 5(stream 2)	27-7 lecture 5(stream 1) lecture 6(stream 2)	28-7 lecture 6 (stream 1)	29-7
1-8 lecture 7 tut 2 this week	2-8 lecture 8(stream 2)	3-8 lecture 8(stream 1) lecture 9(stream 2)	4-8 lecture 9 (stream 1)	5-8
8-8 lecture 10 tut 3 this week	9-8 lecture 11(stream 2) assignment 1 due	10-8 lecture 11(stream 1) lecture 12(stream 2)	11-8 lecture 12 (stream 1)	12-8
15-8 lecture 13 tut 4 this week	16-8 lecture 14(stream 2) quiz 1 starts	17-8 lecture 14(stream 1) lecture 15(stream 2)	18-8 lecture 15 (stream 1)	19-8
22-8 lecture 16 tut 5 this week	23-8 lecture 17 (stream 2)	24-8 lecture 17(stream 1) lecture 18(stream 2)	25-8 lecture 18 (stream 1) test 6pm	26-8 quiz 1 ends
29-8 mid	30-8 sem	31-8 break	1-9 this	2-9 week
5-9 mid	6-9 sem	7-9 break	8-9 this	9-9 week
12-9 lecture 19 tut 6 this week	13-9 lecture 20(stream 2) assignment 2 due	14-9 lecture 20(stream 1) lecture 21(stream 2)	15-9 lecture 21 (stream 1)	16-9
19-9 lecture 22 tut 7 this week	20-9 lecture 23(stream 2) quiz 2 starts	21-9 lecture 23(stream 1) lecture 24(stream 2)	22-9 lecture 24 (stream 1)	23-9
26-9 lecture 25 tut 8 this week	27-9 lecture 26(stream 2)	28-9 lecture 26(stream 1) lecture 27(stream 2)	29-9 lecture 27 (stream 1)	30-9 quiz 2 ends
3-10 lecture 28 tut 9 this week	4-10 lecture 29(stream 2) assignment 3 due	5-10 lecture 29(stream 1) lecture 30(stream 2)	6-10 lecture 30 (stream 1)	7-10
10-10 lecture 31 tut 10 this week	11-10 lecture 32(stream 2)	12-10 lecture 32(stream 1) lecture 33(stream 2)	13-10 lecture 33 (stream 1)	14 -10
17-10 lecture 34 tut 11 (no points)	18-10 lecture 35(stream 2)	19-10 lecture 35(stream 1) lecture 36(stream 2)	20-10 lecture 36 (stream 1)	21-10

Resources

Course Notes for the course are available from the University Book Store for about \$20, and from Cecil as a single download.

Texts There are two required texts for the course:

- Calculus: Early Transcendentals, 8th Edition, by H. Anton, I Bivens, S Davis (Wiley).
- Contemporary Linear Algebra, H. Anton, R. Busby (Wiley).

They are available at the University Bookshop and VOL 1 Bookshop, 33 Symonds St.

They are sold as a shrinkwrapped pair for \$162. Second-hand copies may also be available.

These texts are also the required texts for MATHS 150/108/250/253.

Text Publisher's Web site. Students using the Anton texts have the publisher's permission to visit and use the following companion Web site: <http://www.wiley.com/college/anton>

Matlab The software package Matlab is used in many undergraduate mathematics courses.

Purchase A student-version of Matlab is available for \$73 from the Student Resource Centre in the Basement of the Maths building. This allows you to install and run Matlab on your own computer (Windows/Mac/Linux).

Lab Availability Matlab is available for you to run in the following computer labs:

- (a) Mathematics/Statistics/Computer Science Ground-Floor Computer lab, G91
Matlab demonstrators are available at these labs.
- (b) Student Commons.
- (c) On weekends, Maths students may use the Computer Science labs rm303.130, rm 303.191, rm 303.G91 in building 303S (9am - 8.45pm).

General Matlab help is available from <http://www.auckland.ac.nz/matlab/>

208 Coursework book Small Matlab code segments appear throughout the lecture notes.

Assessment Matlab will not be examined in the 208 mid-term or final exam, but you may be required to use it in your assignments.

Calculators *including graphics, will be permitted in the mid-term test and final examination, but the memory must be cleared at the start.*

Formula sheets will *not* be provided in tests or examinations.

Expectations: Courses at the University of Auckland are assumed to use 10 hours of student time per week. In this course the normal pattern of student study is expected to be (each week):

3 hours lectures, 1 hour tutorial, and 6 hours preparation (for lectures, assignments, revision etc).

- Students are expected to attend all lectures and tutorials, and to come to class prepared. This means that you will have previewed the material in the text and done any preliminary examples that have been set.
- NOT ALL COURSE MATERIAL WILL BE COVERED IN LECTURES. The Course-Notes Book makes reference to the text and which sections are to be regarded as part of the course. It is the responsibility of each student to ensure that he/she is familiar with this material.
- *You cannot expect to progress comfortably through the course without consistent attendance at lectures and tutorials, and completion of all tutorial problems, assignments and the mid-term.* Please be aware that as a second-year course, 208 requires considerably more work than 108.
- If you feel unsure about the suitability of your preparation for the course, please contact either your current lecturer or the course-coordinator to discuss your options.
 - The last day for deletion or change of a course is the second Friday of the semester.
 - If you withdraw from the course after that date the course will remain on your academic record and show as a withdrawal. There will be no refund of fees in this case.

CECIL CECIL is the prime means of information about the course. All announcements made in lectures will also be made on CECIL. Students are requested to log on to CECIL on a regular basis, and use it to get information about the course, about assignments, about any matters concerning rooms, resources, or assessments. Access Cecil at <http://www.cecil.auckland.ac.nz>

Class Notices Announcements sent via Cecil can be read within the Announcements section of the class Cecil page. They are simultaneously sent to the address you designate on your Cecil Personal Settings page. Set this email address to one that you are able to read daily. You are advised that many essential notices are sent via Cecil through the semester - it is your responsibility to read these notices either via Cecil or your designated email address. If for any reason during the semester you are *locked out* of Cecil, you can view course materials and notices by logging on to Cecil as a “pin user”: Click on the “pin user” icon on the Cecil login page, and then log in with the username maths208, and password maths208. This will bring up all the course-materials and notices of the current semester for Maths 208.

Lecture Presentations All lecture presentations will be derived from the Course Notes Book. Students not attending lectures can obtain the text references from the Course Notes.

Tutorials Weekly tutorials start in the *second* week of the semester: Monday 25 July.

It is essential that you attend the tutorials and participate, to consolidate your learning and to prepare for doing the assignments. Tutorial answers (not worked solutions) will be available from Cecil the Friday after the tutorial.

Assignments There will be 3 assignments through the semester.

These give important practise in the problem-solving methods and concepts dealt with in the course. They will be made available on Cecil the Tuesday of the week before they are due, and are due in the boxes outside G16, the Student Resource Centre. Assignments will generally be marked within a week. Assignments handed in to the wrong box, or handed in late, will not receive credit. *You are forewarned!*

Assignment	available on Cecil	date due (at 4pm)
Assignment 1	Tuesday 2 August	Tuesday 9 August
Assignment 2	Tuesday 23 August	Tuesday 13 Sept
Assignment 3	Tuesday 27 Sept	Tuesday 4 October

After your assignment is returned please consult the model answers which will be on cecil. If you feel your assignment has been incorrectly marked (or the marks added incorrectly), just take your script to your lecturer in office hours. He/she will consider it and make a decision which is final. This is a normal university routine, and no cause for panic. Please do not come for tiny adjustments of just 1 mark (trivial when expressed as a percentage). Do not attempt to claim extra marks by comparing your answer with some other students answer. Markers are rotated each assignment for fairness.

The quizzes The 2 quizzes focus on background skills. These will be multi-choice on-line tests for which you will be allowed 3 attempts each whenever you wish over 1 week. The computer platform for the quizzes is not always reliable. If it crashes the quiz marks will be re-allocated to the marks for tutorials (ie the marks for tutorials will be scaled up in proportion to the lost quiz marks).

Mid-semester Test There will be one one-hour test held on **Thursday 25 August** from 6:00-7.00pm in BLT100 (surnames A-H), Engineering 3404 (surnames I-P) and Library B10 (surnames Q-Z).

The test will cover lectures 1 to 13 inclusive, that is all the algebra. It will be multi-choice.

There will be an early test in at 4pm to 5pm in BLT 100 (Biology building 106) for all students who have clashes with other tests. Please do not send me panic e-mails if you have a clash. I do not want at list of names, nor do you need my permission to do the early test (provided of course you have a clash). Just turn up. It is not a problem. We have booked a large room for the early test. Students entitled to extra time should also attend the early test.

Final Exam The University will announce the final exam timetable towards the end of the semester. You will be notified on Cecil. Rooms for the final exam are only made available the night before the exam date. Consult notices placed around campus at the appropriate time for the location of your final exam. It will consist of long answers only. There will be no multi-choice in the final exam.

Coursework Mark Discrepancies If there is any discrepancy between your course-work marks and those which appear on Cecil, please take the relevant marked work to your lecturer.

Assessment Final grades for this course will be as follows:

25% from the test, 9% from the 3 assignments, 4% from the tutorials, 2% from the quizzes and 60% from the final exam.

Unlike previous years, there will be no plussage in this paper.

Normal university aegrotate procedures apply to anyone prevented by illness etc from sitting either the test or the exam, but you will have to sit at least one of either the test or the exam to be eligible for an aegrotate pass.

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 marks contribute to the final mark you receive in this course. We view cheating on assignment work as seriously as cheating in an examination.

Generally acceptable forms of collaboration include the following: Get help in understanding course-material from staff and tutors – you are encouraged to ask for help. Discussing assignments and methods of solution with other students.

Generally unacceptable forms of collaboration (“cheating”) include the following: Copying all or part of another student's assignment, or allowing someone else to do all or part of your assignment for you. Allowing another student to copy all or part of your assignment. Doing all or part of an assignment for somebody else. This is treated as seriously as copying another student's assignment.

If you are in any doubt about the permissible degree of collaboration, then please discuss it with a staff member.

Getting Further Help For assistance with the material covered in the course:

- Ask about the material in the tutorials.
- Get help and advice from the tutors in the Assistance Room in room B25 in the basement of the Mathematics Building. It will be open on weekdays from 10am to 4pm, starting in week 2.
- Visit the lecturer in his/her office during office-hours. Office hours will be announced in class, and posted on Cecil.
- 1 to 1 tutoring is available. Make your appointment at the maths office.
- The Student Learning Centre (SLC) in the Information Commons offers some one-to-one assistance. You pay \$10 to join the SLC and this entitles you to book SLC assistance for the entire calendar year.

For assistance in any other matter, please contact Alastair, the Course Coordinator.

Harassment & Complaints Complaints about assignment or tutorial marks are best taken to your lecturer who is in a position to do something immediately. More general complaints can be taken up by your class representative who should be elected or appointed in the first couple of lectures. You may also approach the Head of Department or the Departmental Manager for Mathematics (extension 88063). 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 the campus.

We hope you enjoy the content of the course, and the challenge it offers.

Alastair McNaughton, Wiremu Solomon, Wendy Stratton, Shixiao Wang.