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Front Cover: Mathematics undergraduate students in the Department’s Tuakana room: Sina Collins, George Gray, Albert Pati, Joseph Peni, Ranee Smith, Carl Tuvae.
WELCOME TO THE DEPARTMENT OF MATHEMATICS

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.

Regards,
Bill Barton
Head of Department

IMPORTANT DATES

1 DECEMBER 2006
Deadline for new students to submit Application for Admission if 2007 programme includes Summer School courses. Application for Admission also closes 1 December for all students applying to Sport and Exercise Science and Optometry.

8 DECEMBER 2006
Deadline for new students to submit Application for Admission if 2007 programme includes Semester 1 and Semester 2 courses only.

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.

SUMMER SCHOOL – 2007
Orientation Day 3 January
Lectures Begin 4 January
Auckland Anniversary Day 29 January
Deadline to withdraw from summer school courses 1 week before the end of lectures
Waitangi (NZ) Day 6 February
Lectures End 8 February
Exams* 12 February - 14 February
Semester ends 14 February

SEMESTER 1 – 2007
Semester 1 Begins 26 February
Mid Semester/Easter Break 6 April - 21 April
Anzac Day 25 April
Graduation 3 May - 11 May
Deadline to withdraw from first semester courses 3 weeks before the end of lectures
Queen’s Birthday 4 June
Lectures End 2 June
Study Break/Exams* 2 June – 25 June
Semester 1 ends 25 June
Inter Semester Break 26 June – 14 July

SEMESTER 2 – 2007
Semester 2 Begins 16 July
Mid Semester Break 27 August – 8 September
Graduation 25 September - 27 September
Deadline to withdraw from second semester courses 3 weeks before the end of lectures
Labour Day 22 October
Lectures End 21 October
Study Break/Exams* 20 October - 12 November
Semester 2 ends 12 November

SEMESTER 1 – 2008
Semester 1 Begins 3 March 2008 (Provisional)

* Aegrotat and Compassionate Applications must be submitted within 1 week of the date that the examination affected took place. Deadline for withdrawal from double semester courses is three weeks before the end of lectures in the second semester.
ADMISSION AND ENROLMENT

NEW STUDENTS
For ALL students, if you are not enrolled at The University of Auckland in 2006, 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.

If the programme you seek admission to has a Summer School semester, or if you wish to apply to Sport and Exercise Science or the Bachelor of Optometry, applications for admission close 1 December 2006. The closing date for most undergraduate Science is 8 December 2006. Later application may be considered provided places are available.

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 a 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 a place, you will gain access to the Enrolment module on nDeva and you can then proceed to enrol in courses on-line.

RETURNING STUDENTS
If you are currently enrolled at The University of Auckland in 2006, and would like to change your existing programme (for example MSc after completion of BSc(—Hons)), apply on nDeva (www.auckland.ac.nz/nDeva); log on and click 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, Science Centre, Building 301, 23 Symonds Street).

The University of Auckland will be open for enrolment from November 2006 to the end of February 2007. You are welcome to attend at any time during normal office hours to seek academic or enrolment advice or assistance in completing your enrolment.

If you have any problems regarding admission to the University, please contact the Student Information Centre in:

Room 112, Level 1 (Ground Floor)
The Clock Tower, 22 Princes Street
Auckland City Campus
Telephone: 64 9 373 7599 Ext 88199
Facsimile: 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
Ext 82121
Room 305 - Mathematics Department
Email: j.sneddon@auckland.ac.nz

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.

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.

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APPLYING AND ENROLLING FOR UNDERGRADUATE PROGRAMMES

Make the most of the opportunities we provide to help you find out as much as possible about the programmes you are interested in.

ARE YOU READY TO APPLY?

DO YOU HAVE WEB ACCESS OR CAN YOU COME ON TO CAMPUS TO OUR HELP LABS?

YES

- Log on to website www.auckland.ac.nz
- Click on apply now.
- Complete the online application for admission.
- You will receive a letter of acknowledgement with your Net ID and password for accessing the online application and enrolment system. This acknowledgement will ask you to send through specific certified documents.
- Your programme(s) will be assessed by the relevant faculty and an offer letter will be mailed to you. You can check the status of your application online using your Net ID and password.
- Accept or decline your offer(s) online.
- To help you select your courses you can use The University of Auckland Calendar or handbooks. (The Calendar is for sale in bookshops, or can be accessed from the website at www.auckland.ac.nz/calendar; to obtain handbooks call 0800 61 62 63.) If you would like personalised advice, visit the faculty student centres or contact The University of Auckland.
- Enrol in your courses.
- Pay your tuition fees.
- You are now a University of Auckland student.

NO

FOR FURTHER INFORMATION
PHONE 0800 61 62 63
FOR OVERSEAS CALLS
PHONE 64 9 308 2386

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.

Transition Vs. Postgraduate Programmes
Since 2006, most Masters programmes have become one year degrees preceded by either a one year Bachelors Honours degree or a Postgraduate Diploma.

Doctoral Students
Doctoral degrees will remain essentially the same in structure and duration. The structure of the PhD will not change except that it will be 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.

GENERAL EDUCATION
Courses in General Education are a distinctive feature of University of Auckland bachelors degrees. General Education is aimed at producing graduates with flexibility, critical thinking skills, and an appreciation and understanding of fields outside of their usual area of study. The General Education programme consists of high quality, intellectually challenging courses taught by some of the University's best teachers and researchers. 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 Society
- 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. MATHS 190G).

The classes and programme of study will be the same for all students. Science students are encouraged to seek advice on General Education in their degree from the Science Faculty Student Centre.

GENERAL EDUCATION

- A) Music, Art and Contemporary Society
- 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. MATHS 190G).

The classes and programme of study will be the same for all students. Science students are encouraged to seek advice on General Education in their degree from the Science Faculty Student Centre.
WHY SHOULD I CONSIDER A MAJOR IN MATHEMATICS?

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, computing 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 choose 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 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 Pure Mathematics).

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 Pure 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/oa/science/about/subjects/
When I first started thinking about going to university, I wasn’t really sure what I wanted to do. I had already decided to enrol at The University of Auckland because of its reputation for having good programs in a number of disciplines. There were so many areas I was interested in and I wasn’t quite sure which one to choose. In the end, I enrolled in a BSc in mathematics and physics. I felt that together these areas would provide me with a good foundation for a wide range of possible later careers. It wasn’t until towards the end of this degree, having picked up a BA in philosophy along the way, that I really began to feel firm about where I wanted to go with my studies. I had become quite taken with the idea of studying aeronautics/astronautics, but it took me this long to realize that it was actually something that I could do. An Honours degree in applied maths at Auckland seemed the next logical step. Having completed this degree, I decided to accept an offer from the California Institute of Technology. I gained a Masters degree in 2002 and a PhD in 2006. My specialty is hypersonic (i.e. very fast) gas dynamics - the topic of my research is the entry of meteors into the earth’s atmosphere. This is a very interesting and relevant problem, not only because of the potential hazard to human life posed by such objects, but also because it is a very similar problem in many ways to the entry of a man-made object into an extraterrestrial planetary atmosphere. This is important to me, as atmospheric entry and aero-capture (using a planet’s atmosphere to slow a spacecraft down) is an area that I would very much like to pursue in my future career. I believe that my undergraduate education has stood me in very good stead for my current work. For some reason it seems that mathematics provides a fairly good description of the world around us – even something as seemingly exotic as a spacecraft entering an alien atmosphere!

Dr. Stuart Laurence - Aeronautics.

"I got interested in Finance after I attended a seminar presentation in the Mathematics department while I was finishing my Honors. The presentation was about the Black-Scholes options pricing formula, a beautiful mathematical application to a long-standing open question in Finance. The impact of this formula on the financial markets was gigantic, increasing the numbers of options traded and creating an entire new field of study within Finance. Seeing how mathematics could be applied to a practical problem in finance got me interested in this subject, and I completed a Masters thesis on the modelling of interest rate targeting. Once my Masters degree was completed I applied for PhD scholarships in Finance at Business Schools in the USA. Once I complete the PhD I’ll be on the job market. My advice to students wanting to move in a similar direction is to build a solid mathematical background as it will give one an edge and open doors in many different disciplines. Have fun!"

Artemiza Woodgate - Finance.

WHo Are Mathematics Graduates?

"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.

"When I first started at The University of Auckland, I had no real idea as to what I wanted to do for a job, let alone a career. I decided to leave my options open and I chose to do a Bachelor of Science. My undergraduate course gave me an opportunity to study a lot of the things that interested me such as philosophy, physics, computer science, chemistry and mathematics. At the end of my degree, I had a major in mathematics and had been thinking about leaving to get a job as a software developer. Before I made up my mind I went and talked to Professor Butcher about what my options would be if I chose to continue on to do a Masters in mathematics. He convinced me that there were some interesting papers and research areas to get involved in if I chose to. That (and the student lifestyle!) convinced me to stay on for another two years. During my Masters I had a great degree of freedom to study some very interesting topics such as fractal geometry, numerical methods in Hamiltonian systems and gravitational micro-lensing. Within these areas there was a great deal of computational and technical work to get through, much of which I had never come across before. After two years of work I was very familiar with feeling as though I didn’t know enough to solve the problem, but that I should give it a try anyway. This would turn out to be one of the most important aspects of my university training!"

Mike Harré - Commerce Commission.

"When I was at high school, I never thought I would do a degree in mathematics at all, but I have always loved both music and mathematics. I enrolled at the Music Department and while I was doing those papers I took one Mathematics paper - MATHS 162 - Introduction to Applied Mathematics. Something in there really caught my interest. We used mathematical modeling and those methods interested me. Mathematics has always been part of my life - and I'm still using maths, even though I'm not studying any more. I don't think there are any boundaries between music and mathematics or between mathematics and management. Things and skills I learned while studying are still useful in my life, especially in my job."

Ruby Cheng-pei Chen - Management

"I joined Statistics New Zealand as a Mathematical Statistician in November 1999. Before that, I worked in Tonga’s Statistics Department, after graduating with a Master of Science degree in Maths from The University of Auckland. I have worked on a wide variety of projects, ranging from designing samples to deriving estimation methodology for household and economic sample surveys."

Temalei Topou - Statistics

How About Other Mathematics Graduates Career Paths?

Information Analysis (MSD), Teaching, Information Systems or Computer Science, Operations Research, Biostatistics, Chemistry, Ecological Modelling (AgResearch), Resource Accounting Analyst (Landcorp), Electrical or Computer Engineering, Scientist-Modeller/Statistics (NIWA), Statistical Analysis (Statistics NZ), Meteorology (Metservice), Commercial Banking Graduate programmes, Research, Analysis with Policy Focus, Business Analysis, Sustainability Analysis (Landcorp) are just a few examples.
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). A degree is also known as a programme.

Students intending to graduate with a BSc must pass exams for 360 points worth of coursework. Each course is usually worth 15 points so a BSc degree is usually made up of 24 courses.

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 should 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 2007 University of Auckland 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 I) should consider enrolling in Superstart for its calculus content.

10 day course (recommended for most students)
Date: February 12-23, 2007
Course fee: $240

7 day course (recommended only for students with strong algebra and a good understanding of functions but gaps in calculus and/or trigonometry)
Date: February 15-23, 2007
Course fee: $175

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

TERTIARY FOUNDATION CERTIFICATE PROGRAMME (TFC)

The TFC Programme is recommended for students who left school without enough background to be successful in University courses. It is a full-year programme covering a range of subjects. The Mathematics section prepares students for MATHS 101 or MATHS 102 the following year. Further information and application forms are available from the Co-ordinator:

Stephanie Wyatt
English Department
Arts 1 Building
Room A 403
Ext 87335

For information on the Mathematics component contact:
Moira Statham or Sheena Parnell
Room 324 - Mathematics Department
Ext 85750
Email: parnell@math.auckland.ac.nz
Email: statham@math.auckland.ac.nz

MAX (Mathematical Acceleration and eXtension) is a course designed for high-school students who have shown themselves to be able mathematicians, who wish to be challenged in maths and who can handle a solid workload. It is essentially a chance to gain credits in a degree programme while still at Secondary School. During one semester, students attend lectures and tutorials one evening a week from 4.30 pm to 7 pm, or study extramurally. An information meeting for interested students is organised early November every year.

For further details see
www.math.auckland.ac.nz/Teaching/MAX/
or contact:
Wendy Stratton
Room 413 - Mathematics Department
Ext 85757
Email: wstratton.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. 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.

<table>
<thead>
<tr>
<th>NCEA BACKGROUND</th>
<th>COURSE</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Level 3 Mathematics or Statistics and fewer than 12 credits in Mathematics at Level 2.</td>
<td>MATHS 101 Maths in Society</td>
<td>For students with little or no school mathematics preparation. Can also be taken as General Education course.</td>
</tr>
<tr>
<td>Fewer than 12 credits in Level 3 Mathematics or Statistics, or no Level 3 but at least 18 credits at Level 2.</td>
<td>MATHS 102 Functioning in Mathematics</td>
<td>Covers much of the content of NCEA Level 3 Calculus.</td>
</tr>
<tr>
<td>12 credits in Calculus or Statistics at Level 3, or MATHS 102. Restricted against MATHS 150.</td>
<td>MATHS 108 General Mathematics 1</td>
<td>Standard entry point for first year, multiple streams, wide selection of tutorials. Extends Level 3 Calculus.</td>
</tr>
<tr>
<td>At least 18 credits in Calculus at Level 3 (not Statistics), or equivalent. Restricted against MATHS 108.</td>
<td>MATHS 150 Advancing Mathematics 1</td>
<td>For students with a good background. Mathematics majors should take this course.</td>
</tr>
<tr>
<td>Concurrent or prior enrolment in MATHS 108 or 150 strongly recommended.</td>
<td>MATHS 162 Introduction to Applied and Computational Mathematics</td>
<td>Applied Mathematics majors should take this course.</td>
</tr>
<tr>
<td>No prerequisites or restrictions. Please refer to General Education Schedule.</td>
<td>MATHS 190G Great Ideas Shaping our World</td>
<td>Can be taken as a General Education course, or by students majoring in mathematics.</td>
</tr>
</tbody>
</table>

STAGE I AND II CORE COURSES

Two distinct pathways are available (and both meet the needs of students studying Commerce):
- an option of advancing mathematics (MATHS 150 and 250) for already well-prepared students, and those who may wish to major or minor in Mathematics;
- a general option (MATHS 108 and 208).

There are introductory level courses (MATHS 101 and 102) for students who feel they would need extra preparation.

A separate course, MATHS 162 (Introduction to Applied and Computational Mathematics) provides an introduction to mathematical modelling and computation.

Two MATHS 101 (Mathematics in Society) and MATHS 190 (Great ideas shaping our world) provide an overview of the great ideas in mathematics.
STAGE I COURSES

KEY

MATHS = Mathematics courses
SS = Summer School
S1 = Semester 1
S2 = Semester 2
C = City Campus
T = Tamak Campus
E = Epsom Campus
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.

Study Guides and other resource materials are available at the Student Resource Centre (SRC) in Room B01 in the basement of the Science Centre, Building 303, 38 Princess St, Auckland.

MATHS 101/ MATHS 101G (15 points)
MATHS IN SOCIETY
S1 and E, S2 C

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.

Text required:
Resource Pack is available from the Student Resource Centre (SRC).

MATHS 102 (15 points)
FUNCTIONING IN MATHEMATICS
S5 C, S1 C, S2 C

Recommended Preparation:
For students who have achieved fewer than 12 credits in Calculus or Statistics at NCEA Level 3, or who have not studied at Level 3 but have achieved at least 18 credits in Mathematics at NCEA Level 2 (or equivalent). This course may not be taken with or after any other mathematics course at Stage I or above except MATHS 101.

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

MATHS 108 (15 points)
GENERAL MATHEMATICS I
S5 C, S1 C and T, S2 C and T

Recommended preparation:
MATHS 102 or at least 12 credits in Calculus or Statistics at NCEA Level 3 (or equivalent).

Restrictions:
MATHS 130, 150, 151, ENGS 111, PHYSICS 111

Texts required:
Wiley.
Anton, H & Busby, R.C. “Contemporary Linear Algebra”.
Wiley.

MATHS 130 (15 points)
ADVANCING MATHEMATICS I
S1 C, S2 C

Recommended preparation:
B+ in MATHS 102, or at least 18 credits in Calculus at NCEA Level 3.

Restrictions:
MATHS 108, 109, 130, 151, 230, ENGS 111, PHYSICS 111

Texts required:

The standard first year Mathematics course for students with good mathematics background who are considering a major or a minor in Mathematics or a major in any science, economics and finance. Limits and derivatives of functions of 1 and 2 variables, differential equations, vectors, lines and planes, systems of linear equations, dot and cross product, Matrix algebra and determinants.

MATHS 153 (15 points)
ACCELERATED MATHEMATICS
S1 C

Note:
Enrolment requires consent of Department.

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

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

Texts recommended:
Anton, H & Busby, R. “Contemporary Linear Algebra”. Wiley.

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

MATHS 162 (15 points)
INTRODUCTION TO APPLIED AND COMPUTATIONAL MATHEMATICS
S1 C, S2 C and T

Recommended preparation:
Concurrent or prior enrolment in one of MATHS 108, 130, 150 or 151 is recommended.

Text required:
“Introduction to Applied & Computational Mathematics”, written by members of the Applied and Computational Mathematics Unit. (Available from the SRC.)

Text recommended:

An introduction to mathematical modelling and scientific computing and to a selection of mathematical techniques in the context of applications. Students will learn how to formulate mathematical models and how to solve them using numerical and other methods (and computers in the Undergraduate Laboratory). While it is not essential to take MATHS 162 to be able to take second year courses in Applied Mathematics, we strongly recommend that any student wishing to study Applied Mathematics take this course in their first year. It is a core course for students whose primary interest is Applied Mathematics.
**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 (Introduction to Applied and Computational Mathematics) 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).

**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 255 as a prerequisite. At Stage III, a major in Applied Mathematics must contain MATHS 361; it is recommended that it also contain 362 and 363. A major in Mathematics (sometimes referred to as Pure Mathematics) has less restrictions. It is recommended that it contain 332 and 320 or 328 if you are considering postgraduate study.

Mathematics majors should take all three of these courses.

Applied Mathematics majors should take MATHS 253 and 260. Entering to MATHS 253 and 255 from MATHS 208 requires good grades; otherwise, advancing students must take MATHS 250 (Advancing Mathematics 2).
STAGE II COURSES

MATHS 202 (15 points)
TUTORING IN MATHEMATICS
S1 C
Prerequisite:
Enrolment requires consent of Department.
Text required:
CD accompanying the MATHS 102 course is available from the SRC.
For students who want an interactive practical involvement in methods of teaching and learning of mathematics. Students will tutor, mark and analyze assignments for MATHS 102 (Mathematics 2), and will use this experience in discussions and seminars about developing conceptual understanding in mathematics. As is usual, students will receive payment for assignment marking. Students wishing to enrol in this course should contact Moira Statham.

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

MATHS 208 (15 points)
GENERAL MATHEMATICS 2
S1 C, S1 C and T, S2 C
Prerequisite:
15 points from MATHS 108, 150, 151, ENGLISH 111, PHYSICS 111
Restrictions:
MATHS 208, PHYSICS 211.
Cannot be taken after MATHS 253
Text recommended:
A sequel to MATHS 108, covering further matrix and vector algebra (solution of linear systems, least squares, eigenvalues vector spaces), calculus of series and Taylor approximation, multivariable calculus and optimization, differential equations and difference equations and the use of symbolic computing with applications. It is the only Stage II Mathematics course available at Summer School.

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

MATHS 253 (15 points)
ADVANCING MATHEMATICS 3
S1 C, S2 C and T
Prerequisites:
15 points from MATHS 152, 250, PHYSICS 112, 210 or an A pass in MATHS 208
Restrictions:
MATHS 230, PHYSICS 211
Text required:
Howl, Anton, IRL, Bivens and Stephen Davis “Calculus” (8th edition).
Howard Anton and Robert Busby “Contemporary Linear Algebra”
Standard sequel to MATHS 250, available every semester at the City Campus and in the second semester at Tamaki. It covers inner product spaces and applications. Orthogonal diagonalization and quadratic forms. Differential calculus for functions of several variables. Multiple integrals. Vector valued functions and space curves. Vector calculus. Green’s theorem. Series. It is a foundation for a large number of Stage III courses in pure and applied mathematics and statistics. All students intending to advance in mathematics should take this course unless they have already done MATHS 230.

MATHS 255 (15 points)
PRINCIPLES OF MATHEMATICS
S1 C, S2 C
Prerequisites:
15 points from MATHS 150, 151, PHYSICS 111, ENGLISH 111, or a B in MATHS 108
Restrictions:
MATHS 109, 152, 230, PHYSICS 112, 210
Texts required:

Students wishing to study MATHS 253 after MATHS 208 will only be able to do so directly if they obtain an A or A+ grade in MATHS 208.

COMPSCI 225 (15 points)
DISCRETE STRUCTURES IN MATHEMATICS AND COMPUTER SCIENCE
S1 C, S2 C
Recommended preparation:
MATHS 108, 152 or 150 or COMPSCI 101
Restriction:
445.225
Introduction to logic, principles of counting, mathematical induction, recursion and relations, 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.

MATHS 250 (15 points)
ADVANCING MATHEMATICS 2
S1 C, S2 C
Prerequisites:
15 points from MATHS 150, 151, PHYSICS 111, ENGLISH 111, or a B in MATHS 108
Restrictions:
MATHS 109, 152, 230, PHYSICS 112, 210
Texts required:
Howard, Anton, IRL, Bivens and Stephen Davis “Calculus” (8th edition).
Howard Anton and Robert Busby “Contemporary Linear Algebra”
The study of differential equations is central to the study of mathematical modeling of systems that change. This course develops methods for the solution of 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 modeling are discussed. This is a core course for students who wish to advance in pure mathematics.

MATHS 260 (15 points)
DIFFERENTIAL EQUATIONS
S1 C and T, S2 C
Note:
Cannot be taken after MATHS 253 or its equivalent.
Restrictions:
PHYSICS 211
Text required:

MATHS 270 (15 points)
NUMERICAL COMPUTATION
S1 C, S2 C
Recommended preparation:
MATHS 108, 150 or equivalent, and a computing course such as COMPSCI 101 or MATHS 162
Restrictions:
MATHS 267
Text required:
Lecture notes are available on line.

An introduction to the algorithms that are used to solve frequently occurring problems in computation. Topics covered include linear and non linear systems of equations, interpolation, quadrature (integration) of functions and numerical solution of ordinary differential equations. This is a core course for students whose primary interest is in Applied Mathematics.
MATHS 302 (15 points)
INTRODUCTION TO MATHEMATICS EDUCATION
S1 C
Recommended preparation:
At least 45 points from courses in Mathematics or Statistics.

Texts recommended:

MATHS 310 (15 points)
HISTORY OF MATHEMATICS
S2 C
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.

MATHS 315 (15 points)
MATHEMATICAL LOGIC
S2 C
Recommended preparation:
COMPSCI 225 or MATHS 255

Text recommended:
Hamilton, A. G. “Logic for Mathematicians”.

MATHS 320 (15 points)
ALGEBRAIC STRUCTURES
S2 C
Prerequisites:
MATHS 255 or 328 or an A-pass in MATHS 253

Text required:

MATHS 326 (15 points)
COMBINATORIAL COMPUTING
S1 C
Recommended preparation:
COMPSCI 225 or MATHS 255

Texts required:

MATHS 328 (15 points)
ALGEBRA AND APPLICATIONS
S1 C
Prerequisite:
15 points from MATHS 255, or B-pass in COMPSCI 225 and one of MATHS 208, 250, 253

Text suggested:
Hamilton, A. G. “Logic for Mathematicians”. Semantic and syntactic approaches to propositional logic, introduction to set theory and formal systems, first-order predicate logic, soundness and completeness of predicate calculus, an introduction to model theory. Gödel's incompleteness theorem. It is recommended for students with an interest in the foundations of mathematics or theoretical computer science.

MATHS 330 (15 points)
REAL AND COMPLEX ANALYSIS
S1 C
Prerequisite:
MATHS 255 and 255, or 253 and a B-pass in MATHS 260

Text required:

MATHS 332 (15 points)
MULTIVARIABLE CALCULUS
S2 C
Prerequisite:
MATHS 332

MATHS 340 (15 points)
MULTIVARIABLE CALCULUS
S1 C, S2 C
Prerequisite:
MATHS 253

Text suggested:
Stewart, J., “Calculus” or “Multivariable Calculus”, or Anton, with any text covering Stokes’ Theorem for surfaces.

MATHS 347 (15 points)
REAL AND COMPLEX ANALYSIS
S1 C
Prerequisite:
MATHS 255 and 255, or 253 and a B-pass in MATHS 260

Text suggested:
Stewart, J., “Calculus” or “Multivariable Calculus”, or Anton, with any text covering Stokes’ Theorem for surfaces.

MATHS 361 (15 points)
ADVANCED METHODS IN APPLIED MATHEMATICS I
S1 C
Recommended preparation:
MATHS 260, MATHS 253 or equivalent, or PHYSICS 211

Text required:

This is an introductory course in Partial Differential Equations (PDEs) covering Fourier series, Fourier integrals, boundary value problems and separation of variables, with application to the solution of second order PDEs in one, two and three dimensions.

MATHS 362 (15 points)
ADVANCED METHODS IN APPLIED MATHEMATICS II
S2 C
Recommended preparation:
MATHS 260, MATHS 253 or equivalent, or PHYSICS 211

Restriction:
MATHS 347

Text recommended:
Haberman, R., “Applied Partial Differential Equations with Fourier Series and Boundary Value Problems (4th edition)”. Further techniques used in modern applied mathematics, including vector calculus, complex variables, the calculus of variations, and Green’s functions for ODEs. The emphasis throughout the course is on the application of these techniques.
Graduate Mathematics

Graduate Degrees

There are four possible graduate programmes you can enrol in after getting your BSc in Mathematics or 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. On page 27 you will find a list of graduate courses that will be offered next year.

If you require further information, please contact Hannah Bartholomew, Ext 84239, Graduate Advisor for all graduate programmes, except PhD.

Bachelor of Science (Honours) (BSc(Hons))

You need to pass 120 points of 700-level courses, with at least 75 points in the subject. To be admitted into the BSc(Hons) programme, you must have a major in Mathematics including either MATHS 320 or MATHS 332 and at least B in at least 90 points worth courses at Stage III. These courses need not all be in Mathematics or Applied Mathematics. If you are doing a BSc(Hons) in Applied Mathematics, you must pass MATHS 361 and either MATHS 362 or MATHS 363 before enrolling in the degree.

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

Postgraduate Diploma in Science (PGDipSci)

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

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You need to pass 120 points of 700-level courses, with at least 75 points in the subject. To be admitted into the BSc(Hons) programme, you must have a major in Mathematics including either MATHS 320 or MATHS 332 and at least B in at least 90 points worth courses at Stage III. These courses need not all be in Mathematics or Applied Mathematics. If you are doing a BSc(Hons) in Applied Mathematics, you must pass MATHS 361 and either MATHS 362 or MATHS 363 before enrolling in the degree.

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

Postgraduate Diploma in Science (PGDipSci)

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

## Programmes Which Include a Mathematics Major

<table>
<thead>
<tr>
<th>Degree</th>
<th>Mathematics</th>
<th>Applied Mathematics</th>
<th>Industrial Mathematics</th>
<th>Logic and Computation</th>
<th>Bioinformatics</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSc</td>
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<td>BSc(Hons)</td>
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<tr>
<td>GradDipSci</td>
<td>*</td>
<td>*</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>PGDipSci</td>
<td>*</td>
<td>*</td>
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<td></td>
<td></td>
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<tr>
<td>MA</td>
<td>*</td>
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</tr>
</tbody>
</table>

## Postgraduate Courses in 2007

### Summer School

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>University (Mathematics Education)</th>
<th>Points</th>
<th>Prerequisites (P) or Recommended Preparation</th>
</tr>
</thead>
<tbody>
<tr>
<td>707 #</td>
<td>Special Topic in Mathematics Education 1</td>
<td></td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>708 #</td>
<td>Special Topic in Mathematics Education 2</td>
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<td>709 #</td>
<td>Special Topic in Mathematics Education 3</td>
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<td>710 #</td>
<td>Special Topic in Mathematics Education 4</td>
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<td></td>
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<tr>
<td>711 #</td>
<td>Special Topic in Mathematics Education 5</td>
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<tr>
<td>784 #</td>
<td>Advanced Topic in Mathematics 4</td>
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</table>

### Semester 1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>University (Mathematics Education)</th>
<th>Points</th>
<th>Prerequisites (P) or Recommended Preparation</th>
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<tbody>
<tr>
<td>681 #</td>
<td>Postgraduate Topic in Mathematics 1</td>
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<td>694 #</td>
<td>Postgraduate Diploma Project 1</td>
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</tr>
<tr>
<td>705 #</td>
<td>Socio-Political Issues in Mathematics Education</td>
<td></td>
<td>15</td>
<td>MATHS 302</td>
</tr>
<tr>
<td>712 #</td>
<td>Mathematics and Learning</td>
<td></td>
<td>15</td>
<td>MATHS 302</td>
</tr>
<tr>
<td>720 #</td>
<td>Groups, Fields and Galois Theory</td>
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<td>15</td>
<td>MATHS 302</td>
</tr>
<tr>
<td>715 #</td>
<td>Graph Theory and Combinatorics</td>
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<td>15</td>
<td>P. MATHS 320</td>
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<tr>
<td>730 #</td>
<td>Measure Theory and Integration</td>
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<td>15</td>
<td>MATHS 332</td>
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<tr>
<td>740 #</td>
<td>Complex Analysis</td>
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<td>MATHS 333</td>
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<td>750 #</td>
<td>Topology</td>
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<td>MATHS 332</td>
</tr>
<tr>
<td>745 #</td>
<td>Chaos, Fractals and Bifurcations</td>
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<td>15</td>
<td>MATHS 253</td>
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<tr>
<td>763 #</td>
<td>Partial Differential Equations</td>
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<td>15</td>
<td>MATHS 361/362</td>
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<td>770 #</td>
<td>Advanced Numerical Analysis</td>
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<td>MATHS 270</td>
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<td>781 #</td>
<td>Advanced Topic in Mathematics 1</td>
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<tr>
<td>782 #</td>
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<tr>
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<td>788 #</td>
<td>Advanced Topic in Applied Mathematics 2</td>
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<td>791 #</td>
<td>Honours Dissertation in Mathematics</td>
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<td>792 #</td>
<td>Project in Mathematics 2</td>
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### Semester 2

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>University (Mathematics Education)</th>
<th>Points</th>
<th>Prerequisites (P) or Recommended Preparation</th>
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<tr>
<td>682 #</td>
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<tr>
<td>695 #</td>
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<td>701 #</td>
<td>Research Issues in Mathematics Education</td>
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<td>MATHS 302</td>
</tr>
<tr>
<td>706 #</td>
<td>Technology in Mathematics Education</td>
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<td>707 #</td>
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<tr>
<td>714 #</td>
<td>Number Theory</td>
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<td>15</td>
<td>P: B+ in MATHS 328 or 320</td>
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<tr>
<td>721 #</td>
<td>Rings, Modules, Algebras and Representations</td>
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<td>15</td>
<td>MATHS 320</td>
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<td>731 #</td>
<td>Functional Analysis</td>
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<td>MATHS 332</td>
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<tr>
<td>761 #</td>
<td>Ordinary Differential Equations &amp; Dynamic Systems</td>
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<td>15</td>
<td>MATHS 361/362</td>
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<td>769 #</td>
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### First Semester

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<th>Prerequisites (P) or Recommended Preparation</th>
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<tr>
<td>795 #</td>
<td>MSc Thesis in Applied Mathematics</td>
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<td>796 #</td>
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<tr>
<td>799 #</td>
<td>Part-time MSc Thesis in Mathematics</td>
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</table>

* students must enrol for both A and B components of the course in consecutive semesters
# indicates courses for which a supervisor must be found
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. 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.

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 1970's) 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 square) 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 sphere can be shrunk to a point (as a loop can do on the 3D 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 research direction, 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 - in an interview given to the NZIMA newsletter - Prof. D. Gauld, whose research domain 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. The development of 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 (e.g. 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 solve 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
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 NZ, AgResearch, MAF etc.), industry, insurance companies, local bodies, market research companies, universities and technical institutes. In all of these jobs they are designing and extracting programs from specifications, 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:
Wrenu Solomon
Ext 88771
Email solomon@math.auckland.ac.nz
Room 209 - Mathematics Department
or
Ilze Ziedins
Ext 85051
Email ilze@stats.auckland.ac.nz
Room 211 - Statistics Department

**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
Ext 86629
Email shixiao@math.auckland.ac.nz
Room T721.340 - Mathematics Department
Tamaki Campus

**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 means 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 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
Ext 82121
Email j.sneddon@math.auckland.ac.nz
Room 311 - Mathematics Department
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

ENGLISH LANGUAGE SUPPORT
The University of Auckland English Language Academy (ELA) provides English language programmes for all students who are interested in pursuing undergraduate and postgraduate degrees, as well as specialist English and Teacher training courses. The ELA offers IELTS preparation courses and is an accredited IELTS test centre. It is also a Trinity TESOL training centre.

It also offers the Foundation Certificate in English for Academic Purposes (FCertEAfP) which provides high quality academic English preparation for university study, the FCertEAfP covers: language structure, academic learning strategies, listening strategies, academic writing skills, vocabulary, fluency and accuracy in writing, effective note taking skills, academic report and essay writing, examination preparation skills, presentation skills, effective use of learning resources and communication techniques. It takes the equivalent of one full-time semester to complete, and is taught at The University of Auckland English Language Academy.

For information, please contact the English Language Academy at: Level 5 SAP Building, 67 Symonds Street Phone: 64 9 919 7695 Fax: 64 9 919 7899
Email: el@nz.ac.nz
Website: www.ela.auckland.ac.nz
Postal Address: Private Bag 92019, Auckland

DELNA (DIAGNOSTIC ENGLISH LANGUAGE NEEDS ASSESSMENT)
DELNA is an assessment that enables us to identify your level of academic English. If you need to improve your skills, you will be guided to sources of effective English language enrichment within the University. DELNA is only for students who have accepted a place and enrolled at The University of Auckland. It cannot be used to exclude you from a particular programme, there is no cost, and the results do not appear on your academic record.

There are two parts to the assessment:
1. The Screening (required for all first-year students at The University of Auckland):
   • is a 30-minute assessment.
   • includes a vocabulary task and a text-editing task.
   • enables us to quickly identify students who may need assistance with the demands of academic English.
2. The Diagnosis (required for students whose screening results suggest that they need assistance with academic English language skills):
   • is a 2-hour assessment.
   • includes a listening, reading and writing task.
   • enables us to recommend appropriate English language enrichment options.

Upon completion of the diagnosis students who need to improve their English language skills will be invited to discuss their specific needs with the DELNA Language Adviser.

For information about the English Language requirements specific to mathematics, please contact: Jamie Sneddon
Room 305 - Mathematics Department
Ext. 82121
Email: j.sneddon@auckland.ac.nz

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
Tel. +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.

THE STUDENT LEARNING CENTRE
The Student Learning Centre (SLC) offers further support for mathematical skills which are not related to specific courses, e.g. calculator skills, basic arithmetic and algebra.

The following are examples of the support available:
• workshops prior to enrolment;
• pre-semester workshops in February and July;
• help with self-study modules in basic skills;
• one-to-one support.

It costs $10 to join the SLC, then you can attend any of the workshops. Check with either SLC office to see which options are offered at the two campuses.

The SLC on City Campus is located on Level 3 of the Kate Edger Commons. The SLC on Tamaki Campus is in the Resource Centre in Building 710.1. Both centres are staffed by part-time academic tutors with special skills for helping students to develop better learning strategies.

During the year brochures are published advertising the workshops that will be held. The Centre holds mathematics, chemistry and statistics workshops for those students who do not have the background knowledge normally assumed in these areas for Stage I courses. Students may register for workshops or make individual appointments with tutors at the City Campus SLC office (ext 88850) or the Tamaki campus SLC office (ext 86665).
LECTURES AND TUTORIALS

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 (total) 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, 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.

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.

Sick or bereavement

ASSISTANCE ROOM
The Mathematics Department on City Campus operates an Assistance Room for help with mathematics courses. Room B25 is situated in the basement of Building 303, Science Centre. Assistance Room is primarily for Stage I students, with some assistance available for Stage II and III students. One or more tutors will be available to help students with problems arising with assignments or the understanding of a course. The assistance room is staffed from 9am to 4pm, Monday to Friday during semesters. During study breaks it will also be staffed, but for reduced hours.

The Mathematics assistance room is coordinated by:
Alastair McNaughton
Ext B5244
Room 330 - Mathematics Department
Room 723.343 - Tamaki Campus
Email: a.mcnaughton@math.auckland.ac.nz

At Tamaki Campus a part time assistance room is operated an assistance Room for help with mathematics courses. Room B25 is situated in the basement of Building 303, Science Centre. Assistance Room is primarily for Stage I students, with some assistance available for Stage II and III students. One or more tutors will be available to help students with problems arising with assignments or the understanding of a course. The assistance room is staffed from 9am to 4pm, Monday to Friday during semesters. During study breaks it will also be staffed, but for reduced hours.

The Mathematics assistance room is coordinated by:
Alastair McNaughton
Ext B5244
Room 330 - Mathematics Department
Room 723.343 - Tamaki Campus
Email: a.mcnaughton@math.auckland.ac.nz

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
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).
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.

COMPUTER ACCESS

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.

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 303.

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. On the Tamaki Campus there are two undergraduate Laboratories in Level 1 of Buildings 721 and 723, and a further Laboratory for advanced science and technology students in Level 2 of Building 731. 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 (e.g. disk jams in the drive), do NOT attempt to remedy the fault personally but ask a demonstrator.

The Computing Laboratory is coordinated by:
Dr Allison Heard
Ext. 88816
Room 414 - Mathematics Department
Email: heard@math.auckland.ac.nz

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

MATLAB

From 2006 all first and second year undergraduate mathematics courses (with the exception of MATHS 101) 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 in 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.otmu.auckland.ac.nz/ find_a_pool_room.htm.

COMMUNICATION AND STUDENT REPRESENTATION

Each class represents 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 department coordinator is:

Greg Oates
Ext. 88605
Room 322 - Mathematics Department
Email: oates@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 the 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, Daniela Rovere (Rm 336, Ext 88063), or any approachable lecturer. Complaints such as inaccurate marking of tests or assignments are usually best dealt with by the lecturer.
STUDENT SUPPORT NETWORKS AND SERVICES

CAREER CENTRE
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.

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 workshops, seminars and a drop-in service at the City Campus Science Centre and at Tamaki.

You will find the Careers Centre in Room 001 of The Clock Tower, 22 Princes Street, and on the web at www.auckland.ac.nz/careers. Visit the Centre to discuss your career options, get your CV and cover letter reviewed, attend a workshop, have a practice interview or use the extensive resources.

The University Careers Centre also has a branch at Tamaki campus where you can discuss your career options with a careers consultant, have your CV and cover letter reviewed or have a practice interview. Visit our website www.auckland.ac.nz/careers for details of location and times.

The Careers Centre advertises job vacancies, employer presentations and careers fairs online at www.jobs4grads.net. It is recommended that students attend employer events for any organisations that they wish to apply to. Recruitment by key government departments and management consultancies occurs early in the year. In May each year a general Careers Fair is held. Attendance at this will help students gain more information about the wide range of career options available with their science degrees.

CHAPLAINCY
Chaplains at Maclaurin Chapel and Newman Hall are available to students for pastoral care and spiritual guidance. Both facilities provide facilities for worship, prayer, relaxation and study.

CHILDCARE
The University operates a number of childcare centres on the City, Grafton and Tamaki campuses. All deliver a healthy, safe and stimulating environment for children below age five.

FINANCIAL SERVICES
Student finance advisers can counsel students on major sources of funding available to them, and assist with budgeting and financial planning.

HEALTH SERVICE
A comprehensive medical service is available on the City, Tamaki, Grafton and Epsom campuses.

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/mdr.

STUDENT ADVOCACY NETWORK
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!

If you’re having trouble with any aspect of university life, often a fellow student can be the best person to help. We’ve had to negotiate our way through the same obstacle course - we understand your point of view.

The Student Advocacy Network is a group of students helping students. We are trained to provide prompt, confidential and quality support and advice to other students. Besides lending a sympathetic ear, we can offer advice about your rights, university procedures and other services you might find helpful. We can also help you resolve disputes by speaking on your behalf or by attending meetings with you for support.

The Student Advocacy Network operates a drop-in service every weekday during semester. We are located upstairs in the AUSA House, 3 Alfred Street. Student advocates can also be contacted through the Student Representation Coordinator on 309 0789 ext 238 or by email at wave@auckland.ac.nz. Website: www.ausa.auckland.ac.nz/wave

The Kate Edger Information Commons
Student Commons
STUDENT LEARNING CENTRE
The Student Learning Centre facilitates students’ development of more effective academic learning and study skills. Throughout the year, the Centre runs courses on a wide range of topics, from reading and notetaking to time management. Appointments for individual consultations are available, as well as drop-in hours for urgent problems.

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
Telephone: 373 7599 Ext 85886,
Email: enquiries@math.auckland.ac.nz
Website: www.math.auckland.ac.nz

At Tamaki campus the administration is handled through the office of the Division of Science and Technology located in Level 3 of Building 731.

STUDENT RESOURCE CENTRE
Students’ primary contact with the Mathematics Department will be through this service. The Student Resource Centre is located in B01, basement of the Science Centre, Building 303 at the City Campus. At the Tamaki Campus the Student Resource Centre is located in building 710.1.

ASSISTANCE ROOM FOR STAGE I AND II MATHS STUDENTS
The assistance rooms is located in the basement of the Science Centre, Building 303 in room B25, past the Student Resource Centre.

THE UNIVERSITY LIBRARY
Te Tumu Herenga
The University Library is an essential resource for the successful undergraduate student. It has multiple libraries spread over the five campus sites: City, Tamaki, Epsom, Grafton and North Shore.

Over 1.9 million volumes of books and serials are available in the University Library system. The Library also has extensive electronic resources, maps, videotapes, DVDs, microforms, manuscripts, and newspapers. Your University ID card is your Library card, your photocopy card and your print card. You need to present your ID card when you want to borrow books and other library materials.

Science Resources In The General Library
Ask at the Enquiry Desk on Level 1 for assistance. The Science Information Services Team is located on Level M. The printed periodical collections in biology, marine science, chemistry, computer science, food science, forensic science, geology, physics, mathematics, and statistics are located on Level M. Geography and psychology serials are shelved with the book collection.

Tamaki Library
Tamaki Library has resources in computer science, environmental sciences, marine science, mathematics, physics, psychology, sports and exercise sciences and statistics.

The Leigh Marine Research Laboratory Library
The Library at Leigh specialises in marine science resources.

Other Relevant Scientific Material
There are also relevant scientific resources in the Architecture, Engineering, Law, and Medical Libraries.

VOYAGER, the Library Catalogue
Voyager provides access to all books, periodicals, and other resources. You can also use Voyager to check your patron details, to renew and recall books and to see which books you have on loan or have recalled. http://voyager.auckland.ac.nz/

LEARN, the Library Electronic Academic Resources Network
The Library’s electronic network is your gateway to a wide range of information resources, including the full text of many periodicals. These resources may be accessed from computers in The University of Auckland Library System, from the Information Commons, computer labs and offices on the Campus and from home. www.library.auckland.ac.nz

LIBRARY SERVICES
Information skills’ tutorials and workshops
A variety of tutorials and workshops are offered to enable students to fully utilise the Library’s resources. These include:

• Orientation tours
• Voyager and LEARN tutorials
• An overview of electronic resources available on LEARN
• Subject and course-related seminars
• Workshops on databases and the Internet

Courses may be booked online from the LEARN homepage.

SHORT LOAN
There is a Short Loan Collection in the

However, the assistance rooms are in the basement of the Science Centre, Building 303 in room B25, past the Student Resource Centre.

Information Commons where students may borrow prescribed and recommended material.

Other Library Services
1. Inter-Campus Library Delivery Service
   This will assist you in getting books and articles held at another campus or in Off-Campus Storage.

2. Interlibrary Loan and Document Delivery
   You need your lecturer’s or tutor’s signature to request an item which is not held in any of the University of Auckland libraries.

3. Photocopying
   Self-service photocopiers are available in all the libraries. The service is based on a PIN-protected account that is accessed using your student ID card.

4. Electronic Help Desk
   A NetID and password is required in order to access the Library’s electronic resources. The IC Helpdesk, within the Information Commons, will guide you in accessing your Netlogin.

5. Ask a Librarian Service
   This service, available via LEARN, allows you to email requests for information to the library. For Further Information Contact enquiries@math.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;
• Head of Department;
• Faculty-level official;
• 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.
MEMBERS OF THE MATHS DEPARTMENT

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Statistics

Building 730
Optometry Clinic
SLT Clinic

Building 731
Computer Science
Physics
Psychology Clinic
Speech Language Therapy

Building 733
Biological Sciences
Geography & Environmental Science

Building 734
Sport & Exercise Science
Psychology

Building 740
Wine Science

Building 750
Sport & Exercise Science Clinics

Building 751
UniSports