THE UNIVERSITY OF AUCKLAND
FACULTY OF SCIENCE

2009

Faculty of Science
Mathematics Undergraduate Handbook

THE UNIVERSITY OF AUCKLAND

FACULTY OF SCIENCE

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Welcome

The Department of Mathematics is one of the largest and most diverse departments within The University of Auckland, covering Applied Mathematics, Mathematics Education and Pure Mathematics. It has a strong international reputation and offers degrees and diplomas that enjoy widespread recognition with employers in New Zealand and internationally.

The staff of the Mathematics Department teach and research in many of the faculties of this University. It is possible to study Mathematics in combination with a very wide range of other subjects, especially in the Faculties of Arts, Commerce and Science for the degrees of BA, BCom or BSc. Mathematics is an ideal supporting subject for students of many other disciplines.

If you are majoring in another subject but enjoy Mathematics, you might like to consider a double major which includes Mathematics. Using Mathematics as a supplement to your primary major will enhance your future career and professional life. It is our experience that your future prospects and employability in any other

field are enhanced with significant mathematical content in your degree. The increased analytical ability, comprehension of abstract concepts and creative thinking that you gain from studying Mathematics are highly valued in the business, industrial, social and academic worlds.

Those studying in this department will be introduced both to the excitement of learning and exploring Mathematics for its own sake and to the satisfaction of using Mathematics to model and explain our world. They will be expected to use their skills and imagination on problems from old and emerging areas of Mathematics, and from applied fields such as modelling the functions of the heart to waves in sea-ice.

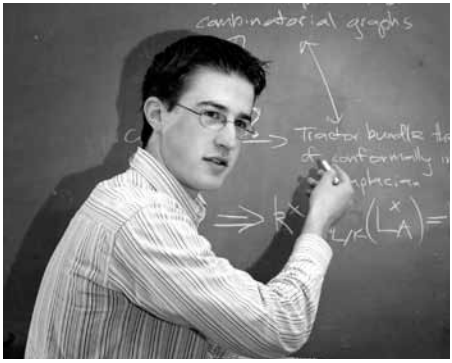
Graduates from the department take up positions in business, foreign affairs, industry, research teams, planning and environmental organisations, and a wide range of other areas.

We will be pleased to welcome you as a student to the Department of Mathematics.

BILL BARTON
Head of Department

"People with a knowledge of maths are in demand in all sorts of areas you might not expect, like the military or Department of Foreign Affairs, and in any branch of industry where processes need modelling. In its purest form, maths is the ability to think abstractly and analytically, and to solve problems, and those skills always have currency."

Simon Marshall - BSc(Hons) in Mathematics, now PhD student at Princeton



Important dates

Academic year 2009	
Summer School - 2009	
Lectures begin	Tuesday 6 January
Auckland Anniversary Day	Monday 26 January
Deadline to withdraw from Summer school courses	1 week before end of lectures (Friday 6 February)
Waitangi Day	Friday 6 February
Lectures end	Friday 13 February
Study break/exams	Monday 16 February - Wednesday 18 February
Summer School ends	Wednesday 18 February
Semester One - 2009	
Semester One begins	Monday 2 March
Mdi-semester/Easter Break	Monday 6 April - Friday 17 April
Mid-semester break	Monday 14 April - Saturday 19 April
ANZAC Day	Saturday 25 April
Graduation	Thursday 30 April May - Friday 8 May
Deadline to withdraw from first semester courses	3 weeks before end of lectures (Friday 22 May)
Queen's Birthday	Monday 1 June
Lectures end	Saturday 6 June
Study break/exams	Saturday 7 June - Monday 30 June
Semester One ends	Monday 29 June
Inter-semester break	Tuesday 30 June - Saturday 18 July
Semester Two - 2009	
Semester Two begins	Monday 20 July
Mid-semester break	Monday 31 August - Saturday 12 September
Graduation	Tuesday 22 September - Thursday 24 September
Deadline to withdraw from second semester courses	3 weeks before end of lectures
Lectures end	Saturday 24 October
Labour Day	Monday 26 October
Study break/exams	Saturday 25 October - Monday 17 November
Semester Two ends	Monday 17 November
Semester One - 2010	
Semester One begins	Monday 1 March 2010

Closing dates for applications for admission in 2009	
1 December 2008	Deadline for new students to submit an Application for admission, if their 2009 programme includes Summer school courses
8 December 2008	Deadline for new students to submit an application for Admission if their 2009 programme includes only Semester One and Two courses. If you are a new student, only one Application for Admission is required. This form is due on either 1 December or 8 December, depending on whether you want to take Summer School courses as well. Applications received after these dates may be accepted if there are places available.

Mathematics studies: Questions and answers

Why Should I Consider a Major in Maths?

What makes Mathematics different from other majors?

Sometimes called the "Queen of Sciences", Mathematics is a unique field of study.

The subject of Mathematics has many aspects: it can be challenging, beautiful, powerful, fascinating, even mysterious to some people, but above all it is useful. Mathematics interacts with other disciplines and makes essential contributions to Science, Medicine and Commerce, as well as to many important contemporary areas of technology such as Communications, Linguistics and Genetics. Wherever problems need to be solved, Mathematics has a role to play. In fact, many sciences rely so heavily on Mathematics that their most important questions are, fundamentally, mathematical.

What will a Mathematics major do for me?

Mathematics leads to perhaps more diverse potential careers than any other discipline because it is the language through which nature, technology and reality are described. It is thus essential for almost every sphere of knowledge and activity in the modern world. For these reasons, mathematics is a powerful and versatile major.

With a degree comprising quantitative methods courses (Mathematics, Statistics, Operations Research and Computing) you will have many opportunities for careers in industry or government, computer development, insurance, meteorology, traffic engineering, systems analysis, computer programming, statistics, biometrics or operations research, and many other fields. There is also a strong demand for Mathematics teachers, in New Zealand and abroad. Mathematics majors are also strong candidates to pursue graduate studies in a variety of fields.

What is the Mathematics major structure?

As a Mathematics major, you have a broad choice of courses and pathways. After completing a set of core courses, you will be able to chose from a variety of courses representing the main areas of Mathematics. First-year (Stage I) courses in Mathematics are designed to provide you with a range of concepts, theoretical results, and analytical, computational and modelling skills that may be applied in a wide variety of areas - in the biological, information and physical sciences, economics, engineering and finance for example. Stage II and III courses build on these, covering more advanced topics, with the aim of helping you to acquire a broader base of skills and a deeper understanding of the concepts involved.

Will I have the opportunity to study topics I have a deep interest in?

You will have the opportunity to take directed reading courses in subjects of interest to you and to undertake undergraduate research with department members. Each year, undergraduate research Summer Scholarships are awarded to students in the department.

What if I Choose Another Major?

If you are majoring in Computer science, Finance, Economics, Political science, Psychology, or any other science, then you will find that the coursework in your major relies heavily on Mathematics. In order to have the best opportunity to do well in those courses and absorb that material, it is very beneficial to identify and take the appropriate Mathematics courses.

The courses offered by the Mathematics Department have applications to many other fields.

What about a double major?

If you are majoring in another subject but enjoy Mathematics, you might like to consider a double major which includes Mathematics.

Using Mathematics as a supplement to your primary major will enhance your future career and professional life. It is our experience that your future prospects and employability in any other field are enhanced with significant mathematical content in your degree. The increased analytical ability, comprehension of abstract concepts and creative thinking that you gain from studying mathematics are highly valued in the business, industrial, social and academic worlds.

What degrees may I get with a double major which includes mathematics?

At undergraduate level a Mathematics major can be taken as part of the following Degrees: either a Bachelor of Science (in Mathematics, Applied Mathematics, Industrial Mathematics, Bioinformatics, or Logic and Computation) or a Bachelor of Arts (in Mathematics).

What are the degree and majors requirements?

On the Faculty of Science website, you will find the requirements for various Degrees that give you the opportunity to study Mathematics: www.science.auckland.ac.nz/subjects/

"I haven't got a strong maths background but I am curious about maths"

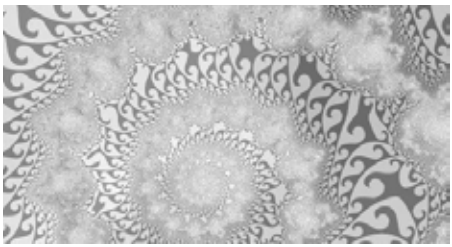
"I enjoyed maths at school but I am majoring in arts, law, .."

Besides the regular entry level Maths courses, another way of discovering Mathematics when you are majoring in Arts, or Social Sciences, Business and Commerce, or Humanities, Life or Physical Sciences, Communications or Languages, are two General Education courses (see the General Education section for details): MATHS 101G "Mathematics in Society" and MATHS 190G "Great Ideas Shaping our World".

I am not sure what major to choose: who can I talk to?

If you wish to discuss your Major options, have problems enrolling in Mathematics courses or any enquiries, please contact the Undergraduate Advisor at the Mathematics Department:

Jamie Sneddon
Room 305 - Mathematics Department
Phone: ext 82121
Email: ugadvice@auckland.ac.nz



What are the main degrees with Mathematics?

Choosing a Degree

Mathematics can be studied as either a major or minor part of any of the most popular degrees. The Faculty of Science offers degrees in Mathematics (this includes Mathematics Education courses) and Applied Mathematics. The Faculty of Arts offers degrees and diplomas in Mathematics (this includes Applied \ Mathematics and Mathematics Education courses). Your choice of degree depends upon what else you want to study.

BSc (Bachelor of Science, 3 year programme)

Combine Mathematics with any of: Computer Science, Statistics, Psychology, Biological Sciences, Geography, Chemistry, Physics, Geology, or Sports and Exercise Science.

You can also **specialise** in Bioinformatics, Logic and Computation or Industrial Mathematics.

BCom (Bachelor of Commerce, 3 year programme)

Combine Mathematics with any of: Accounting, Finance, Economics, Management, Marketing, Computer Information Systems.

BA (Bachelor of Arts, 3 year programme)

Use to combine Mathematics with any of: Statistics, Geography, Mathematics, Sociology, Anthropology, Politics, Education, Philosophy or any other Arts subject.

Conjoint BCom/BSc or Conjoint BA/BCom (both give 2 degrees in a minimum of 4 years)

These are challenging programmes that permit a broader education and increased employment opportunities.

Degrees and specialisations including a Mathematics major[1]

Degrees	Specialisations				
	Mathematics	Applied Mathematics	Industrial Mathematics	Logic and Computation[2]	Bioinformatics[2]
BA	★				
BSc	★	★	★	★	★
BSc(Hons)	★	★		★2	★2
GradDipSci	★	★			
PGDipSci	★	★		★2	
MA	★				
MSc	★	★		★3	★3
PhD	★	★			

[1]See the Graduate Mathematics section (Page 25) ad the Mathematics Postgraduate Handbook for explanation about graduate and postgraduate (post-Bachelor) degrees and diplomas. [2] Requires specialisations in these areas (including courses in topics other than Mathematics) . [3] Requires PGDipSci/BSc(Hons) in another subject than Mathematics.

What careers for Mathematics Graduates?

A good mathematical background enhances and develops your problem-solving skills, comprehension of abstract concepts and analytical and creative thinking. These are valued qualities in technical roles and in positions of leadership and management. According to a US-based website www.careercast.com, the job of Mathematician is the "best" occupation out of a list of 200, with other maths-based jobs like Statistician, Actuary, Accountant, Computer scientist and Economist also making the top twelve

Our Mathematics graduates work in:

- Academic careers
- Analysis with Policy Focus
- Biostatistics
- Biotechnology (USA)
- Carthography
- Chemistry
- Commercial Banking
- Ecological modelling (AgResearch)
- Electrical or Computer Engineering
- Insurance Risk Assesment (Vero)
- Information systems or Computer science
- Investment banks
- Meteorology (Metservice)
- Ministery of Defence
- Operations Research
- Research (Crown and private institutions)
- Software Programming
- Statistical analysis (eg. Statistics NZ)
- Teaching
- Traffic Analysis and Engineering
- Sustainability Analysis (Landcorp)

- **or as**

- Actuary
- Business Analysist
- Information Analysist (MSD)
- Neuroscientist (Harvard)
- Resource Accounting Analyst (Landcorp),
- Scientist-Modeller/Statistician (NIWA)
- Telecommunications consultants (Telecom)

Further Mathematics careers include

- Aeronautics
- Airline scheduling
- Automobile industry consultants
- Brain modelling and imaging
- Circuit design
- Cryptography (including internet and telecommunication security)
- Data mining
- Drug development
- Internet traffic-routing
- Military intelligence
- Oceanography/Fisheries
- Soil-remediation
- Seismic exploration
- Space missions
- Stock-market brokers

... applied mathematicians have even been consultants to chocolatiers!

Undergraduate Mathematics Studies

Introduction to Undergraduate Studies

Most students coming to The University of Auckland study towards a degree. The most common is a Bachelor's degree, such as a Bachelor of Science (BSc), Bachelor of Arts (BA) or Bachelor of Commerce (BCom). A degree is also known as a programme.

It usually takes three years of full time study to complete a BSc. Each year at university, students should take 8 courses if they are doing a full time programme – 4 each semester.

As progress is made through the degree, the courses become more specialised. To illustrate this, courses are divided into three levels of difficulty – Stage I, II and III. Sometimes, students need a preparation to Stage I courses: several pre-degree programmes were designed for them.

Some Stage I and II courses need to be taken before some other Stage II and III courses. The former are called prerequisites. Some courses cannot be taken if other courses are taken. These are known as restrictions.

A student must take courses in at least three subjects as part of their degree. One of the subjects can be chosen as a major, or a number of courses in related subjects can be taken as a specialisation. A major or a specialisation is also known as a plan.

A student needs to take at least 4 courses (60 points) at Stage III for a major or a specialisation.

A BSc in Mathematics can be in Mathematics or in Applied Mathematics. Mathematics courses are also included as part of other programmes such as the Bachelor of Technology and the Bachelor of Commerce. Mathematics can also be taken as a major for the Bachelor of Arts (BA).

A good starting point for essential information about enrolment and degrees is the Faculty of Science Prospective students webpage at www.science.auckland.ac.nz/uoa/science/for/prospective/prospective.cfm

The present handbook should be read in conjunction with the 2009 University of Auckland Calendar. See **www.auckland.ac.nz/calendar.** Particularly, students should refer to the Calendar to ensure they comply with all degree requirements. The Calendar is the legal reference document of The University of Auckland. It sets out details of general University and programme-specific regulations and provides detailed course information. It can be accessed online at www.auckland.ac.nz/calendar, via Faculty offices or at the University's various libraries. Details on courses and their requirements can be found in the "Regulations for the Degree of Bachelor of Science" (or in the "Regulations for the Degree of Bachelor of Arts") sections.

Pre-degree Programmes

Superstart Refresher Course

This is a two week intensive course for students who:

(a) have a low level of achievement in NCEA Level 3 Calculus (e.g. have "Achieved" rather than "Merit" or better, in all NCEA Level 3 Calculus credits i.e. an average of 60 or less);

(b) have gaps in their preparation, either from incomplete Level 3 NCEA credits or by having completed CIE AS rather than A2;

(c) have studied Statistics rather than Calculus at Level 3; or

(d) have Year 13 (Seventh Form) equivalent qualifications, but have not studied Mathematics for some time.

Students falling into these categories can expect real difficulty in the first year entry level Mathematics courses (MATHS 108, ENGSCI 111, PHYSICS 111). The aim of Superstart is to boost skills and understanding in order to make a pass in the standard courses more achievable. Students who have 18 credits at Level 3 mainly in Statistics and who wish to study MATHS 150 (Advancing Mathematics 1) should consider enrolling in Superstart for its calculus content.

10 day course
(recommended for most students)
Date: 16 - 27 February, 2009
Course fee: $250

7 day course
(recommended only for students with strong algebra and a good understanding of functions but gaps in calculus and/or trigonometry)

Date: 19 - 27 February 2009
Course fee: $185

For further information see:
www.math.auckland.ac.nz/Wiki/Superstart/

Tertiary Foundation Certificate Programme (TFC)

The Tertiary Foundation Certificate Programme (TFC) is recommended for students who need skills, confidence and a qualification, to equip them for university study. It is a full-year programme covering a range of subjects where Mathematics and English are compulsory. The Mathematics section prepares students for MATHS 101 or MATHS 102 the following year. Further information and application forms are available from the Programme Secretary:

Gill Stringer
English Department
Arts 1 Building
Room A 403
Phone: ext 84145
Email: g.stringer@auckland.ac.nz

Or for information on the Mathematics component contact:

Moira Statham or Sheena Parnell
Room 324 - Mathematics Department
Phone: ext 85750
Email: parnell@math.auckland.ac.nz
or statham@math.auckland.ac.nz

MAX (Mathematical Acceleration and eXtension)

A course designed for high-school students who have shown themselves to be able mathematicians and who can handle a solid workload. For further details see www.math.auckland.ac.nz/Teaching/Max/

or contact:
Wendy Stratton
Room 413
Phone: ext 85757
Email: w.stratton@math.auckland.ac.nz

Selecting Stage I Mathematics Courses

The Mathematics Department has a variety of entry levels for courses in Mathematics, depending upon a student's mathematical background.

Enrolment in Stage 1 courses is largely determined by NCEA results, or equivalent. Students should consult course diagrams and descriptions in this handbook and choose the courses they feel will suit them best. Enrolment choices can be revised during the first two weeks of each semester.

NCEA Background	Course	Notes
No Level 3 Mathematics or Statistics and fewer than 12 credits in Mathematics at Level 2.	MATHS 101 Mathematics in Society	For students with little or no school mathematics preparation. Can also be taken as General Education course.
At least 18 credits in Mathematics at NCEA Level 2 (or equivalent) and fewer than 12 credits in Calculus or Statistics at NCEA Level 3.	MATHS 102 Functioning in Mathematics	Covers much of the content of NCEA Level 3 Calculus.
At least 12 credits in NCEA Level 3 Calculus, or at least 18 credits in NCEA level 3 Statistics (or equivalent) or MATHS 102. Restricted against MATHS 150	MATHS 108 General Mathematics 1	Extends Level 3 Calculus.
At least 18 credits in Calculus at NCEA Level 3, including at least 6 credits at merit or excellence (or equivalent) or B+ in MATHS 102. Restricted against MATHS 108	MATHS 150 Advancing Mathematics 1	Students considering a major in Mathematics, Economics, Physics or Computer Science should take this core course.
Students also need to be enrolled in MATHS 108 or 150.	MATHS 162 Modelling and Computation	Applied Mathematics majors should take this core course.
Enrolment requires permission from Department. See MAX brochure	MATHS 153 Accelerated Mathematics	For Year 13 High-School students only. UoA students should take MATHS 150.
No prerequisites or restrictions. Please refer to General Education Schedule.	MATHS 190/190G Great Ideas Shaping our World	Can be taken either as a General Education course or as part of a BSc/BA.

Stage I Courses

Key	
MATHS	Mathematics courses
SS	Summer School
S1	Semester 1
S2	Semester 2
C	City Campus
E	Epsom Campus
M	Manukau Institute of Technology
91 - 94	Tertiary Foundation Certificate Courses
100 - 199	Stage I level courses
200 - 299	Stage II level courses
300 - 399	Stage III level courses

Textbooks are available from the University Bookshop (UBS) in the Kate Edger Commons building, City Campus.

Study Guides and other resource materials are available at the Student Resource Centre (SRC) in Room G16, on the ground floor of the Science Centre, Building 303, 38 Princes St, Auckland.

MATHS 101/ MATHS 101G (15 points) Mathematics in Society

Recommended Preparation: For students who have not studied Mathematics at NCEA level 3 (or equivalent) or have no formal mathematical background. This course may not be taken with or after any other Mathematics course at Stage I or above.

MATHS 101 and the General Education Mathematics course, MATHS 101G, are taught as a single course. They are aimed to build confidence using Mathematics while demonstrating the role Mathematics plays in understanding and guiding human activity. The course is taught thematically and students experience how fundamental mathematical ideas occur in modelling diverse features of our society, such as our environment, (e.g. air pollution), medicine (e.g. burns, drugs dosages).

Timetable		
SS C	10:00AM to 12:00PM 10:00AM to 11:00AM + tutorial	Tue Thu Fri Wed
S1 C	4:00PM to 5:00PM + tutorial	Mon Tue Wed
S2 C	4:00PM to 6:00PM 4:00PM to 5:00PM + tutorial	Mon Wed
S2 E	10:30AM to 12:20PM	Mon Wed
S2 M	9:00AM to 12:00PM 8:30AM to 10:00AM	Tue Wed

Text required: Course Resource Pack from Student Resource Centre

For advice: Dr Hannah Bartholomew
hannahb@math.auckland.ac.nz , Ext 84239

Following course: MATHS 102

MATHS 102 (15 points)
Functioning In Mathematics

Recommended Preparation: For students who have achieved fewer than 12 credits in Calculus or Statistics at NCEA Level 3, or who have achieved at least 18 credits in Mathematics at NCEA Level 2 (or equivalent) and fewer than 12 credits in Calculus or Statistics at NCEA Level 3

Restriction: MATHS 102 may be taken with or after MATHS 190, or after MATHS 101. It may not be taken with or after any other Mathematics course at Stage I or above.

This introduction to calculus focuses on the development of mathematical skills and concepts leading up to calculus, through active participation in problems using functions to model real life contexts. It prepares students for further study, for instance, MATHS 108, 150.

Timetable		
SS C	10:00AM to 12:00PM 10:00AM to 11:00AM + tutorial	Tue Wed Thu Fri
S1 C	10:00AM to 11:00AM + tutorial	Mon Tue Thu
S2 C	4:00PM to 5:00PM + tutorial	Mon Tue Thu

Recommended Text: Coursebook from University Book Shop

For advice: Garry Nathan
nathan@math.auckland.ac.nz or Greg Oates
oates@math.auckland.ac.nz

Following courses: MATHS 108 or MATHS 150 with B+ or better

MATHS 108 (15 points)
General Mathematics 1

Recommended Preparation: MATHS 102 or at least 12 credits in NCEA level 3 Calculus or at least 18 credits in NCEA level 3 Statistics (or equivalent)

This is the post-Year 13 entry point for students wishing to take mathematics to support non-mathematical degrees or majors. It leads on to a few courses in mathematics. The topics covered are similar to MATHS 150, but the emphasis is on techniques and applications. Contexts from science, informatics, commerce, and biomedicine are used to illustrate the underlying role played by mathematics and provide students with the knowledge they need for these fields.

Restriction: ENGSCI 111, MATHS 130, 150, 151, 153, 208, 250, PHYSICS 111, 210.

Timetable (each stream has also a set of tutorials to choose from)		
SS C	12:00PM to 1:00PM 12:00PM to 2:00PM	Tue Wed Thu Fri
S1 C	8:00AM to 9:00AM	Mon Wed Fri
S1 C	10:00AM to11:00AM	Mon Wed Fri
S1 C	12:00PM to 1:00PM	Mon Wed Fri
S1 C	3:00PM to 4:00 PM	Mon Wed Fri
S2 C	12:00PM to 1:00PM	Mon Wed Fri
S2 C	2:00PM to 3:00PM	Mon Wed Fri
S2 C	5:00PM to 6:00PM	Mon Wed Fri

Texts required: Anton, H., Bivens, I., Davis, S. "Calculus" (8th Edition). Wiley.

Anton, H., & Busby, R.C. "Contemporary Linear Algebra". Wiley.

Recommended Text: Coursebook from the University Book Shop (UBS).

For advice: Jamie Sneddon
sneddon@math.auckland.ac.nz

Following courses

- MATHS 208
- MATHS 250 with B+ or better
- MATHS 270 with MATHS 162

MATHS 150 (15 points)
Advancing Mathematics 1

Recommended preparation: B+ in MATHS 102, or at least 18 credits in NCEA level 3 Calculus, including at least 6 credits at merit or excellence (or equivalent)

This is the "Gateway to Mathematics" course, and is the post-Year 13 entry point for those intending to major in Mathematics, Physics, Statistics, or needing to keep their mathematical options open to enhance courses such as Computer Science, Geology, Economics, Finance, or Mathematical Biology. It continues to develop ideas in calculus, and is an introduction to linear algebra. The emphasis is on the underlying ideas and developing mathematical symbolism, ways of thinking, proving, and problem solving in preparation for further mathematical study.

In 2009 we are ensuring that - on average - grades obtained in this course will match grades obtained in MATHS 108.

Restriction: MATHS 108, 109, 151, 130, 208, 250, ENGSCI 111, PHYSICS 111, 210

Texts required:

- Anton, H., Bivens, I., Davis, S. "Calculus" (8th Edition). Wiley.
- Anton, H & Busby, R.C. "Contemporary Linear Algebra". Wiley.

Timetable		
S1 C	10:00AM to11:00AM + tutorial	Mon Thu Fri
S2 C	2:00PM to 3:00PM + tutorial	Mon Tue Fri

For advice: Wendy Stratton
stratton@math.auckland.ac.nz

Following courses

- MATHS 208, 250
- MATHS 270 with MATHS 162

MATHS 153 (15 points)
Accelerated Mathematics

A version of MATHS 150 for high achieving Year 13 students.

Note: Enrolment requires consent of Department.

Restrictions: MATHS 108, 109, 130, 150, 151, ENGSCI 111, PHYSICS 111

Timetable		
First lecture	4:30PM to 7:00PM	Tue 17 February
S1 C (during school terms)	4:30PM to 7 :00PM (mid-February to early June) (tutorial 5:30PM to 6:10 PM)	Tue

Materials required: Lecture Notes and a CD (also available free as web download).

Texts recommended: Anton, H, Bivens, I & Davis, S "Calculus" 8th Edition

Anton, H & Busby, R "Contemporary Linear Algebra", Wiley.

For advice: Wendy Stratton
stratton@math.auckland.ac.nz

Following courses:

- MATHS 208, 250
- MATHS 270 with MATHS 162

MATHS 162 (15 points)
Modelling and Computation

Corequisite: Concurrent enrolment in MATHS 108 or MATHS 150

In this introduction to mathematical modelling and scientific computing, students will learn how to formulate mathematical models and how to solve them using numerical and other methods. A core course for students who wish to advance in Applied Mathematics.

Timetable		
S1 C	1:00PM to 2:00PM + tutorial	Mon Thu Fri
S2 C	1:00PM to 2:00PM + tutorial	Mon Thu Fri

Text recommended: Coursebook from UBS

For advice: Allison Heard heard@math.auckland.ac.nz

Following course: MATHS 270

MATHS 190/ MATHS 190G (15 points)
Great Ideas Shaping Our World

Mathematics contains many powerful and beautiful ideas that have shaped the way we understand our world. This course explores some of the grand successes of mathematical thinking. No formal mathematics background is required, just curiosity about topics such as infinity, paradoxes, knots and fractals and cryptograph

Text required: E. Burger and M. Starbird, "The Heart of Mathematics" (2nd edition)

Note: should be ordered directly from publisher.

Timetable		
S1 C	12:00PM to 1:00PM + tutorial	Mon Wed
S2 C	12:00PM to 1:00PM + tutorial	Mon Wed

For advice: Vivien Kirk kirk@math.auckland.ac.nz

Stages II and III

Stage II

There are two levels of courses at Stage II. The first level, MATHS 208 (General Mathematics 2) and MATHS 250 (Advancing Mathematics 2), follow on from their Stage I equivalents, MATHS 108 and 150. Students with good grades in MATHS 108 are encouraged to progress to MATHS 250. MATHS 270 (Numerical Computation) follows on from MATHS 162 (Modelling and Computation) and is required for a major in Applied Mathematics. COMPSCI 225 (Discrete Structures in Mathematics and Computer Science) is also a mathematics course. It follows on from MATHS 108 or 150. Beyond MATHS 208 and 250 come MATHS 253 (Advancing Mathematics 3), MATHS 255 (Principles of Mathematics) and MATHS 260 (Differential Equations).

Mathematics majors should take all three of these courses.

Applied Mathematics majors should take MATHS 253, 260 and 270. Entrance to MATHS 253 and 255 from MATHS 208 requires A-; otherwise, advancing students must take MATHS 250 (Advancing Mathematics 2).

Stage III

There are several pathways into many of the Stage III courses; the diagrams in this handbook only show the preferred prerequisites. You should check the course listings to see what other prerequisites are allowed. Stage III Pure Mathematics courses often require MATHS 255 as a prerequisite. At Stage III, a major in Applied Mathematics must contain MATHS 361 and 340; it is recommended that it also contain 362 and 363. A major in Mathematics (sometimes referred to as Pure Mathematics) has less restrictions. It should contain MATHS 332 and 320 or MATHS 328 if you are considering postgraduate study.

Stage II Courses

MATHS 202 (15 points)
Tutoring in Mathematics

Prerequisite: Prerequisite: 30 points from courses in Mathematics and Departmental consent required

This is a mainly practical course in which selected students learn tutoring skills that are put to use in MATHS 102 tutorials. In a small interactive class, students learn to mark, to question strategically and to facilitate learning. The theory and issues of Mathematics Education as a research field is also introduced.

It will normally be expected that students will have passed at least 90 points at Stage 1 including at least 30 points in Mathematics, and that they are enrolling in at least one other Stage II Mathematics course.

Text required: CD accompanying the MATHS 102 course is available from the SRC.

Timetable		
S1 C	2:00PM to 3:00PM	Mon Tue Wed

For advice and enrolment: Moira Statham statham@math.auckland.ac.nz

Following course: MATHS 302

MATHS 208 (15 points)
General Mathematics 2

Prerequisite: 15 points from ENGSCI 111, PHYSICS 111, MATHS 108, 130, 150, 151, 153

Restrictions: Cannot be taken, concurrently with, or after, MATHS 250, 253, PHYSICS 210, 211

This sequel to MATHS 108 features applications from the theory of multi-variable calculus, linear algebra and differential equations to real-life problems in statistics, economics, finance, computer science, and operations research. Matlab is used to develop analytical and numerical methods of solving problems.

Texts recommended:

- Anton, H., Bivens, I., Davis, S. "Calculus" (8th Edition). Wiley.
- Anton, H & Busby, R.C. "Contemporary Linear Algebra". Wiley.

Timetable (each stream has also a set of tutorials to choose from)		
SS C	12:00PM to 1:00PM 12:00PM to 2:00PM	Thu Tue Wed Fri
S1 C	2:00PM to 3:00PM	Mon Tue Wed
S1 C	5:00PM to 6:00PM	Mon Tue Wed
S2 C	8:00AM to 9:00AM	Mon Tue Wed
S2 C	3:00PM to 4:00PM	Mon Tue Wed

For advice: Alastair McNaughton a.mcnaughton@math.auckland.ac.nz
Bill Barton barton@math.auckland.ac.nz

Following courses:

- MATHS 250, 260, 269
- MATHS 253, 255 with A- or better

MATHS 250 (15 points)
Advancing Mathematics 2

Prerequisites: 15 points from ENGSCI 111, MATHS 150, 153, 208, PHYSICS 111, or a B+ pass in MATHS 108

Restrictions: MATHS 109, 152, 230, PHYSICS 112, 210

This preparation for advanced courses in Mathematics is intended for all students who plan to progress further in Mathematics. Covers topics from multivariable calculus and linear algebra that have many applications in science, engineering and commerce, including vector spaces, eigenvalues, power series, least squares and improper integrals. The emphasis is on both the results and the ideas underpinning these.

Texts required:

- Anton, H., Bivens, I., Davis, S. "Calculus" (8th Edition). Wiley.
- Anton, H & Busby, R.C. "Contemporary Linear Algebra". Wiley.

Timetable		
S1 C	2:00PM to 3:00PM + tutorial	Mon Tue Fri
S2 C	3:00PM to 4:00PM + tutorial	Mon Tue Fri

For advice: Warren Moors
moors@math.auckland.ac.nz

Following courses: MATHS 253, 255, 260, 269

MATHS 253 (15 points)
Advancing Mathematics 3

Prerequisites: 15 points from MATHS 152, 250, PHYSICS 112, 210, or an A- pass in MATHS 208

Restrictions: PHYSICS 211

The standard sequel to MATHS 250. It covers topics in linear algebra and multi-variable calculus including linear transformations, quadratic forms, double and triple integrals and constrained optimisation. It is a preparation for a large number of Stage III courses in mathematics and statistics, and for many advanced courses in physics and other applied sciences.

All students intending to advance in mathematics should take this course.

Texts required:

- Anton, H., Bivens, I., Davis, S. "Calculus" (8th Edition). Wiley.
- Anton, H & Busby, R.C. "Contemporary Linear Algebra". Wiley.

Timetable		
S1 C	1:00PM to 2:00PM + tutorial	Mon Thu Fri
S2 C	1:00PM to 2:00PM + tutorial	Mon Thu Fri

For advice: Alastair McNaughton
a.mcnaughton@math.auckland.ac.nz

Following courses:

- MATHS 340
- MATHS 320 with A- or better
- MATHS 361, 362 with MATHS 260
- MATHS 332 with MATHS 255 or A- in MATHS 260

MATHS 255 (15 points)
Principles of Mathematics

Prerequisites: 15 points from MATHS 152, 250, PHYSICS 112, 210 or an A- pass in MATHS 208

Text required: Geoff Smith, "Introductory Mathematics: Algebra and Analysis", Springer 2004

An introduction to mathematical thinking and communication: how to organise arguments logically and prove results. Rigorous notions are developed using topics that are central to the foundations of algebra and analysis including set theory, logic, abstract vector spaces and elementary number theory. An essential course for all students advancing in pure mathematics.

Timetable		
S1 C	9:00AM to 10:00AM + tutorial	Mon Tue Fri
S2 C	4:00PM to 5:00PM + tutorial	Mon Tue Fri

For advice: Jianbei An an@math.auckland.ac.nz

Following courses:

- MATHS 315, 320, 326, 328
- MATHS 332 with MATHS 253

MATHS 260 (15 points)
Differential Equations

Prerequisite: 15 points from MATHS 150, 153, 208, 250, PHYSICS 111, or at least an A- in MATHS 108

Text required: Blanchard, Devaney and Hall, "Differential Equations", (1st or 2nd edition).

The study of differential equations is central to mathematical modelling of systems that change. Develops methods for understanding the behaviour of solutions to ordinary differential equations. Qualitative and elementary numerical methods for obtaining information about solutions are discussed, as well as some analytical techniques for finding exact solutions in certain cases. Some applications of differential equations to scientific modelling are discussed. A core course for applied mathematics.

Timetable		
S1 C	11:00AM to 12:00PM + tutorial	Mon Tue Fri
S2 C	11:00AM to 12:00PM + tutorial	Mon Tue Fri

For advice: Vivien Kirk kirk@math.auckland.ac.nz

Following courses:

- MATHS 361, 362 with MATHS 253
- MATHS 332 with B+ or better and MATHS 253
- MATHS 363 with B+ or better, or with MATHS 270

New course

MATHS 269 (15 points)
Mathematics of Money

Prerequisite: MATHS 150, 208 or 250

An introduction to the mathematics of the personal finance of saving and investment. Topics include interest, inflation, annuities, bonds, shares, mortgages and pension plans. Aspects of KiwiSaver will be covered. This course will provide a useful introduction to STATS 370 but is not a prerequisite.

Text required: *(available through the UoA Library as an e-Resource)* D Lovelock, M Mendel, and A Larry Wright, An introduction to the mathematics of money - saving and investing, Springer, 2007.

Timetable		
S2 C	2:00PM to 3:00PM + tutorial	Mon Thu Fri

For advice: Allison Heard heard@math.auckland.ac.nz and Robert Chan chan@math.auckland.ac.nz

Following course: MATHS 363 with MATHS 260

MATHS 270 (15 points)
Numerical Computation

Prerequisite: MATHS 108 or 150 or equivalent, and a computing course such as COMPSCI 101 or MATHS 162 or equivalent

Restrictions: MATHS 267

Text required: Lecture notes are available online.

Many mathematical models occurring in Science and Engineering cannot be solved exactly using algebra and calculus. Students are introduced to computer based methods that can be used to find approximate solutions to these problems. The methods covered in the course are powerful yet simple to use. This is a core course for students who wish to advance in applied mathematics.

Timetable		
S1 C	3:00PM to 4:00PM + tutorial	Mon Tue Wed
S2 C	9:00AM to 10:00AM + tutorial	Mon Tue Wed

For advice: Allison Heard heard@math.auckland.ac.nz and Robert Chan chan@math.auckland.ac.nz

Following course: MATHS 363 with MATHS 260

COMPSCI 225 (15 points)
Discrete Structures in Mathematics and Computer Science

Recommended preparation: MATHS 108, 152 or 150 or COMPSCI 101

Restriction: 445.225

Introduction to logic, principles of counting, mathematical induction, recursion, relations and functions, graphs and trees, and algorithms. This course is especially suited for students of computer science and others who are interested in logic and the foundations of mathematics.

Timetable		
S1 C	10:00AM to 11:00AM	Mon Wed Thu Fri
S2 C	9:00AM to 10:00AM	Tue Wed Thu Fri

For advice: J. Sneddon ugadvice@math.auckland.ac.nz

Following courses:

- MATHS 315
- MATHS 326: B+ in either MATHS 208 or 250
- MATHS 328: B+ in COMPSCI 225 and one of MATHS 208, 250, 253

Stage III Courses

MATHS 302 (15 points)
Teaching and Learning Mathematics

Recommended preparation: at least 45 points from courses in Mathematics or Statistics

For people interested in thinking about the social, cultural, political, economic, historical, technological and theoretical ideas that influence Mathematics Education, who want to understand the forces that shaped their own Mathematics Education, or who are interested in teaching. Students will develop their ability to communicate ideas in essay form.

Texts recommended:

- "Mathematics Education: A Handbook for Teachers, Volume 1", edited by J. Neyland, published by The Wellington College of Education, Wellington.
- "Mathematics in the New Zealand Curriculum", Ministry of Education, 1992.

Timetable		
S1 C	4:00PM to 6:00PM	Mon Wed

For advice: Judy Paterson
paterson@math.auckland.ac.nz

MATHS 310 (15 points)
History of Mathematics

Corequisite: At least 30 points at Stage III in Mathematics.

Assessment: 100% internally assessed.

This study of some topics occurring in the history of Mathematics which facilitate understanding of modern Mathematics. Topics include concepts of number, geometry, algebra and differential and integral calculus.

Timetable		
S2 C	5:00PM to 6:00PM	Mon Tue Wed Thu

For advice: Garry Tee tee@math.auckland.ac.nz

MATHS 315 (15 points)
Mathematical Logic

Prerequisite: COMPSCI 225 or MATHS 255 or PHIL 222

Text recommended: Hamilton, A. G. "Logic for Mathematicians".

Logic addresses the foundations of mathematical reasoning. It models the process of mathematical proof by providing a setting and the rules of deduction. Builds a basic understanding of first order predicate logic, introduces model theory and demonstrates how models of a first order system relate to mathematical structures. The course is recommended for anyone studying high level computer science or mathematical logic.

Timetable		
S2 C	3:00PM to 4:00PM + a tutorial	Mon Tue Wed

For advice: Sina Greenwood
sina@math.auckland.ac.nz

MATHS 320 (15 points)
Algebraic Structures

Prerequisites: MATHS 255 or 328, or an A– pass in MATHS 253

This is a framework for a unified treatment of many different mathematical structures. It concentrates on the fundamental notions of groups, rings and fields. The abstract descriptions are accompanied by numerous concrete examples. Applications abound: symmetries, geometry, coding theory, cryptography and many more. This course is recommended for those planning graduate study in pure mathematics.

Text required: Gallian, J.A., "Contemporary Abstract Algebra", Houghton Mifflin Company.

Timetable		
S2 C	2:00PM to 3:00PM + tutorial	Mon Tue Wed

For advice: Jianbei An an@math.auckland.ac.nz

MATHS 326 (15 points)
Combinatorial Computing

Prerequisite: MATHS 255, or COMPSCI 225 and a B+ in either MATHS 208 or 250

Combinatorics is a branch of Mathematics that studies collections of objects that satisfy specified criteria. An important part of combinatorics is graph theory, which is now connected to other disciplines including bioinformatics, electrical engineering, molecular chemistry and social science. The use of combinatorics in solving counting and construction problems is covered using topics that include algorithmic graph theory, codes and incidence structures, and combinatorial complexity.

Recommended Text: Agnarsson, Greenlaw "Graph Theory: Modeling, Applications, and Algorithms"

Timetable		
S2 C	11:00AM to 12:00PM + tutorial	Wed Thu Fri

For advice: J. Sneddon sneddon@math.auckland.ac.nz

MATHS 328 (15 points)
Algebra and Applications

Prerequisite: MATHS 255, or B+ pass in COMPSCI 225 and one of MATHS 208, 250, 253

Text required: "Algebra and Applications" is available from the SRC.

The goal of this course is to show the power of algebra and number theory in the real world. It concentrates on concrete objects like polynomial rings, finite fields, groups of points on elliptic curves, studies their elementary properties and shows their exceptional applicability to various problems in information technology including cryptography, secret sharing, and reliable transmission of information through an unreliable channel

Timetable		
S1 C	9:00AM to 10:00AM + tutorial	Wed Thu Fri

For advice: A. Slinko slinko@math.auckland.ac.nz

Following course: MATHS 320

MATHS 332 (15 points)
Real Analysis

Prerequisite: MATHS 253 and 255, or 253 and a B+ in MATHS 260

A standard course for every student intending to advance in pure mathematics. It develops the foundational mathematics underlying calculus, it introduces a rigorous approach to continuous mathematics and fosters an understanding of the special thinking and arguments involved in this area.

The main focus is analysis in one real variable with the topics including real fields, limits and continuity, Riemann integration and power series.

Timetable		
S1 C	2:00PM to 3:00PM	Mon Tue Wed Fri

For advice: R. Gover gover@math.auckland.ac.nz

Following course: MATHS 333

MATHS 333 (15 points)
Analysis in Higher Dimensions

Prerequisite: MATHS 332

Strongly Recommended: MATHS 253, 255

By selecting the important properties of distance many different mathematical contexts are studied simultaneously in the framework of metric and normed spaces. Examines carefully the ways in which the derivative generalises to higher dimensional situations. These concepts lead to precise studies of continuity, fixed points and the solution of differential equations. A recommended course for all students planning to advance in pure mathematics.

Timetable		
S2 C	9:00AM to 10:00AM	Mon Wed Thu Fri

For advice: R. Gover gover@math.auckland.ac.nz

MATHS 340 (15 points)
Real and Complex Calculus

Prerequisite: MATHS 253

Restrictions: MATHS 347

Calculus plays a fundamental role in mathematics, answering deep theoretical problems and allowing us to solve very practical problems. Extends the ideas of calculus to two and higher dimensions, showing how to calculate integrals and derivatives in higher dimensions and exploring special relationships between integrals of different dimensions. It also extends calculus to complex variables.

Text required: Michael Greenberg, Advanced Engineering Mathematics (2nd edition)

Timetable		
S2 C	1:00PM to 2:00PM + tutorial	Mon Tue Wed
S2 C	1:00PM to 2:00PM + tutorial	Mon Tue Wed

For advice: Philip Sharp
sharp@math.auckland.ac.nz

MATHS 361 (15 points)
Partial Differential Equations

Prerequisite: MATHS 260 and 253 or equivalent, or PHYSICS 211

Partial differential equations are used to model many important phenomena in the real world (such as heat flow and wave motion). An introductory course on methods of solution for linear partial differential equations in one, two and three dimensions.

Text required: Michael Greenberg, Advanced Engineering Mathematics (2nd edition)

Timetable		
S1 C	10:00AM to 11:00AM + tutorial	Wed Thu Fri

For advice: S. Taylor taylor@math.auckland.ac.nz

MATHS 362 (15 points)
Methods in Applied Mathematics

Prerequisite: Either MATHS 260 and MATHS 253 or equivalent; or PHYSICS 211

Recommended preparation: MATHS 340 and 361

Restriction: MATHS 347

Techniques such as variational methods, Green's functions, and perturbation analysis are a crucial part of the applied mathematician's toolbox. Covers a selection of such advanced topics in detail, and is suitable for those students intending to advance in applied mathematics or physics.

Recommended texts:

- Holmes "Introduction to perturbation methods"
- Stakgold "Green's functions and boundary value problems"
- Tang "Mathematical Methods for Engineers and Scientists 3 Fourier Analysis, Partial Differential Equations and Variational Methods"

Timetable		
S2 C	10:00AM to 11:00AM + tutorial	Wed Thu Fri

For advice: Mike Meylan
meylan@math.auckland.ac.nz

MATHS 363 (15 points)
Advanced Modelling and Computation

Prerequisite: Either MATHS 260 and 270, or B+ in MATHS 260, or PHYSICS 211

Restriction: MATHS 367

Recommended reading:

- Holmes "Introduction to Numerical Methods in Differential Equations"
- Strogatz "Nonlinear Dynamics and Chaos"
- Blanchard, Devaney and Hall "Differential Equations"
- Haberman "Applied Partial Differential Equations"

Much of modern research in applied mathematics, physics and engineering relies heavily on the construction and numerical solution of mathematical models. Covers the theory and practice of such computational approaches, including the study of numerical linear algebra and differential equations, and bifurcations in ordinary differential equations. Matlab is used extensively.

Timetable		
S2 C	12:00PM to 1:00PM + tutorial	Wed Thu Fri

For advice: S. Taylor taylor@math.auckland.ac.nz

Graduate Mathematics

Graduate Degrees

There are four possible graduate programmes you can enrol in, after getting your BSc/BA in Mathematics or BSc in Applied Mathematics (excluding the PhD). Any enrolment in a postgraduate programme must be approved by the graduate advisor for the Department of Mathematics.

The information below summarises the regulations for the degrees. If you require further information, please contact

Steve Taylor
Graduate Advisor for all graduate programmes (except PhD)
Room 306 - Mathematics Department
Email: pgadvice@math.auckland.ac.nz

Postgraduate Diploma in Science (PGDipSci)

This is the most popular graduate programme, possibly because you can take up to four years to complete it.

PGDipSci in Mathematics

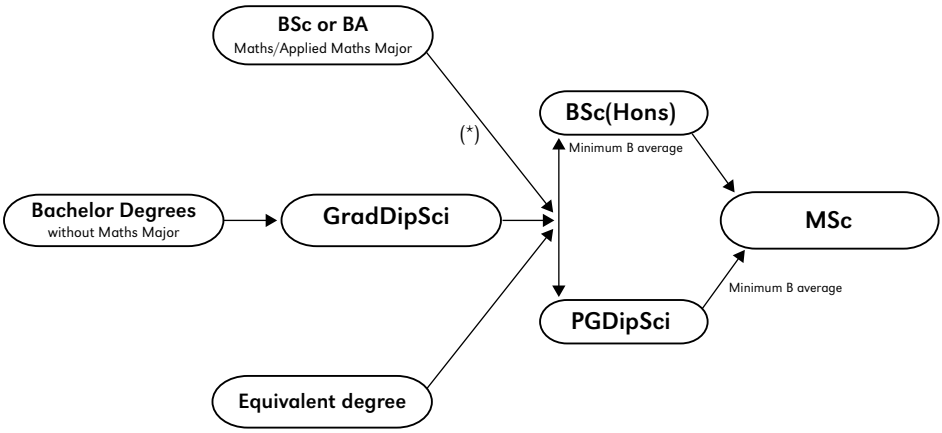
Prerequisite: A major in Mathematics, including (either MATHS 320 or 328) and MATHS 332, or an equivalent
Note: Mathematics Education students may substitute MATHS 302 for one of these courses
Requirement:
* at least 75 points in 700 level Mathematics courses
* up to 45 points from approved 600 or 700 level courses in Mathematics or related subjects, with the approval of the Head of Department

PGDipSci in Applied Mathematics

Prerequisite: A major in Applied Mathematics, or equivalent

Requirement:
* at least 60 points from MATHS 761, 763, 764, 769, 770, PHYSICS 701, 707
* up to 60 points from approved 700 level courses in Mathematics or related subjects with approval of the Head of Department

If your average marks for the courses of your PGDipSci are sufficiently high, you will be awarded the degree with distinction or merit.



(*) A Mathematics Major BSc/BA can continue with an Applied Mathematics GDipSci and vice versa.

Bachelor of Science or Arts (Honours) (BSc(Hons) / BA(Hons))

BSc(Honours)/BA(Honours) in Mathematics

Prerequisite: A major in Mathematics including (either MATHS 320 or MATHS 328) and MATHS 332 and at least 90 points at Stage III (These courses need not all be in Mathematics or Applied Mathematics.)

Requirement:

* 30 points: MATHS 776 (Dissertation in Mathematics or Applied Mathematics) and
* 90 points in 700-level Mathematics courses or at least 60 points in 700-level Mathematics courses and up to 45 points, subject to approval by the Head of Department, from 700-level courses in a related subject

BSc(Honours) in Applied Mathematics

Prerequisite: A major in Applied Mathematics and at least 90 points at Stage III

Requirement:

* at least 45 points from MATHS 761, 763, 764, 769, 770, PHYSICS 701, 707
* 30 points: MATHS 776 Dissertation in Mathematics or Applied Mathematics
* up to 45 points from approved 700-level courses in Mathematics or related subjects with approval of the Head of Department

You can do an Honours degree either full-time over one year or part-time over two years.

Graduate Diploma in Science (GradDipSci)

This diploma is at a lower level than a postgraduate diploma in science. To get a GradDipSci, you must pass 120 points at Stage II and above, with at least 75 points (of the 120) at Stage III or above. You can do a GradDipSci in Mathematics or Applied Mathematics. Before you can enrol in a GradDipSci you must have a BSc or an equivalent degree. A GradDipSci can be done part-time over four years. Students who enrol in this diploma are often transferring from other universities. If you have any questions about the programme, you should contact the Graduate Advisor.

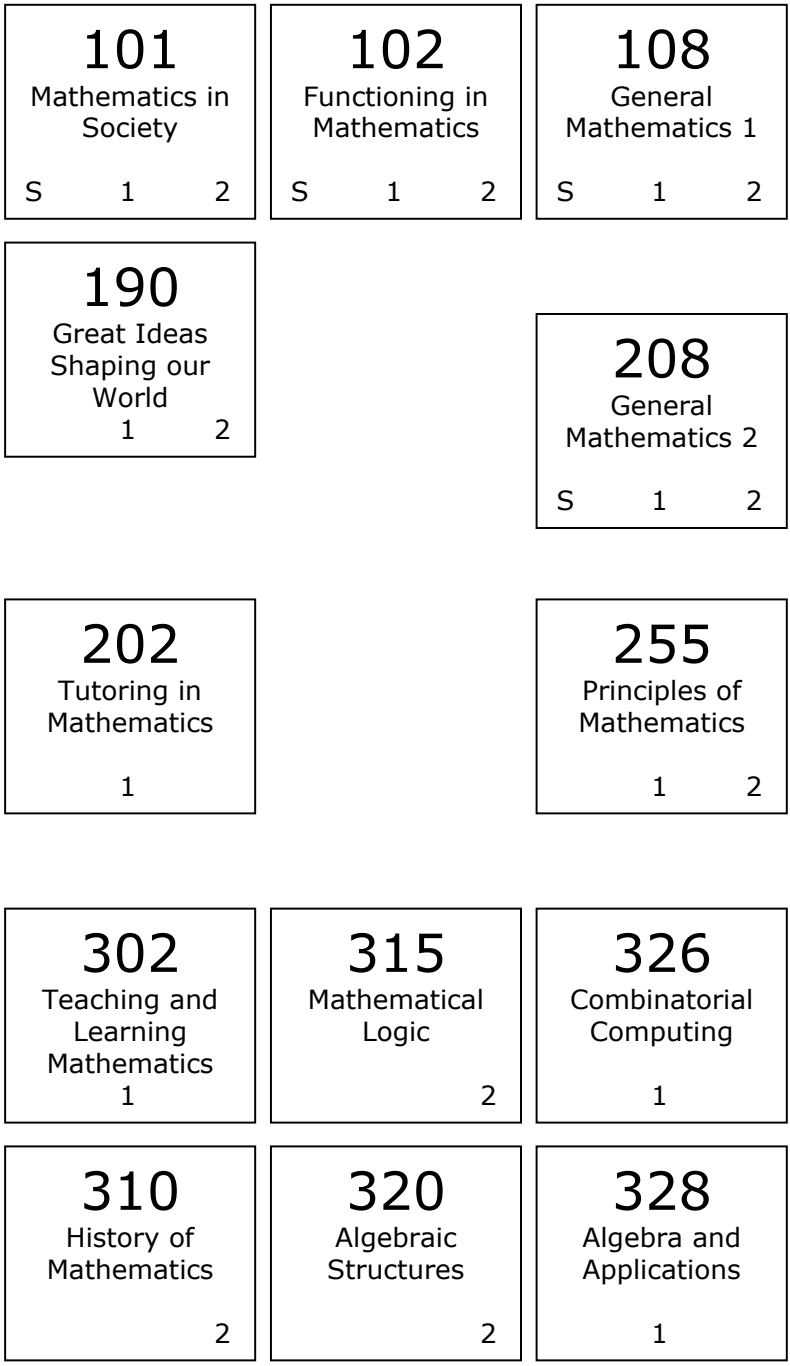
Master of Science (MSc)

To get an MSc, you must either do a 120 point thesis or a 90 point thesis and 30 points of approved 700-level courses. You can do an MSc in Mathematics, Applied Mathematics, Bioinformatics or Logic and Computation. Before you can enrol in an MSc you must have a BSc(Hons) or PGDipSci with sufficiently high marks in the required major. A MSc can be done part-time over two years.

Overview of Graduate Courses

2009 Postgraduate Courses			
MATHS	Title	Point value	Prerequisites or Recommended preparation
Summer Semester			
701	Research Skills in Mathematics Education	15	Department approval
Semester 1			
705	Social Issues in Mathematics Education	15	Department approval
706	Technology and Mathematics Education	15	Department approval
715	Graph Theory and Combinatorics	15	MATHS 326 or 320
720	Group Theory	15	MATHS 320
730	Measure Theory and Integration	15	MATHS 332 Recom.: MATHS 333
740	Complex Analysis	15	MATHS 332 Recom.: MATHS 333, 340
745	Chaos, Fractals and Bifurcation	15	Department approval
750	Topology	15	MATHS 332 or 353 Recom.: MATHS 333
763	Advanced Partial Differential Equations	15	MATHS 340 and 361
770	Advanced Numerical Analysis	15	MATHS 270 and one of MATHS 340, 361, 363
Semester 2			
712	Mathematics and Learning	15	Department approval
713	Logic and Set Theory	15	MATHS 315 or PHIL 305
714	Number Theory	15	B+ in MATHS 328 or 320
721	Representations and Structure of Algebras and Groups	15	MATHS 320
731	Functional Analysis	15	MATHS 332 and MATHS 333. Recom.: MATHS 730, 750
761	Dynamical Systems	15	MATHS 340 and 361
769	Applied Differential Equations	15	MATHS 340 and 361
783	Advanced Topic(s) in Mathematics 3 (Lie Groups and Algebras)	15	Recommended: MATHS 320 and 332
789	Advanced topics in Applied Mathematics 4 (Non-linear PDEs)	*15*	Recommended: MATH 340 and MATH 361
Various special topics and advanced topics courses, in Mathematics, Applied Mathematics and Mathematics Education are also available		15 or 30	Require a supervisor and Department approval

2009 Mathematics Undergraduate Courses Diagram



Please consult the Undergraduate Advisor for a personalised study plan.

150	153	162
Advancing Mathematics 1	Accelerated Mathematics	Modelling and Computation
1 2	1	S 1 2

250	COMPSCI 225	269
Advancing Mathematics 2	Discrete Structures	Mathematics of Money
1 2	1 2	2

253	260	270
Advancing Mathematics 3	Differential Equations	Numerical Computation
S 1 2	1 2	1 2

332	340	361
Real Analysis	Real and Complex Calculus	Partial Differential Equations
1	1 2	1

333	362	363
Analysis in Higher Dimensions	Methods in Applied Mathematics	Advanced Modelling and Computation
2	2	2

Branches of Mathematics

Pure Mathematics

Pure Mathematics is Mathematics which is studied because of its intrinsic beauty and usefulness within the subject, rather than mathematical techniques (sometimes called Applied Mathematics) which are developed to attack specific problems arising outside the field of Mathematics. Much Pure Mathematics was developed completely without regard to its applicability outside Mathematics, but has since proved to be absolutely indispensable in many and varied applications, and underlies all Applied Mathematics.

A degree with a focus on Pure Mathematics is an excellent qualification for a career in teaching or research, but also in many other domains. Taking additional courses in Applied Mathematics, Computer Science and Statistics can open career opportunities in government, insurance, banking and communications. A degree grounded in Pure Mathematics provides a good base for further study towards a masters degree or PhD in Mathematics, or in other branches of the mathematical and information sciences.

Pure Mathematics may be classified broadly into the areas of Algebra, Analysis, Combinatorics, Geometry, Logic, Number theory and Topology. There are many interconnections between these areas and this adds to their beauty and strength.

Analysis is the subject that grew out of Newton's discovery of calculus, although concepts as convergence and limit can be traced back to Greek mathematicians of Antiquity, while the first works on infinite series are due to Indian mathematicians of the Middle Ages. Analysis studies such topics as continuity, integration, differentiability, including the study of ordinary differential equations, partial differential equations and probability theory. All these subjects are critical to the applications of analysis to Physics, Engineering, Finance, Statistics, Biology, Genetics and almost anything that has a quantitative component.

Algebra is concerned with the study of structure, relation and quantity. It is a pure field but has a wide variety of applications, from understanding the Rubik's cube to classifying crystal structures and designing algorithms. A recent powerful application is to communications security: How do you communicate securely over an insecure network (eg. the Internet)? This problem has been around in a simpler form for centuries and its solution (found in the late 1970s) is used every time you use your browser for secure transmission, such as banking transactions. The solution, part of what is now called Public-key Cryptography, is described completely using mathematical ideas which are presented in MATHS 328. You can even easily make your own code.

Topology is sometimes called rubber sheet geometry, because it concerns itself with the spatial properties that are preserved after shapes are stretched or deformed without breaking. It does not distinguish between a square and a circle (as a rubber band circle can be stretched into a sphere) and it ignores distances (so that two different sized circles are equivalent in the topological universe). Topology studies global characteristics of shapes and surfaces and quantifies the differences algebraically, then uses those algebraic tools to further explore these characteristics and related ideas. The Poincaré Theorem (a long standing conjecture whose last case - in 3-dimensions - was proved by Grigori Perelman) is one of the most famous topological results. In a simplified version (from 1904) it states that if any loop on the surface of a 3-dimensional shape can be shrunk to a point (as a loop can do on the 3-D sphere), then the shape is just a 3-D sphere. This theorem has implications in a variety of fields such as astronomy and relativity theory. Topology has

strong connections to abstract Algebra, Analysis and Geometry, and has applications to Physics, Genetics (eg. understanding the knotting and unknotting of DNA) and Computer Science. A recent development, the topological quantum field theory, can be used for breaking cryptographic systems based on integer factorisation, widely used in banking encryptions. "People say pure mathematicians are just playing games with a bunch of rules", says Prof. D. Gauld, whose research topic is topology. "The amazing thing is that, so often, 10 or 50 years later, these great applications arise. When I first heard about topological quantum field theory, in 1994, there was no mention of their connection with banking encryptions."

Geometry arose as the field of knowledge dealing with spatial relationships. It was one of the two fields of pre-modern Mathematics, the other being the study of numbers. It appeared (more than 2500 years ago) as a collection of techniques dealing with the lengths, angles, areas, and volumes of physical objects, both on earth and in the sky. Greek mathematicians made it into a tool for developing logical arguments, abstract reasoning and investigating the nature of space and time. Euclid's Elements is the most famous geometry book of the Antiquity, since it presents geometric knowledge of that time through a set of axioms, which later came to be known as Euclidean geometry. Geometric thinking became a means to find the most efficient way to model a given phenomenon, after abstracting it from its particular instances. After the development of the calculus and the theory of differential equations, geometry was expanded to cover situations in which the classical lines, planes, and spheres were replaced by 'shortest paths on a surface' (or higher dimensional objects), 'minimal surfaces' (like soap films), and 'constant mean curvature surfaces' (like soap bubbles). In fact, all sorts of problems in which the solution was a configuration that minimized some quantity (such as mass, energy, volume, etc.) were seen to be special cases of a new 'differential' geometry and this launched a revolution in the study of partial differential equations that is continuing today. Einstein's theory of relativity and modern quantum theory (including string theory and its generalizations) are all part of differential geometry's wide scope. Its applications include not only theoretical Physics, but computer modelling of shape (eg. computer models of the brain), graphical representations, heat flow, optimization and control theory, and understanding properties of partial differential equations and their transformation rules.

The four courses MATHS 150, 250, 253 and 255 form a core that should normally be taken by students wishing to advance to courses in Pure Mathematics at Stage III or beyond.

Applied Mathematics

Modern science relies absolutely on Applied Mathematics. Any student interested in Physics, Biology, Earth sciences, Engineering, Medicine, Chemistry, Economics, or many other areas, will find the study of Applied Mathematics not only useful, but vitally important.

It is the job of an applied mathematician to show how mathematical techniques can be applied to science and technology to answer interesting questions. Our goal is usually to use mathematical equations to study real-world problems rather than to study equations for their own sake. In our department we use Mathematics to study such diverse areas as physiology, ice flow, floating runways, astronomy, quantum chemistry, nonlinear systems, the human genome and many other areas. Elements of these research areas are incorporated into our courses wherever possible.

The first year course MATHS 162 provides an introduction to Applied Mathematics, and it is strongly recommended that all students with interests in Applied Mathematics take this course. Some of the courses listed under Pure Mathematics in this handbook are also very important for Applied Mathematics and should be included in any course of study in Applied Mathematics.

Students taking Applied Mathematics will often also be taking another Science major. Indeed, we encourage this, as this gives a breadth of training that students will find useful.

For further information contact the Undergraduate Advisor,
Dr. Jamie Sneddon
Room 305 - Mathematics department
Phone: ext 82121 Email: sneddon@math.auckland.ac.nz

or Vivien Kirk
Room 423 - Mathematics department
Phone: ext 88792
Email: kirk@math.auckland.ac.nz

Mathematics Education

Mathematical thinking is behind almost every type of activity in society, and there is thus a permanent need for Mathematics graduates who are adept at passing on mathematical knowledge and techniques. Some Mathematics graduates will be in a position where they will take up careers in secondary teaching, some will tutor individuals or groups, and some will enter a university as lecturers. Mathematics Education is a basic study for any of these activities. Mathematics teaching is an extremely satisfying occupation. It involves: helping people to overcome their fears of Mathematics and appreciate the beauty of the subject; helping others gain mathematical understanding and a new power over their environment; and sharing ideas with other people.

The Mathematics Education Unit within the Department of Mathematics offers courses which examine the teaching and learning of the subject. These can be taken by anyone studying Mathematics, but are particularly suitable for those who are thinking about teaching, tutoring, or lecturing Mathematics as a career. The courses require a reasonable background in Mathematics, and they will contribute to a student's own understanding of Mathematics while providing an opportunity to reflect upon how Mathematics is learnt.

Please note that MATHS 302 is a recommended prerequisite for all graduate Mathematics Education courses.

To become a secondary Mathematics teacher you need at least one Stage III Mathematics or Statistics course in your degree and to have completed the one year Graduate Diploma in Teaching (Secondary) programme.

Interested students are invited to discuss their programmes with:

Judy Paterson
Room 322 - Mathematics Department
Phone: ext 88605
Email: paterson@math.auckland.ac.nz

or Mike Thomas
Room 327 - Mathematics Department
Phone: ext 88791
Email: m.thomas@math.auckland.ac.nz

Mathematics with Statistics

Mathematics is the foundation for statistical theory and practice. A strong background in calculus and linear algebra provides ideal mathematical training for the budding statistician. Statistics is an indispensable tool for a wide range of mathematical applications, in areas as diverse as Industrial Mathematics, Operations Research, Financial Mathematics, biological modelling, Physics and Chemistry.

Statisticians work in the following sorts of areas: banks, Crown research institutes, Crown health enterprises, finance companies, government departments (eg. Treasury, Statistics N.Z., AgResearch, MAF etc.), industry, insurance companies, local bodies, market research companies, universities and technical institutes. In all of these jobs they are designing studies, analysing data, making projections and helping to make decisions.

Statistics courses at The University of Auckland are designed not only for future statisticians, but for all students to help them become better accountants, applied mathematicians, market

researchers, psychologists, biologists, geographers, engineers and so on.

In addition to general Statistics, courses in Operations Research (OR) are offered. OR is the application of mathematical and scientific methods to solve certain classes of problems in the design and management of large or complex systems found in business, industry and government. Basic OR techniques can be grouped broadly into two classes, namely optimization methods such as linear and non linear programming, Markovian decision theory, deterministic and stochastic dynamic programming, optimal control and inventory control; and modelling techniques such as computer simulation, queuing theory, Markov processes and time series analysis.

For further information contact:
Wiremu Solomon
Rm 209 - Mathematics Department
Phone: ext 88771
Email: solomon@math.auckland.ac.nz

or Ilze Ziedins
Rm 211 - Statistics Department
Phone: ext 85051
Email: ilze@stat.auckland.ac.nz

Industrial Mathematics

Industrial Mathematics may be taken as a specialisation in the 3-year BSc programme. This will enable students to advance in problem-solving methodology across a broader front than possible within the present subject majors. Many first-degree graduates need to be acquainted with an appreciation of, and skills in, mathematical methods, deterministic and stochastic modelling, data analysis, numerical and computational Mathematics, and operations research. This is not possible within a single major, yet this broad approach will be an attractive option for many students intending to do a three year degree only.

For further information contact:
Shixiao Wang
Rm 408 - Mathematics Department
Phone: ext 87316
Email: wang@math.auckland.ac.nz

Mathematics with Computer Science

The disciplines of Mathematics and Computer Science are strongly linked and have had considerable influence on each other over the past four decades. Each new application of computers and each technological advance in their design brings a new set of associated questions in Mathematics. Graph theory, the study of network arrangements, is studied because of its usefulness in modelling many practical problems which can be solved by computers, and its relationship to other branches of Mathematics such as topology, abstract algebra and linear algebra. An increasingly important problem-solving skill in computing is the ability to count or enumerate objects using techniques in combinatorics. Logic is one of the foundations of Mathematics in terms of proof, and also now used as a tool for proving the correctness of computer programs, defining procedural meanings for computations, and extracting programs from specifications.

The courses COMPSCI 225 (Discrete Structures in Mathematics and Computer Science), MATHS 315 (Mathematical Logic) and MATHS 326 (Combinatorial Computing) have been developed to meet the demand for skills in these areas, and also to enhance the mathematical maturity of students taking Computer Science programmes. The blend of skill and knowledge developed during such a programme is valued by employers in a number of fields including portfolio forecasting, actuarial science and Internet marketing.

For further information contact:
Jamie Sneddon
Rm 305 - Mathematics Department
Phone: ext 82121
Email: j.sneddon@math.auckland.ac.nz

Department and University information

Facilities for new students

Superstart

This is a 2 weeks preparation for MATHS 108, available during the summer semester. For details see the section Pre-degree programme (page 10) or

http://www.math.auckland.ac.nz/wiki/Superstart

New Start Programme

New Start prepares adults for university study. If you do not have a university entrance qualification, or you have not studied for some time and are over 19 years of age, you should consider New Start before you begin your degree.

New Start consists of a series of part-time day or evening courses, all of which are offered at the University's City Campus, with some repeated in the community. You will be introduced to the skills required for success in university study. For further information go to: www2.auckland.ac.nz/newstart/

Email: newstart@auckland.ac.nz

The Student Learning Centre

The Student Learning Centre (SLC) is located in Kate Edger Information Commons, and it is staffed by tutors with special skills for helping students to develop better learning strategies. Twice each semester a brochure is published by the SLC, advertising the workshops that will be held for that half of the semester. The Centre has mathematics skills workshops for those students who do not have the background knowledge normally assumed for MATHS 102 or MATHS 108. You may register for workshops, or make individual appointments with tutors at the SLC office (phone 373 7599, ext 88850 or 88967).

International Students

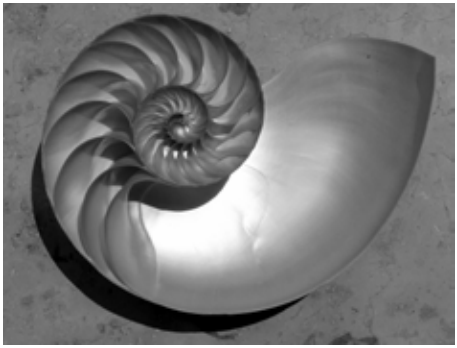
Mathematics courses at all levels are available to international students with the appropriate background. International students apply for places in degree programmes, say Bachelor of Arts (BA) or Bachelor of Science (BSc). If they are successful, they will be able to claim a place in any of the courses offered for that programme, provided they have the prescribed academic background.

Information about minimum entry requirements for the various degree programmes, application procedures and tuition fees is available from:

Auckland International
Phone: +64 9 373 7513
Fax: +64 9 373 7405
Email: int-questions@auckland.ac.nz
Web: www.auckland.ac.nz/international

The International Student Information Centre is located at the back of Old Choral Hall near the University Library on 7 Symonds Street, Auckland.

Opening Hours: Monday to Friday, 8.30am - 5.00pm



Organising your studies and getting help

Lectures, Tutorials, Assignments

Time Allocation Per Course

In addition to time spent attending lectures, laboratories or tutorials, students should plan a minimum of six hours per week studying notes and working on assignment problems. Approximately 10 hours per week over one semester, or 20 hours per week over Summer School should be devoted to a 15-point course taught over one semester.

Study Guides

During the initial lectures of Mathematics courses, a Study Guide for the course will be distributed. This contains the name(s) of the person(s) teaching the course, their office number, hours when they are available for help, assignment due dates, procedures for handing in and collecting assignments, semester test dates, textbooks required, coursework requirements etc. It is the responsibility of students to obtain a Study Guide (use Cecil or the Department website if you missed the hand-out), read it carefully, and then follow the information given in it.

Coursework/Assignments

Coursework consists of tests and assignments. Credit is given for coursework as well as for final exams; the proportion for each course varies. Details of this, test dates and assignment due dates are given in the Study Guide. Due to the volume of assignments to be processed, and the mechanism for distributing them to the student markers, it is not possible to accept late assignments.

All assignments are to be submitted in the basement drop-off boxes of the Student Resource centre (see next page), unless otherwise indicated by the Study Guide.

Sickness or Bereavement

Students who know they will be unable to sit a test should approach their lecturer as soon as they find out. The lecturer may be able to arrange another time to sit the test, or make other arrangements

If temporary illness, injury, or exceptional circumstances beyond your control prevent you from sitting an examination or seriously impair your examination preparation or performance, you may be eligible to apply for aegrotat or compassionate consideration. The requirements are strict and it is essential that you get the right advice by contacting the University Health and Counselling Service, or the Examinations Section of Student Administration.

Applications for Aegrotat and Compassionate Consideration

An application may be made for Aegrotat or Compassionate Consideration by candidates who may have been prevented from being present at an examination, or who consider that their preparation for or performance in an examination has been seriously impaired by temporary illness or injury or exceptional circumstances beyond their control. This also applies to tests, but not assignments.

Application forms are available online or from the relevant campus Student Health and Counselling Services and Examinations Office.

The application form must be submitted to the University Health and Counselling Service within one week of the date that the examination affected took place, or if more than one

examination has been affected, then within one week of the last of those examinations.

Following the decision of Senate on an application for Aegrotat or Compassionate Consideration, a student may apply for reconsideration of that decision no later than four weeks after the student is notified of Senate's decision.

Please refer to The University of Auckland Calendar for the official regulations.

Getting Help

There are several ways of obtaining help with mathematical problems. Because there are such large numbers of students in first and second year courses it must be the responsibility of a student to seek help when needed. This help will be more effective if a student seeks it after first trying to read the relevant parts of the text and lecture notes and identifying the specific questions he or she would like to ask.

The Student Resource Centre

The main point of contact for undergraduate students on the City Campus is the Student Resource Centre which is located in: SciSpace (room G98), on the Ground level of the Science Centre, Building 303, Science Centre
38 Princes Street, City Campus

The Resource Centres have been set up specifically to deal with student-related activities. These include:

- assignment collection and returns after marking
- lockers hire, property lost in the building, student needs, such as CDRs, graph paper, transparancies, Matlab software.
- updating student records such as assignment marks/test marks

If you don't know where to submit your assignment, have submitted it in the wrong box, if your marks do not show up, or have been entered incorrectly, or if you have any other problem related to undergraduate mathematics, please enquire at the SRC.

Assistance Room

The Mathematics Department on City Campus operates an Assistance Room for help with undergraduate Mathematics courses. Room G16 is situated on the Ground floor of Building 303, Science Centre. Assistance Room is primarily for Stage I students, with some assistance available for Stage II and III students. Tutors are available to help students with problems arising with assignments or the understanding of a course. The assistance room is staffed from 10am to 4pm, Monday to Friday during semesters, and available for reduced hours during the study breaks.

The Mathematics Assistance Room is coordinated by: Wendy Stratton
Room 413 - Mathematics Department
Phone: ext 85757
Email: stratton@math.auckland.ac.nz

Individual Assistance from the Teaching Staff

All lecturers designate several hours (known as **office hours**) per week when they will be available in their office to assist students with mathematical questions. These times are usually posted on their office door and announced either in the Study Guide or during lectures. Most lecturers will also give assistance at other times when they are free.

Extra Tutorials

These are offered for some courses during the week and in weekends when there is a demand, and especially immediately prior to Semester Tests and Examinations.

One-to-one Tutoring

Further to the office hours, individual assistance for students doing Stage I courses can be obtained by filling in an appointment sheet at the Department of Mathematics Office (Room 303).

Māori And Pacific Islands Students Tutorial Rooms

Assistance with Mathematics is available for these students in the **Tuākana Rooms**, Rooms 124 and 125, Level 1, Building 303, Science Centre. Tutors are in room 122 at various times. These times are listed on the door to the room.

All Stage I Māori and Pacific students will be contacted by a mentor. These mentors will also provide tuition in the tutorial room. If we do not manage to contact you by the start of semester, please visit out website www.math.auckland.ac.nz/Students/MP/ to find out whom you should contact. Individual assistance is available from:

Gary Nathan
Room 315 - Mathematics Department
Phone: ext 84931
Email: g.nathan@math.auckland.ac.nz

The Student Learning Centre

The Student Learning Centre (SLC) is located in Kate Edger Information Commons, and it is staffed by tutors with special skills for helping students to develop better learning strategies. Twice each semester a brochure is published by the SLC, advertising the workshops that will be held for that half of the semester. The Centre has mathematics skills workshops for those students who do not have the background knowledge normally assumed for MATHS 102 or MATHS 108. You may register for workshops, or make individual appointments with tutors at the SLC office (phone 373 7599, ext 88850 or 88967).

Buying Textbooks

Most textbooks and coursebooks will be available at the University Bookshop in the Kate Edger Information Commons. Coursebooks and other resources prepared by the Department are also available online, as pdf files, via Cecil http://www.auckland.ac.nz/cecil Texts for some courses are in the Short Loan Collection at the Kate Edger Information Commons.

Calculators

Some courses prohibit or restrict the use of calculators in tests and examinations. Restrictions may include such capabilities as:

- alphanumeric keys,
- storage of formulae,
- programming capability,
- communication capability.

The Study Guide for each course should indicate whether or not calculators are to be used and what restrictions if any are to be placed on them.

Many students have access to computers in their own homes. It is not, however, necessary to own a computer to do mathematics, statistics or computer science. The laboratory facilities of the departments are available for students who do not own their own computers, and in any event, computing packages are available on the laboratory machines which are unlikely to be found on most home computers. The hours that the laboratories are open include evenings, weekends and holidays.

Computer access

Using the Computer Laboratories

On the City Campus the Department shares three 120 machine computer laboratories with the departments of Statistics and Computer Science. These are located in the Science Centre, Building 303S.

Mathematics students have booking privileges in the basement laboratory, but may use the other two laboratories when they are not being used by Computer Science students. Because the Laboratories are used by a large number of students and will be very busy around assignment due dates, students are strongly encouraged to work on their assignments early. Students who leave their work to the last day may find all the machines are booked! All students

enrolled in science courses have access to the laboratories. The login name is their NetAccount name - the NetAccount password is also used. Student ID cards are needed to use a computer laboratory.

Handouts are available on:

- Using a PC
- An Introduction to the Undergraduate Labs
- Getting Started Using UNIX

Demonstrators are rostered in the laboratories and they are available to assist students. They can be easily identified by the bright orange or yellow sashes they wear. Their role is not to do assignments for students, but rather to assist students to gain a better understanding of the computer packages being used, and of course to cope with technical problems. Specifically, if the computer being used is, or becomes, faulty, do NOT attempt to remedy the fault personally but ask a demonstrator.

The Computing Laboratory is coordinated by:

Dr Allison Heard
Room 414 - Mathematics Department
Phone: ext. 88816
Email: heard@math.auckland.ac.nz

More information about labs can be found at: www.scl.ec.auckland.ac.nz

Matlab

Almost all first and second year courses will be using the computer algebra system Matlab and its Symbolic Math toolbox in both teaching and assessment. The program is available in the undergraduate computer lab and will also be accessible via the information commons. For more information and a tutorial on getting started with Matlab go to the web page at www.math.auckland.ac.nz/matlab

Lecture and Tutorial Rooms

Each course gets its lecture and tutorial rooms allocated one or two weeks prior to the beginning of the semester. Students need to log into the Student administration server, nDeva, https://ndeva.auckland.ac.nz/ndeva/ in order to check the venues of their classes. For certain popular classes, you need to chose a stream and a time that suits your schedule. To locate a lecture room use www.ltmu.auckland.ac.nz/find_a_pool_room.htm.

Communication and Student Representation

Each class elects a representative each semester to attend meetings to discuss matters concerning students and the department. Generally two meetings are scheduled each semester. Those meetings are attended by the elected student representatives and departmental staff. Any problems affecting students may be raised at these meetings. Students are able to approach their class representatives if they want a matter raised. Student representatives also attend meetings of the Science Faculty, the Board of Studies of Mathematical and Information Sciences and the Mathematics Department. The departmental coordinator is:

Alastair McNaughton
Room 330 - Mathematics Department
Phone: ext 85244
Email: a.mcnaughton@math.auckland.ac.nz

Any student with a complaint about the way he or she has been treated by the department is invited to discuss the matter with the Head of Department. If the prospect of approaching the HOD is daunting, other avenues for complaint are through the class representative, or the Departmental Manager for Mathematics, Lynda Pitcaithly (Rm 336, Ext 88063), or any approachable lecturer. Complaints like inaccurate marking of tests or assignments are usually best dealt with by the lecturer.

Admission and enrolment procedures

New students

For ALL students, if you are not enrolled at The University of Auckland in 2007, apply online at www.auckland.ac.nz/apply_now. If you are unable to access our website, please call 0800 61 62 63 or visit the Student Information Centre at 22 Princes Street, Auckland. This is open Monday to Friday from 8am – 6pm and Saturday 9am – 12noon during peak times.

Student Information Centre
Room 112, Level 1 (Ground Floor)
The ClockTower Building, 22 Princes Street
Auckland City Campus

Phone: + 64 9 373 7599 ext 88199
Fax: + 64 9 367 7104
Email: studentinfo@auckland.ac.nz

The closing date for most undergraduate Science applications is 8 December 2008.

If you want to take courses at Summer School, or wish to apply to Sport and Exercise Science or the Bachelor of Optometry, applications close 1 December 2008.

Only one application is required.

After submitting your application:

Your application will be acknowledged by post, and you will receive your Net ID, password and a list of items required to evaluate your eligibility to be admitted to the University and to your chosen programme/s (if you are submitting a hard copy application form, you are required to include relevant documentation at the time of submission). When all documentation requirements have been met, your application will be assessed by the Admissions Office and relevant faculties. If your application is approved, you will receive an offer of place.

Your Net ID and password allow you to access the University's nDeva site, enabling you to monitor the progress of your application and check if further documentation is required.

Once you have accepted an offer of place, you will gain access to the Enrolment module on nDeva and you can then proceed to enrol in courses online. Postgraduate students may need to contact their department for enrolment to be completed.

Returning students

If you are currently enrolled at The University of Auckland in 2008, and would like to change your existing programme (for example MSc after completion of BSc(Hons)), you should apply on nDeva (www.auckland.ac.nz/nDeva) by logging on and clicking on Add/Change programme.

You will be able to enrol via nDeva, but if you would like help, please call 0800 61 62 63 or visit the Student Information Centre or the Faculty of Science Student Centre (Ground Floor, Building 301, 23 Symonds Street). Postgraduate students may need to contact their department for enrolment to be completed.

The University of Auckland will be open for enrolment from November 2008 to the end of February 2008. You are welcome to attend at any time during normal office hours to seek academic or enrolment advice or assistance in completing your enrolment.

Room 112, Level 1
The ClockTower, 22 Princes Street
Auckland City Campus

Phone: 64 9 373 7599 ext 88199
Fax: 64 9 367 7104
Email: studentinfo@auckland.ac.nz

If you have any problems enrolling in Mathematics courses, please contact the Undergraduate Advisor at the Mathematics Department:

Jamie Sneddon
Phone: ext 82121
Room 305 - Mathematics Department
Email: ugadvice@auckland.ac.nz

Changing Enrolment

Choose carefully at the beginning. It is however, possible to add and delete courses within the first two weeks of each semester without penalty (i.e. tuition fees are refunded for deletions). After this time, you may not enrol in new courses for that semester, and if you are unable to continue a course a 'withdrawal' from courses can be done with consultation of the Associate Dean (Undergraduate Students) until the third week before the end of lectures. However, tuition fees are not refundable in these cases. The regulations for changing courses are outlined in the latest version of The University of Auckland Calendar. Staff at the Student Information Centre in the Clock Tower Building, at the City Campus and at the Student Resource Centre on the Tamaki Campus have the necessary forms to fill in for change of programme or course. The Departmental Graduate Coordinator should be consulted for changes to Masters or Diploma Programmes.

Warning

Students who fail the recommended preparation for a course are strongly advised to repeat the failed course (or courses) rather than continue with their proposed programme. For example, if you have enrolled for MATHS 250 in the second semester but fail MATHS 150 in the first semester you should cancel your enrolment in MATHS 250 and re-enrol for MATHS 150. It will be assumed that students who continue with MATHS 250 have mastered the earlier material.

Academic Programme Structure

Points Structure

From 2006, all courses were changed to a different points value. Students enrolled in a normal full time course of study now complete 120 points per year. The courses in most undergraduate degrees carry a value of 15 points and a normal full time enrolment is eight courses per year.

Transition Points Structure

Transition regulations apply to all students who have continued enrolment during the transition period having commenced study in their programme at this university prior to the 2006 academic year. They also apply to students who commence study in an undergraduate degree in the 2006 academic year having commenced but not completed study in a different undergraduate programme at this university between 2001 and 2005.

The Transition regulations were written to ensure that students are able to complete their qualification without disadvantage in terms of duration of study or the proportion of their qualification to be completed.

Transition regulations are available in the Transition Regulations Handbook. This handbook is available from the Science Faculty Student Centre, the Short Loans Library and online at www.auckland.ac.nz/currentstudents/academiclife.

General Education

The University of Auckland is the only New Zealand university to include a General Education component in its undergraduate degrees. Courses in the programme are designed to give you a greater understanding of New Zealand and its place in the world, an opportunity to mix with students from different disciplines, and expose you to cross-disciplinary research.

Undergraduate Enrolment - where to from here?

Enquire

Visit www.auckland.ac.nz or contact our student advisers for any information you need.
Phone: 0800 61 62 63 | **Email:** studentinfo@auckland.ac.nz
Student Information Centre: Room 112, ClockTower, 22 Princes St, Auckland

Apply for a place in a programme(s)

Do you have internet access, or can you come on to campus to our help labs?

Yes

- Log on to www.auckland.ac.nz
- Click on Apply Now.
- Complete the online Application for a place in your programme(s) of choice.
- You will receive an acknowledgement letter asking you to provide specific certified documents (and in some cases to complete other requirements*) before your application can be assessed. The letter will also tell you how to access the University's nDeva system to complete the next steps.

No

Phone: 0800 61 62 63
(or +64 9 308 2386 if overseas)

Email: studentinfo@auckland.ac.nz

The ClockTower Call Centre will forward required information to you.

Offer

Your application will be assessed and, if successful, an "Offer of a place in a programme" letter will be mailed to you. This normally happens from mid January.**

Accept

Accept or decline your offer of a place in a programme online. Remember – you still need to enrol in your courses!

Enrol in your choice of courses

For help with choosing courses you can:

- talk to staff for advice, and listen to talks on various programmes at Courses and Careers day in late August 2008 and Course Advice Day in late January/ February 2009
- refer to www.science.auckland.ac.nz or to publications relating to your programme, or to The University of Auckland Calendar. For programme publications call 0800 61 62 63. The Calendar is for sale in bookshops or can be accessed from www.auckland.ac.nz Click on "Current Students" then "University Calendar" in the Quick Links box
- go online to check the timetable for your chosen courses
- for more information visit the Faculty of Science Student Centre, Ground Floor, Building 301, 23 Symonds Street
- or call 0800 61 62 63.

Enrol in courses via the online nDeva system, using your login and password.

Pay your tuition fees.

You are now a University of Auckland student. Congratulations!

** For some programmes, you may be required to submit supplementary information (eg, a portfolio of work, referee reports, an online form) or to attend an interview/audition. If you have not already done this, any outstanding requirements will be explained in the acknowledgement letter – ensure that you follow them up as quickly as possible.*

*** You can also check the status of your application online using your login and password (if you don't know these, check the instructions on your acknowledgement letter). If you are not offered a place in the programme(s) of your choice, you will receive a letter outlining alternative options. Please follow the advice on the letter or get in touch with the ClockTower Call Centre. Your final offer of a place is dependent both on you gaining admission to the University (which for school leavers may be dependent on your final school results) and assessment by the faculty offering the programme.*

BSc students must take two General Education courses (30 points) in their degree. These can be taken at any time during the degree, but it may be preferable to take these in Year 2 and 3.

Students will choose General Education courses from schedules which list courses available to their particular degree. The schedules have been developed so that students will take General Education courses that allow them to explore areas of interest outside of their degree subjects. The General Education schedules are:

A) Music, Art and Contemporary Issues

B) Humanities and Social Sciences

C) Business and Society

D) Life Sciences

E) Physical Sciences

F) Mathematical and Information Sciences

G) Communication

H) Languages

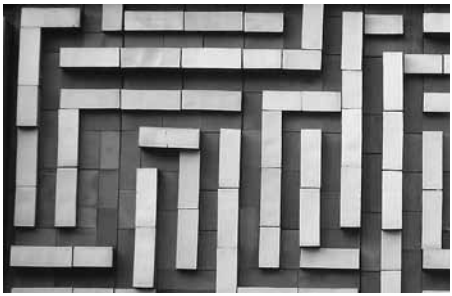
The courses available to BSc students will depend on the subjects in which they are enrolled. For example, students enrolled in a Mathematics course will not be able to take General Education courses from Schedule F Mathematical and Information Sciences.

In some cases, courses are available both as part of the General Education programme and as part of the portfolio of regular degree courses. If students are taking a dual purpose course as part of the General Education programme, they will enrol in the G version of the course (e.g. HISTORY 103G). The classes and programme of study will be the same for all students.

A General Education website, www.auckland.ac.nz/generaleducation can be accessed from the University webpage and enables students to view the courses available to them and provides the information needed for course selection.

The requirement for General Education applies to students who enrol at The University of Auckland from 2006 to begin their first undergraduate degree. Transition students are not required to include General Education as part of their degree. Special arrangements will apply to students transferring from another tertiary institution with credit.

Students are encouraged to seek advice on General Education in their degree from the Science Students' Centre.



Postgraduate Programmes

From 2006, most Masters programmes became one year degrees preceded by either a one year Bachelors Honours degree or a Postgraduate Diploma. A two-years Master could be introduced from Semester 2 2009.

Doctoral Students

Doctoral degrees remain essentially the same in structure and duration. The structure of the PhD is now recorded on the academic transcript in new points in accordance with the 120 points system.

For named doctorates which include courses with points, the courses have been re-weighted as part of the 120 point structure.

Improve your English language skills

All first-year students are required to undertake an assessment that enables us to identify your level of academic English. This free assessment is available via DELNA.

Diagnostic English Language Needs Assessment (DELNA)

DELNA is only available to students who have accepted a place and enrolled at The University of Auckland. It cannot be used to exclude you from a particular programme and the results do not appear on your academic record.

The Screening - a 30 minute compulsory assessment includes a vocabulary task and a text editing task. It enables us to quickly identify whether or not you need assistance with the demands of academic English. If you do require assistance, you will undertake the second part of the assessment.

You can book your screening assessment during Orientation Week or the first week of semester by going online to: www.delna.auckland.ac.nz/booking

The Diagnosis – is only necessary if your screening results suggest you need assistance with academic English language skills. This two-hour assessment includes a listening, reading and writing task. It enables us to recommend appropriate English language enrichment options.

If you do need to improve your skills, you will be invited to discuss your needs with the DELNA Language Adviser and guided to sources of effective English language enrichment within the University.

For more information visit www.delna.auckland.ac.nz

English Language Self Access Centre (ELSAC)

ELSAC provides free services to improve your academic English skills, including tailored support from a Language Advisor and language learning materials. Get help with academic writing, listening skills, and pronunciation and more. ELSAC is located in the Kate Edger Information Commons.

ELSAC

Level 1, Kate Edger Information Commons

Phone: +64 9 373 7599 ext 82134

Email: elsac@auckland.ac.nz

For more information visit www.elsac.auckland.ac.nz

Cheating and Plagarism

Policy on Cheating

Cheating is viewed as a serious offence by The University of Auckland. Penalties are administered by the Discipline Committee of the Senate, and may include suspension or expulsion from the University.

What is cheating?

Cheating, in the context of university coursework and examinations, is the act of attempting to gain an unfair advantage by violating the principle that lies behind all university work - that of intellectual and scholarly integrity.

To cheat is to be intellectually dishonest by passing off as your own, work that has been done by someone else. It is also unjust in that it devalues the grades and qualifications gained legitimately by other students. All staff and students have a responsibility to prevent, discourage and report cheating.

Mathematics students are encouraged to discuss problems with one another and to work together on assignments, but a student must not copy another person's assignment.

Examples of forms of cheating

- Copying from another student during a test or examination, whether or not there is collusion between the students involved;
- Using the work of other scholars or students when preparing coursework or writing an examination and pretending it is your own by not acknowledging where it came from. This is called plagiarism. Course coordinators, lecturers or tutors are the appropriate people with whom you should discuss how to appropriately use and acknowledge the work of others.
- Making up or fabricating data in research assignments, or the writing up of laboratory reports;
- Impersonating someone else in a test or examination, or arranging such impersonation.
- Submitting the same, or a substantially similar, assignment that you have done, for assessment in more than one course
- Misrepresenting disability, temporary illness/ injury, or exceptional circumstances beyond one's control, then claiming special conditions
- Using material obtained from commercial essay or assignment services, including web based sources.

Group work

On the whole, the University requires assessment of the work of individual students. On those rare occasions where the work of a group of students is assessed, group members need to make sure that the workload is shared equally. Course coordinators will determine their own procedures for dealing with cases where the final piece of work reflects unequal participation and effort.

Student support: 'getting help' versus cheating

Typically students cheat because they are having difficulty managing workloads, feel that the course content is too difficult or are experiencing difficulties with the language of the course. None of these reasons are justification for cheating. The University provides many services to help students receive assistance, do better or to make thoughtful decisions about whether to continue.

Options of people to approach for assistance include: the course convenor/coordinator, lecturer, tutorial leader, lab demonstrator, the Head of Department, Faculty-level officials, Health and Counselling services, Student Learning Centre, AUSA or other students, associations, chaplaincy services

The guidelines on Conduct of Coursework and cheating are set out in full on the Teaching and Learning website (www2.auckland.ac.nz/ teachingandlearning/) and is located under 'Students' then 'Plagiarism and Cheating'.

The Mathematics Department has a number of ways of dealing with students caught cheating, for example:

- loss of all marks for the assignment
- loss of all coursework marks
- requesting that the student(s) involved withdraw from the course
- referral of the student(s) involved to the University Discipline Committee, followed possibly by a reprimand, fine or expulsion from the University.

Students in any doubt about the permissible degree of collaboration within a particular course should discuss it with a staff member involved in that course.

Student Services and Important Locations

Students Association

Auckland University Students' Association (AUSA) offers many services to support students and to provide discounted goods. AUSA runs training workshops for Class Representatives throughout the year and publishes a monthly newsletter available through the Department. Students may also contact a Student Advocate, the AUSA Education Coordinator or the Education Vice President regarding academic concerns. If interested in creating a club and receiving funding, contact the AUSA Clubs Liaison Officer. Phone 309 0789 or visit the AUSA House, 4 Alfred Street, across from the General Library on City Campus.

Students with Disabilities

People with disabilities are encouraged to attend and accomplish at The University of Auckland. Lynne Crabb is the Coordinator for students and staff with disabilities and would like students with disabilities (both permanent and temporary) to contact her. She can offer current information on facilities available and ways in which they can be of assistance to you. They are located in Room 036, Basement Level, ClockTower, 22 Princes Street, and can be contacted on extension 88808, fax on 308 2354 or by email disabilities@auckland.ac.nz

Harassment

In the large and complex society of the University it is possible that students may encounter problems with the behaviour of staff or fellow students. If this behaviour is unwanted, unacceptable or offensive it may be harassment. University policy is that harassment on any grounds - including, but not restricted to sexual, racial, religious, and academic - is totally unacceptable. For informal and confidential assistance in dealing with harassment problems, students may approach any member of the Resolve Network (a list of their names can be

found on posters displayed around campus) or the Mediator. For information and contact details, visit www.auckland.ac.nz/uoa/about/uoa/run/policies/antiharrass.cfm .

W.A.V.E

Welfare. Advocacy. Voice. Education.

Located within and run by AUSA, WAVE is the centre of representation for all students at Auckland University. Whether its monetary problems, legal problems or problems with any part of the University WAVE are here to help you. Here's what we do:

WELFARE: WAVE cares about your welfare. If you're stressed, hungry or have exhausted your overdraft - we know how to help via the Welfare Referral Service.

ADVOCACY: Sometimes completing your degree can seem like an obstacle course. You're not just dealing with coursework and exams - there are lectures, classmates, flatmates, landlords, employers, family, student loans, university red tape and all kinds of hassles which can crop up at the most inconvenient times! WAVE provides a confidential, free service for all students via the Student Advocacy Network. Student Advocates advise on student rights and university procedures, assist in resolving disputes between students and staff or among students. The SAN is also the first point of contact for students with legal problems or questions.

VOICE: WAVE co-ordinates student representation at Auckland University. From class and year reps within the departments through to the student representatives sitting on University committees, WAVE gives students a voice in the running of the University.

EDUCATION: Students are here to get an education and WAVE is making sure it's the best one possible by providing lobbying and research on the big educational issues.

WAVE are located in the AUSA and can be contacted by phone on 309 0789 ext 202 via email on wave@auckland.ac.nz. Also checkout our www page on http://web.ausa.auckland.ac.nz/wave

Careers advice

A science degree from The University of Auckland will give you a foundation of knowledge and skills that can lead to a wide range of career opportunities. Our graduates begin their careers in research organisations, local government, central government, universities, commerce and industry, international and community organisations. You may begin your career in a science position, or in a position that is not directly science related but where your science knowledge and skills are of benefit.

The University Careers Centre can assist you with your career planning and job search throughout the course of your studies. The Careers Centre provides assistance to science students through careers information and advice, job search and career research workshops in the Careers Centre, plus seminars and a drop-in service at a variety of times and locations in the Science faculty. For more details please see our website www.auckland.ac.nz/careers.

Careers.Sci

Make sure you visit Careers.Sci, an online career planning programme customised for Science students that will allow you to manage and plan your career. Log on to Cecil (cecil.auckland.ac.nz) and check it out!

www.auckland.ac.nz/careers

For job vacancies and information on current graduate career opportunities, visit http://careerhub.auckland.ac.nz, which also advertises employer presentations on campus. Also go to the Science@Work careers fair in August/September each year. The Careers Centre is located in Room 001 of The ClockTower, 22 Princes Street, and at Tamaki Campus. Please check the careers website for information about opening hours.

Student support services

Service	Location	Contact details
Accommodation and Conference Services	O'Rorke Hall, 16 Mount Street	+64 9 373 7599 ext 87691 accom@auckland.ac.nz www.auckland.ac.nz/accommodation
Careers Centre	Room 001, The ClockTower	www.auckland.ac.nz/careers
Early childhood services	28 Park Avenue Grafton	+64 9 373 7599 ext 85894
Chaplain's Office		+64 9 373 7599 ext 87731 chapelsec@auckland.ac.nz
Disability service	Room 036, The ClockTower (south wing)	+64 9 373 7599 ext 88808 disabilities@aucklandac.nz
Mediator's Office		www.auckland.ac.nz/mdr
Equal Opportunities	Level 1, The ClockTower (East Wing)	+64 9 373 7599 ext 84923 www.eo.auckland.ac.nz
Student Financials Office	Room 108, ClockTower	+64 9 373 7599 ext 84422 www.auckland.ac.nz/fees
Health Services (including Counselling)	Level 3, Student Commons	+64 9 373 7599 ext 87681
Dental Services	Level 3, Student Commons	+64 9 373 7599 ext 83860
International Students' Information Centre	Auckland International, Old Choral Hall	+64 9 373 7513 int-questions@auckland.ac.nz www.auckland.ac.nz/international
Recreation Centre	Building 314 17 Symonds Street	+64 9 373 7599 ext 84788 www.auckland.ac.nz/recreation
Scholarships Office	Room 012, The ClockTower	+64 9 373 7599 ext 87494 scholarships@auckland.ac.nz
Student Advocacy Network	AUSA House 3 Alfred Street	+64 9 309 0789 ext 238 wave@auckland.ac.nz www.ausa.auckland.ac.nz/wave
Student Information Centre	Room 112, The ClockTower	0800 61 62 63 +64 9 373 7599 ext 88199 studentinfo@auckland.ac.nz
Student Learning Centre	Level 3, Information Commons	+64 9 373 7599 ext 88850
Student loans and allowances	StudyLink	0800 88 99 00 www.studylink.govt.nz
Student Resource Centre	Room G16, Science Centre, Building 303	www.math.auckland.ac.nz/wiki/Student_Resource_Centre +64 9 373 7599 ext 85510
Students' Association	AUSA 4 Alfred Street	+64 9 309 0789 ausa@auckland.ac.nz www.ausa.auckland.ac.nz
University Bookshop (UBS)	Kate Edger Building	www.ubsbooks.co.nz

Important Locations

Information Commons

Designed as information hubs, the Information Commons give you computer access and learning support, as well as proving group and individual study areas. You'll find these facilities at our City, Grafton and Epsom campuses.

At the Kate Edger Information Commons on the City Campus you will find computer training rooms, the Student Learning Centre, a Disabilities Resource room, the Library's Short Loan service and the English Language Self-Access Centre (ELSAC).

The IC Helpdesks provide walk-in, roaming, email and telephone support with all aspects of student computing resources and services.

Information Commons
Phone: 373 7599 ext 82333
Email: ichelpdesk@auckland.ac.nz
www.information-commons.auckland.ac.nz

Facilities and support for all students

Refer to the general University Prospectus or the University website www.auckland.ac.nz for a more extensive list of services in place for students.

Mathematics Department Office

The administrative offices for the Mathematics Department at City Campus are located in:

Room 303, Science Centre
Building 303, 38 Princes Street
Phone: 373 7599 Ext 85886
Email: enquiries@math.auckland,ac.nz
Website: www.math.auckland.ac.nz

Offices of Mathematics Department Lecturers

These are located along the main corridor of the third and fourth floors of the Science Centre Building 303 (Maths and Physics Building).

Mathematics and Statistics Computer Laboratories

Basement and ground floor of the Building 303S.

Student Resource Centre

Students' primary contact with the Mathematics Department will be through this service. The Student Resource Centre is located in G16 (within SciSpace), ground floor of the the Science Centre, Building 303, on the City Campus.

Assistance Room for Stage I and II Maths Students

The Assistance Room is located on the Ground floor of the Science Centre, Building 303 in room G16, past the Student Resource Centre.

Tuākana Rooms

The Tuākana programme rooms for Stage I and II Māori and Pacific Islands students are located the first level of the Science Centre, Building 303 in rooms 122 (tutors office), 124 (tutorial room) and 125 (computer room).

University Library | Te Tumu Herenga

The University Library consists of the General Library and 12 subject-specific libraries with over 2.2 million items, 4800 study spaces and 1100 computers.

General Library

Most Science serials are now available electronically. The majority of the Science book collection is shelved on Level M where you will also find printed serial collections for biology, marine science, chemistry, computer science, food science, forensic science, geology, physics, mathematics and statistics. Geography, computer science and psychology serials are shelved with the book collection.

Leigh Marine Research Laboratory Library - has marine science resources.

Tamaki Library – has resources in computer science, physics, psychology and sport and exercise science.

Courses, tours and training

New students are urged to attend courses such as the Library and Resources Overview, Voyager Introduction and Uni IT Essentials.

Study and research support activities are offered at the beginning and during semester time and include orientation tours and library courses on subject and course-related library resources and databases, the Internet, , and using Endnote to compile bibliographies (particularly relevant to graduate students).

To book a course:

www.library.auckland.ac.nz/booking

Other Library services include Ask a Librarian Service, Enquiry Desk, Information Commons Help Desk, Inter-Campus Library Delivery Service,

Interlibrary Loan and Document Delivery and the Short Loan Collection.

Subject Librarians

Visit the subject librarians in Science Information Services on Level M. Consultation sessions are available during visits made by the Subject Librarian to the Department of Mathematics.

Mathematics Subject Librarian

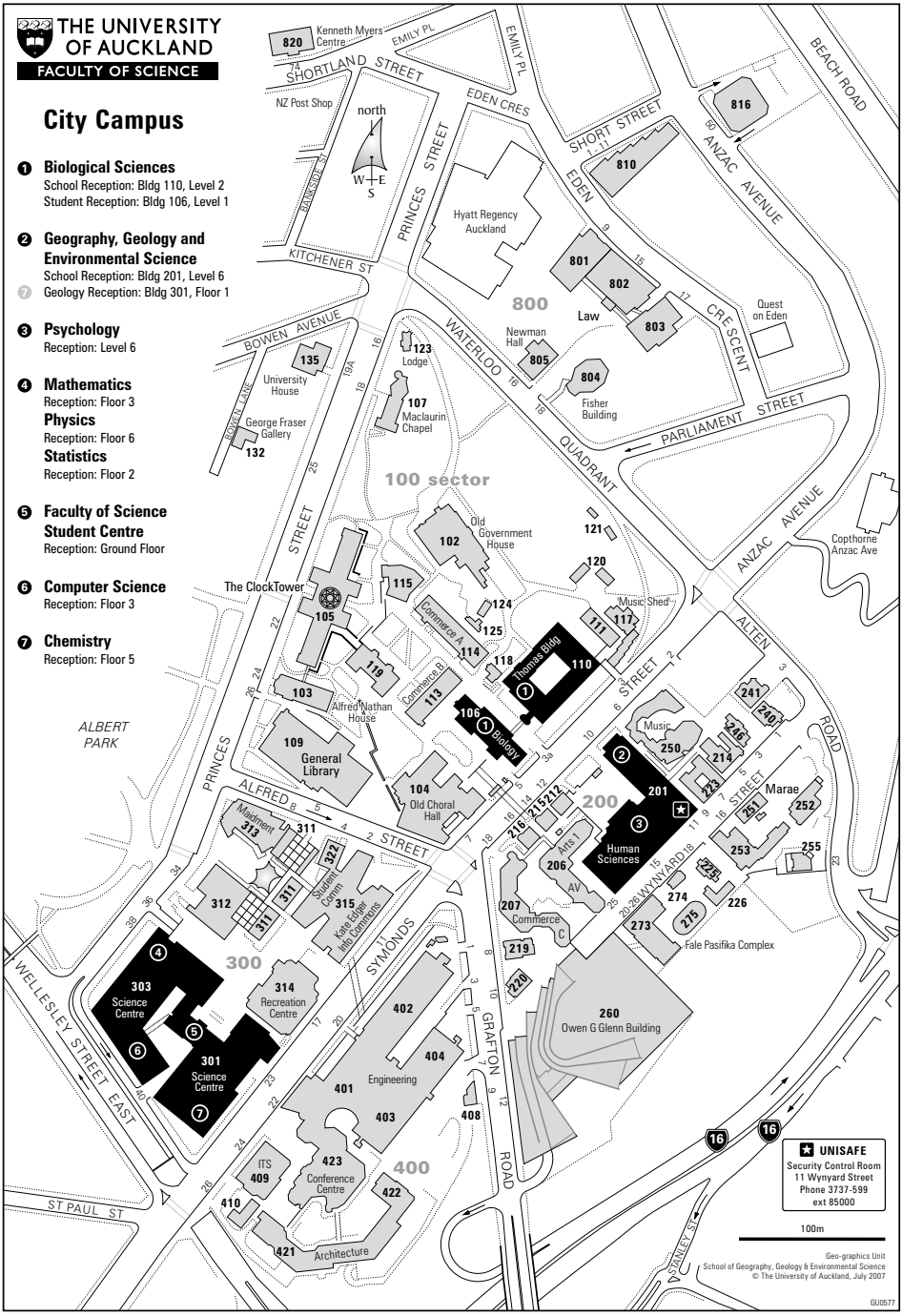
Michael Parkinson
Room M13, Level M, General Library
Phone: 373 7599 ext 85858
Email: m.parkinson@auckland.ac.nz

Borrowing and accessing resources

Your student ID card is your Library card. Use it to access the photocopiers, printers and to borrow items. You also have 24-hour access to resources via the Library website - including the full text of many periodicals, encyclopaedias and electronic books.

General Library
5 Alfred Street, City Campus
Phone: 373 7599 ext 88044
www.library.auckland.ac.nz

Lecture Theatre Locations	
Within the Science Centre (includes most common Mathematics tutorial rooms)	
114 (301.114)	Mathematics tutorial room , Science Centre Building 303 (first floor)
B08	Postgraduate lecture room in the basement of the Science Centre Building 303
B10	Small tutorial room in the basement of the Science Centre Building 303
B25	Mathematics tutorial room in the basement of the Science Centre Building 303
B75 (BTL)	Computer Lab in the basement of the Science Centre Building 303, south wing
B90	Another Computer Lab the basement of the Science Centre Building 303, south wing
G16	SciSpace, Student Resource Centre and Assistance Area, Science Centre, Building 303 (ground floor)
MLT 1	Large Mathematics Lecture Theatre, Science Centre Building 303 (ground floor)
MLT 2	Second Mathematics Lecture Theatre, Science Centre Building 303 (first floor)
MLT 3	Third Mathematics Lecture Theatre, Science Centre Building 303 (first floor)
PLT1	Large Physics Lecture Theatre, Science Centre Building 303 (ground floor)
PLT2	Second Physics Lecture Theatre, Science Centre Building 303 (ground floor)
PLT3	Small Physics Lecture Theatre 3, Science Centre Building 303 (basement)
SLT1	Science Lecture Theatre, Science Centre Building 303 (ground floor)
Others	
301.242	Geol242: Small lecture/tutorial room in the Chemistry/Geology Building
301.248	Geol248: Tutorial room in the Chemistry/Geology Building (301.248)
ALR	Architecture Lecture Room, Architecture Building, 22 Symonds Street
Arts	Arts1 Building, 14A Symonds Street
BLT100	Biology Building Room 100, 5 Symonds Street
BLT204	Biology Building Room 204, 5 Symonds Street
CA, CB, CC	Commerce A, 3A Symonds Street; Commerce B, 5 Symonds Street; Commerce C, 18 Symonds Street
Chem	Chemistry Building, (corner Symonds and Wellesley Streets) 23 Symonds Street) contains the Large and Medium Lecture Theatres (LgeChem, MedChem)
Conf Cen	Conference Centre, 22 Symonds Street Eng Engineering School, 20 Symonds Street HSB
Lib B10, Lib B15, Li bB28	Library Building Basement Theatre 10, 15 and 28 respectively, 5 Alfred Street
Law	Law Buildings, 5-17 Eden Crescent contains Stone, Algie, Northey and Small Lecture Theatres
LargeChem	Large Lecture Theatre, Ground Floor Chemistry Building
MedChem	Medium Lecture Theatre, Ground Floor Chemistry Building
OCH	Old Choral Hall, corner Symonds and Alfred Streets, 7 Symonds Street
OldGovLT	Old Government House Lecture Theatre, 3A Symonds Street
OGGB 3/4/5	Owen G Glenn Building, 12 Grafton Road
F&PAA	Fisher and Paykel Appliances Auditorium, 12 Grafton Road
HSB 1/2	Human Sciences Building, 10 Symonds Street


THE UNIVERSITY OF AUCKLAND
FACULTY OF SCIENCE
City Campus
1 Biological Sciences
School Reception: Bldg 110, Level 2
Student Reception: Bldg 106, Level 1
2 Geography, Geology and Environmental Science
School Reception: Bldg 201, Level 6
7 Geology Reception: Bldg 301, Floor 1
3 Psychology
Reception: Level 6
4 Mathematics
Reception: Floor 3
Physics
Reception: Floor 6
Statistics
Reception: Floor 2
5 Faculty of Science Student Centre
Reception: Ground Floor
6 Computer Science
Reception: Floor 3
7 Chemistry
Reception: Floor 5
Kenneth Myers Centre
NZ Post Shop
SHORTLAND STREET
EMILY PL
EDEN CRES
SHORT STREET
BEACH ROAD
ANZAC AVENUE
north
W E
S
PRINCES STREET
BOWEN AVENUE
KITCHENER ST
Hyatt Regency Auckland
EDEN CRESCENT
Quest on Eden
800
Law
Newman Hall
Fisher Building
WATERLOO QUADRANT
PARLIAMENT STREET
University House
George Fraser Gallery
Lodge
Maclaurin Chapel
100 sector
Old Government House
The ClockTower
Commerce A
Commerce B
Thomas Bldg
Biology
Music Shed
Music
ALTEN ROAD
Copthorne Anzac Ave
ALBERT PARK
General Library
Alfred Nathan House
Old Choral Hall
ALFRED STREET
Marae
200
Human Sciences
Arts 1
AV
Commerce C
WYNYARD
Fale Pasifika Complex
Owen G Glenn Building
300
Science Centre
Recreation Centre
Student Comm
Ken Edger Info Commons
SYMONDS
WELLESLEY STREET EAST
GRAFTON ROAD
400
Engineering
ITS
Conference Centre
Architecture
ST PAUL ST
SYDNEY ST
UNISAFE
Security Control Room
11 Wynyard Street
Phone 3737-599
ext 85000
100m
Geo-graphics Unit
School of Geography, Geology & Environmental Science
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