

MATHEMATICS 2007 POSTGRADUATE HANBDOOK

2007



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 | 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	I 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 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 I ends	25 June
Inter Semester Break	26 June – 14 July
SEMESTER 2 – 2007	
Semester 2 Begins**	l 6 July
Mid Semester Break	27 August – 8 September
Graduation	25 September - 27 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.

**Fees due: First Semester: 26 February; Second Semester: 16 July; Doctoral Students: 26 February

WELCOME TO THE DEPARTMENT OF MATHEMATICS

We would like to extend a warm invitation to all qualified students to consider studying for a postgraduate degree or diploma in Mathematics at the University of Auckland.

The Department of Mathematics is one of the largest and most diverse departments within the University of Auckland. It is also the strongest mathematics department amongst the New Zealand universities, and it has a strong international reputation. It offers degrees and diplomas that enjoy widespread recognition with employers in New Zealand and internationally.

If you enjoyed your experience as an undergraduate student in mathematics, if you would like to enhance your skills and get a taste of leadin edge research, you should consider pursuing graduate studies.

Postgraduate students in Mathematics can specialise in their area of choice and pursue their studies in depth. The Department offers four postgraduate programmes – the Postgraduate Diploma in Science, the Bachelor of Science (or Arts) Honours, the Masters degree and the PhD. There are also graduatelevel diplomas, which are designed with special audiences in mind, in particular the Graduate Diploma in Science and the Secondary Teaching Diploma in Mathematics Education.

A postgraduate qualification in mathematics will open up a wide range of career opportunities and provide you with knowledge and skills in demand in many areas of endeavour. We will be pleased to welcome you as a graduate student in our department.

To those who have accepted our invitation and are commencing graduate study we would like to wish you all the best. We will do everything to ensure your satisfaction and success, and if we can help in any way please do ask. Bill Barton, Head of Department, Mathematics Tom ter Elst, PhD Advisor Hannah Bartholomew, Postgraduate Advisor



Contact and enquiries

Please contact one of the following staff members for information about graduate study and research programmes in Mathematics at the University of Auckland. Enquiries are welcome.

Postgraduate advisor

Dr Hannah Bartholomew Room 308 – Mathematics Department Extension 84239 Email h.bartholomew@math.auckland.ac.nz

Further contact details

PhD Advisor:

Dr Tom ter Elst Room 404 – Mathematics Department Ext 86901 Email: terelst@math.auckland.ac.nz

Undergraduate Advisor:

Dr Jamie Sneddon Room 305 – Mathematics Department Ext 82121 Email: j.sneddon@auckland,ac.nz

Head of the Applied Mathematics Unit:

Dr. Philip Sharp Room 329 – Mathematics Department Ext 88884 Email: sharp@math.auckland.ac.nz

Head of the Pure Mathematics Group:

Associate Professor Rod Gover Room 423 – Mathematics Department Ext 88792 Email: gover@math.auckland.ac.nz

Head of Mathematics Education Unit:

A/Prof Mike Thomas Room 327 – Mathematics Department Ext 88791 Email: m.thomas@math.auckland.ac.nz

Liaison Officer for Maori and Pasifika

Students:

Dr Sina Greenwood Room 404 – Mathematics Department Ext 88776 Email: greenwood@math.auckland.ac.nz

Head of Mathematics Department:

Associate Professor Bill Barton Room 301 – Mathematics Department Ext 88779 Email: b.barton@auckland.ac.nz

Departmental Manager:

Daniela Rovere Room 336 Ext 88063 Email: rovere@math.auckland.ac.nz

Department Address:



THE DEPARTMENT OF MATHEMATICS

Our Department is the largest university mathematics department in New Zealand and one of the best in Australasia. The Department teaches a full range of courses at the undergraduate and graduate levels, and has particular research strengths across the spectrum of mathematics: algebra, combinatorics, complex analysis, differential geometry, differential equations and mathematical modelling, functional analysis and operator theory, history of mathematics, numerical analysis, topology and mathematics education.

Many of our staff members are leading figures in their area, with strong international reputations for their research. Most publish in top journals and regularly speak and participate in conferences and workshops both locally and overseas. The award of prizes and fellowships of professional or scientific societies, and major research grants have honoured some for their work.

Although a large department, we are still able to teach graduate students in small classes, and provide individual attention and access to experts in many fields. The Department employs most graduate students, in some capacity, so that students and staff feel that they are members of the same team. In some universities, graduate classes are huge, or one or two well-known staff members are overloaded with research students. with negative effects, but such is the case at Auckland. We have an excellent reputation and our honours graduates are sought after by some of the best-known universities in North America and Europe. We equally have many international visitors and close links with other disciplines. In short, we provide postgraduate students with a rich, friendly and rewarding environment.

The Mathematics Department offers a wide range of courses at all levels for students



in several Faculties. It comprises over 50 permanent and temporary academic staff, based on the City campus and Tamaki campus.

Within the Department there are two units, which operate with a certain degree of autonomy: the Applied Mathematics Unit and Mathematics Education Unit. Pure Mathematics represents another strong component of teaching and research. Some staff is equally actively involved in the recently established Centre for Discrete Mathematics and Theoretical Computer Science (a joint venture involving the Computer Science and Mathematics Departments of the Universities of Auckland and Waikato).

The Department is housed in the Mathematics/Physics building, on the corner of Princes St and Wellesley St, and adjacent to Albert Park. The Department maintains and operates its own computing equipment, including laboratories of networked Macintosh computers and individual Macintosh, PCs, Sun and SGI workstations for staff and postgraduate students.

WHY GRADUATE STUDY IN MATHEMATICS?

Graduate study in Mathematics opens up a world of possibilities. It can enable you to indulge your academic enthusiasm or satisfy your intellectual curiosity, at the same time providing you with advanced knowledge and problem-solving skills applicable in any number of fields. In this information age a postgraduate qualification in the mathematical sciences places you well for a career in commerce, education, industry or science. Attractive opportunities exist in biotechnology, computing, finance, meteorology, systems analysis, school and university teaching, and many other fields; and Mathematics graduates with honours are particularly sought after.

The idealists among us would hope that preparation for employment is not the sole reason for graduate study. There is always a pride in being accomplished in one's profession, and in keeping up with the latest developments. Graduate-level courses in Mathematics bring you to the cutting edge of the subject, taught by highly qualified staff who are active in research and keen to communicate the background of their specialist field. Reading courses, projects and theses provide a research "apprenticeship", helping you gain valuable skills as well as bringing you to the frontiers of knowledge, and the thrill of discovery or the satisfaction of seeing mathematics at work.

The Department has particular strengths in pure, applied and industrial mathematics, as well as in mathematics education and offers world-class degrees programmes at both undergraduate and postgraduate levels, including BSc, MSc and PhD.

Students in our department have the opportunity to take research projects way before graduation, through awarded research scholarships, but are strongly encouraged to give a research dimension to their graduate studies, through reading courses, projects and dissertations. Furthermore, since 2006, it became a Faculty of Science requirement that the BSc(Hon) degree comprises a 30-point worth research based dimension.

In the fields of **applied and industrial mathematics**, students are welcome to explore, along with our staff, the following research areas: non-linear dynamics, sea-ice in Antarctica, numerical methods, radio-carbon dating, cellular physiology, building acoustics, the solar system, medical imaging, control theory or circuit theory.

In 2006 our students took topics as modelling functions or mechanisms of the human body or modelling distribution of volcanic ashes; they proposed mathematical techniques



Elan Gin (PhD Candidate)

Elan Gin is constructing a mathematical model of the mechanisms underlying saliva secretion as she studies for her PhD. Her research supervisor is Professor James Sneyd, a leading mathematical physiologist and a key reason why Elan cho se to study in Auckland.

Having recently attended the Gordon Research Conference on Theoretical Biology in New Hampshire, USA, Elan rates meeting like-minded people and the opportunities she's had to travel while studying as highlights of her time at The University of Auckland. "A key element of a science degree is being able to communicate your field of study to non-experts. I feel my MSc helped develop my ability to explain my research at a more accessible level." in applied neuroscience or generalisations of social laws (eg. Dodgson's rule), or applications of graph theory to genealogy. They would often attend international workshops and some of their work would be published in well-quoted international journals.



Photo: Interdisciplinary mathematics: Application of finite element analysis, boundary element and collocation techniques to modelling of the human heart and other organs

The Mathematics Education Unit

(MEU) is responsible for foundation and undergraduate courses in mathematics and mathematics education within the mathematics schedule. It offers a suite of graduate courses that can be taken either as part of an MSc, MA or MEd programme. Members of the MEU have research interests in mathematics. education and attend conferences in this field. All have an active publication record, and the MEU has attracted research funding from government and private sources. There is an active seminar programme, a graduate support network, regular outreach activity into schools and the New Zealand mathematics education community, and links with overseas institutions. The Mathematics Education Unit offers research projects or dissertation topics in the following areas: Ethno-mathematics, Statistics and probability, Methodologies or Technology issues.

In 2006 mathematics education students were involved in research concerning the connections between technology and the

mathematics curricula, or the way students perceive equations; in studies of the way mentoring maths teachers would raise their own students achievements; in developing new tools for teaching mathematics (eg. teaching geometry via origami folding). Mathematics education papers and research are credited under the Pure Mathematics major offered by the Department.

Students planning to take research project or dissertations with **pure mathematicians** in the Department have a choice of supervisors amongst researchers at the top of their fields. Pure Mathematics is represented by two research units, **Algebra and Combinatorics**, on one side and **Analysis and Geometry**, on the other side. Their main research topics are analysis, algebra, combinatorics, group theory, topology, geometry, and graph theory.

Some of the 2006 students graduated with papers on tractor calculus, small volume 4-manifolds and Runge-Kutta-Nystrōm numerical methods. Pure mathematics summer scholarships projects included the following subjects, the degree-diameter problem in graphs, comparative probability orderings in sets and geometric models in string theory.



Development and use of pure mathematical techniques for distinguishing knotted structures ... are applied to molecular biology (RNA strands and protein folding) and theoretical physics.

STUDYING IN AUCKLAND

New Zealand is an independent country located in the South Pacific, just to the west of the international date line and about 2000 km east of Australia, and geographically similar in size to Britain and Japan. It has a population of 4.2 million, mostly of European descent, with about 12% indigenous (Maori) and increasing numbers of people from other backgrounds including Pacific and south-eastern Asian nations.

Auckland is the largest city in New Zealand, with a population of just over one million, and extending 60 km from north to south across an isthmus between the Tasman Sea and the Pacific Ocean. Antipodal to Malaga in Spain (and similar in latitude to Athens and Monterey) but moderated by its oceanic position, Auckland's climate can be described as sub-tropical: warm in summer and mild in winter (with the temperature rarely falling below freezing point).

The city is a comfortable place to live, with many open spaces and easy access to sea, bush, forest and farmland, but at the same time cosmopolitan in outlook. It has a rich ethnic mix and all that implies in terms of restaurants, sports and entertainment and other cultural

facilities.

THE UNIVERSITY OF AUCKLAND

The University dates from 1883 and has grown most spectacularly in recent years to its current enrolment of approximately 30,000 students. The University has large faculties of arts, science, and commerce, and specialist schools of architecture, engineering, fine arts, law, music and medicine.

The University's city campus is situated on a rise overlooking the harbour, only five minutes' walk from the central business district. In 1991 the University opened a satellite campus on a spacious site in the suburb of Tamaki, about 8 km east of the city centre. This campus, fully integrated with the city campus, is planned to expand to provide teaching and research facilities in core and specialist programmes (some complementary to those on the city campus) for over 3000 students. IN 2006, another campus has been opened at EPSOM, to host the extended Faculty of Education.

All parts of the University are easily accessible - most staff lives within twenty minutes drive of work.



FINANCIAL SUPPORT FOR STUDENTS

Whilst the Department of Mathematics endeavours to support its postgraduate students, there is still a big competition for scholarships. The Department offers alternative financing paths. Please browse through this section for further details.

UNIVERSITY SCHOLARSHIPS

The scholarships page at http://www.auckland. ac.nz/scholarships on the University of Auckland website has information on many scholarships. This page is updated regularly. Unfortunately, a lot of these scholarships do not apply to Faculty of Science students. A list of scholarships that are more suitable for Science students is available at http://www2. auckland.ac.nz/science/scholarships-postgrads. ptml on the Faculty of Science website.

In addition, the Faculty of Science and the Department of Mathematics offer summer scholarships. The deadline for these scholarships is usually early September and early October respectively. You can apply to the Department of Mathematics for information about these.

Once you start your graduate degree, you should regularly check the postgraduate email list for announcements about scholarships. Further information about scholarships is available at http://www.auckland.ac.nz/uoa/for/ prospective/welcomes/internationalstudents/ costs/scholarships/scholarships_home.cfm

SCHOLARSHIPS FOR INTERNATIONAL STUDENTS

Information about scholarships available to international students can be found at http://www.auckland.ac.nz/uoa/for/prospective/ welcomes/internationalstudents/costs/ scholarships/scholarships_home.cfm.

PART-TIME EMPLOYMENT

The main types of paid employment for

graduate students within in the Department of Mathematics are assignment marking and lab demonstrating. In addition, students are employed to run first-year tutorials and to help in the first-year assistance room. Application forms can be obtained from the Department of Mathematics.

Assignment Marking:

There is a large amount of assignment marking (for undergraduate courses) each year. The Department pays Stage III and graduate students to do marking, and this employment is open to anybody with good grades in first and second year Mathematics courses. Each semester we employ about 30 markers. Contact Jamie Sneddon at j.sneddon@auckland. ac.nz for further information.

Computer Lab Demonstrating:

The Department has two undergraduate computer labs it shares with the Department of Statistics. Each year, the Department employs about 20 students to work in the labs as demonstrators. Naturally, these students must have a good working knowledge of the computers and software used in the labs. Contact Jamie Sneddon at j.sneddon@auckland. ac.nz for further information.

Temporary Tutorships:

These are available to PhD students and to a small number of Masters students who have ability or experience in teaching or lecturing. The duties vary but usually involve teaching and marking.

Contact Bill Barton at b.barton@auckland.ac.nz for further information.

Assistant Lectureships:

These are available to PhD students only. The duties vary from lectureship to lectureship, but usually involve examination marking and teaching. Contact Bill Barton at b.barton@ auckland.ac.nz for further information.

Note: There is a trade-off between studying

and part-time work. If you work too many hours a week, your studies will suffer. For example, if you are doing an MSc thesis fulltime and you work 15 hours a week, your thesis will typically take several more months to complete than if you had no paid employment.

STUDENT ALLOWANCES

Student Allowances are administered by the New Zealand Department of Social Development, Information booklets and application forms are available from StudyLink at www.studylink.govt.nz or by phoning freephone 0800 88 99 00 or freefax 0800 88 33 88.

The University of Auckland is not involved in the administration of the allowances scheme.

FEES

There are two levels of fees: local and international. Citizens and permanent residents of New Zealand and Australia, together with French and German citizens pay local fees. For further information, please see http://www. auckland.ac.nz/fees.

Since I January 2006, new international PhD students are being accorded domestic status for the purposes of tuition fees. A new international PhD student is defined as a foreign student enrolled for the first time after 19 April 2005 in a Doctor of Philosophy programme at a New Zealand university. Email enquiries about this should be directed to postgraduate@auckland.ac.nz.

All other students pay international fees. More information about fees for international students can be found at http://www.auckland. ac.nz:80/uoa/for/prospective/welcomes/ internationalstudents/costs/tuition/intltuition_ pg.cfm#postgrad_fees.

ENROLMENT PROCEDURES Enrolment at the University of Auckland is a

three steps process. Any student seeking to begin a new programme, undergraduate or postgraduate, must firstly apply on-line on nDeva. https://ndeva.auckland.ac.nz/ndeva/. This is the first step. For help with admission to postgraduate programmes, go to http:// www.postgrad.auckland.ac.nz/postgraddegree/ ProspectivePGStudent/PSHowtoApply.asp.

In the Department of Mathematics, all postgraduate programmes need to be approved by the Postgraduate Advisor, Hannah Bartholomew.

Once Departamental approval is given, the Faculty of Sceince will need a few weeks to issue students with an approval and with an offer of place. At this stage, students need to formally accept the offer of place either online or by mail. (Make sure the email and post addresses are updated). This is the second step.

Prospective students need to contact Hannah bartholomew after admission in the programme of their choice and before enrolment in their courses.

Hence, the third step occurs once the offer was accepted. Students need to return to nDeva to enrol in the courses of their choice.

Prospective PhD students should contact the PhD Advisor in the Department of Mathematics, Tom terElst, directly to discuss the possibility of admission. Email: terelst@ math.auckland.ac.nz.

International students should in parallel fcontact the International Office. Tel. +64 9 373 7513 Fax. +64 9 373 7405 Email: int-guestions@auckland.ac.nz



POSTGRADUATE DEGREE PROGRAMMES

GRADUATE DEGREES IN MATHEMATICS

There are four possible graduate programmes you can enrol in after getting your BSc or BA in Mathematics or Applied Mathematics. A degree is obtained after having passed 120 worths of post-graduate courses. (A regular course is usually 15 points, while some - research-based- projects may be worth 30, 45 or 60 points). A major for each of the graduate degrees is 75 points or more in the subject (Mathematics or Applied Mathematics).

The graduate advisor for the department of Mathematics must approve any enrolment in a graduate degree.

The information below summarises the regulations for the degrees. In the next section 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) Room 308 - Mathematics Department h.bartholomew@math.auckland.ac.nz

ENTRY REQUIREMENTS FOR POSTGRADUATE PROGRAMMES

The information below summarizes the prerequisites and requirements for the four degrees. These regulations are not hard and fast and exceptions are possible, although very few exceptions are made to the requirements for the degrees. These guidelines should be read in conjunction with the University of Auckland Calendar 2007, which contains the official regulations and course requirements approved by the University. It is available at http://www. auckland.ac.nz/calendar.

NB. A degree can be started either in the first or the second semester.

POSTGRADUATE DIPLOMA IN SCIENCE (PGDipSci)

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

You need to pass eight 15-point courses at either the 600- or 700-level, with at least 75 points in the Major.

If you are doing the degree in Applied Mathematics, you must pass MATHS 361 and either MATHS 362 or MATHS 363 before enrolling in the degree.

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



should contact the graduate advisor.

BACHELOR OF SCIENCE (HONOURS) (BSc(HONS))

To be awarded a BSc(Hon) 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) in Mathematics programme, you must have a major in Mathematics including either MATHS 320 or MATHS 332 and at least B- in at least 90 points of courses at Stage III. These courses need not all be in 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.

For BSc(Hon), you will have to find a enroll in MATHS 791 and write an honours disertation, under the supervision of a member of the Mathematics department.

You can do an honours' degree either full-time over one year or part-time over two years. At graduation, you actual class of honours will depend on the average mark for the courses you attempt for your BSc(Hons), computed over all th epapers attempted (passed or failed). An average greater than A- leads to first class honours, an average between B and B+ leads to 2nd class honours (Ist division), an average of B- leads to 2nd class honours (2nd division) and an average

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

MASTER OF SCIENCE (MSc)

Under the 2007 regulations, you can no longer be admitted into an MSc after being awarded a BSc. You must first get a PGDipSci or a BSc(Hons) with a B- average over at least 90 points, of which at least 75 points must be in 700-level courses. The emphasis in an MSc is on original research.

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

If your average mark for your MSc is sufficiently high you will be awarded the degree with honours.

Before being admitted into an MSc programme, you will need to get the approval of the Department of Mathematics, then find a supervisor for your thesis and have him or her

complete a simple thesis proposal form.

If you require more information about doing an MSc, please contact the graduate advisor.

Transitional regulations

If you started your graduate degree in 2005 or before, your enrolment in 2007 will be covered by transitional regulations. Please contact the postgraduate adviser for the Department of Mathematics if you have any questions about these regulations.

POSTGRADUATE PROGRAMMES WITH MATHEMATICS MAJORS						
DEGREE	SPECIALISATION					
	Mathematics	Applied Mathematics	Industrial Mathematics	Logic and Computation	Bioinformatics	
BSc(Hons)	*	*		*	*	
GradDipSci	*	*				
PGDipSci	*	*		*		
MA	*					
MSc	*	*		*	*	
PhD	*	*				

GRADUATE-LEVEL COURSES

KEY

MATHS = Mathematics courses

- SS = Summer School
- S1 = Semester 1
- S2 = Semester 2
- C = City Campus
- T = Tamaki Campus
- 600 799 = Stage IV courses

Here is a description of the graduate-level courses the Department is expecting to offer.

Please contact the lecturer(s) involved or a Graduate Students Coordinator if you would like to find out more details. In addition to these, several reading courses and research projects are offered - see the next section.

MATHS 681 PG TOPIC IN MATHEMATICS 1

15 points

MATHS 681 deals with some topic(s) from pure mathematics, applied mathematics, or mathematics education.

MATHS 682 PG TOPIC IN MATHEMATICS 2

30 points

MATHS 682 deals with some topic(s) from pure mathematics, applied mathematics, or mathematics education

MATHS 690

GRADUATE DIPLOMA DISSERTATION (MATHEMATICS)

30 points Students can enrol in MATHS 690 (worth 30 points) or in MATHS 690A and 690B (each worth 15 points).

MATHS 691 POSTGRADUATE DIPLOMA DISSERTATION (MATHEMATICS)

30 points Students can enrol in MATHS 691 (worth 30 points) or in MATHS 691A and 691B (each worth 15 points).

MATHS 692 GRADUATE DIPLOMA DISSERTATION (APPLIED MATHEMATICS)

30 points

Students can enrol in MATHS 692 (worth 30 points) or in MATHS 692A and 621B (each worth 15 points).

MATHS 693 POSTGRADUATE DIPLOMA DISSERTATION (APPLIED MATHEMATICS)

30 points

Students can enrol in MATHS 693 (worth 30 points) or in MATHS 693A and 693B (each worth 15 points).

MATHS 694 POSTGRADUATE DIPLOMA PROJECT 1

15 points

MATHS 694 involves participation in a research project or investigation in a topic from pure mathematics, applied mathematics or mathematics education under the supervision of one or more staff members, and a presentation by the student of the results in a written report and seminar.

MATHS 695 POSTGRADUATE DIPLOMA PROJECT 2

15 points

MATHS 695 involves participation in a research project or investigation in a topic from pure mathematics, applied mathematics or mathematics education under the supervision of one or more staff members, and a presentation by the student of the results in a written report and seminar

MATHS 701 RESEARCH ISSUES IN MATHEMATICS EDUCATION

15 points SS C

Recommended Preparation: MATHS 302 and one of MATHS 702-MATHS 709 Research methodology for mathematics and statistics education, designed to meet the needs of students embarking on Master's level studies or planning a disertation or thesis in Mathematics Education. Main lecturer: Assoc Prof Bill Barton

MATHS 702 MATHEMATICS CURRICULUM

15 points 2008, S2 The historical development, current trends, theories and practice of the mathematic and statistics curricula and assessment. The interconnections between curriculum development, assessment and other mathematics education issues. Main lecturers: Dr Hannah Bartholomew, Dr Maxine Pfannkuch

MATHS 703 THEORETICAL ISSUES IN MATHEMATICS EDUCATION

15 points 2008, S1

Recommended Preparation: MATHS 302 A critical examination of theories and recent writings on the assessment of mathematics in New Zealand schools and overseas A selection of key learning theories are introduced. Social and psychological perspectives are discussed, including their applications in research and their implications for mathematics education teaching and learning.

Main lecturers: Dr Hannah Bartholomew, Assoc. Prof. Mike Thomas

MATHS 705 SOCIAL ISSUES IN MATHEMATICS EDUCATION

2007 and 2009, S2 15 points

Recommended Preparation: MATHS 302 A selection of topics from cultural identity, social and language issues arising in mathematic education. Critical examination of theories and current literature will be made, within a casestudy approach.

MATHS 706 TECHNOLOGY AND MATHEMATICS EDUCATION

15 points 2007 and 2009, S1 The use of computers and calculators in mathematics education, with a focus on both theoretical and practical aspects of their use in the mathematics classroom. The pedagogical implications of techology for the present and future will be discussed.

MATHS 707-710 SPECIAL TOPICS IN MATHEMATICS EDUCATION 1-4 15 points By arrangement

These are special topic 15-point papers that are also available for personal study in a particular area of interest in mathematics education. You will have a supervisor for your topic. These courses require that students do individual study in a particular area of interest in mathematics education. They are offered in every semester, including Summer School. Please consult the Department of Mathematics before enrolment.

MATHS 711 A & B SPECIAL TOPICS IN MATHEMATICS EDUCATION 5 30 points By arrangement This is a special topic 20 point paper 7

This is a special topic 30-point paper. This course allows students to do individual study

in a particular area of interest in mathematics education. It can be taken as MATHS 711 (30 points) in Summer School or as MATHS 711A and 711B (each worth 15 points) over Semesters 1 and 2. A supervisor is required for this course. Please consult the Department of Mathematics before enrolment.

MATHS 712 MATHEMATICS AND LEARNING

2007, 2009, S2; 2008 S1 15 points

An examination of a mathematical topic up to undergraduate level in the light of current research. The focus will be on investigating how that topic may be effectively learned at senior levels. The topics will be 2007 Calculus, 2008 Algebra and 2009 Calculus).

STATS 708 TOPICS IN STATISTICAL EDUCATION

2007 and 2009, First semester 15 points

Covers a wide range of research in statistics education at the school and tertiary level. An examination of the issues involved in statistics education in the curriculum, teaching, learning, technology and assessment areas.

MATHS 713 LOGIC AND SET THEORY

15 points

S2 C

Recommended Preparation: MATHS 315 A study of the foundations of pure mathematics, formalising the notions of "mathematical proof" and "mathematical structure" through Predicate Calculus and Model Theory. Includes an exploration of the limits of these formalisations (including Godel's incompleteness theorems), and a study of Axiomatic Set Theory (including a discussion of consistency and independence).

MATHS 714 NUMBER THEORY

15 points S2 C

Recommended Preparation: MATHS 320 A broad introduction to aspects of elementary, analytical and computational number theory, including some or all of the following: primitive roots, quadratic residues, Diophantine equations, primality testing (and applications to cryptology), the two- and four-squares theorems, arithmetical functions, Diophantine approximation, distribution of primes. Prerequisites: B+ in either MATHS 328 or MATHS 320.

MATHS 715 GRAPH THEORY AND COMBINATORICS 15 points

SI C

Recommended Preparation: MATHS 320 Theory and applications of combinatorial graphs (networks), block designs, and errorcorrecting codes. Topics include graph connectivity, trees, colourings, embeddings, digraphs, matchings, incidence matrices, eigenvalue methods, Steiner systems, perfect and linear codes. Prerequisites: MATHS 326 or 320.

MATHS 720 GROUP THEORY

15 points S1 C Recommend Preparation: MATHS 320

Fundamentals of group theory, including direct products, group actions on sets, Sylow's theorems, p-groups, free groups, group presentation, solubility, nilpotent groups, extensions and semi-direct products, plus other topics as time permits. Prerequisites: MATHS 320.

MATHS 721 RINGS, MODULES, ALGEBRAS AND REPRESENTATIONS

15 points S2 C Recommended Preparation: MATHS 320

A sequel to the course MATHS 320, investigating the properties, extensions and applications of further algebraic structures (such as modules and other algebras), and the representation of algebras in terms of matrices. Prerequisites: MATHS 320.

MATHS 730 MEASURE THEORY AND INTEGRATION

I 5 points SI C Recommended Preparation: MATHS 332 or 333

Measures on sigma-algebras (with emphasis on the Lebesgue and Lebesgue-Stieltjes measures), the Lebesgue integral, measure spaces, the Fubini theorems, signed and complex measures, the Lebesgue-Radon-Nikodym theorem, the Vitali system, absolutely continuous functions, and the Fundamental Theorem of Calculus.

MATHS 731 FUNCTIONAL ANALYSIS

15 points

S2 C

Recommended Preparation: MATHS 332 or 333

Normed linear spaces, Banach spaces and Hilbert spaces, and some of the main developments in these areas. Highlights include the Hahn-Banach theorem, the Banach-Steinhaus theorem, the Riesz Representation theorem, Fourier series, and the Spectral theorem.

MATHS 735 ANALYSIS ON MANIFOLDS AND DIFFERENTIAL GEOMETRY

15 points

S2 C - Not offered in 2007

An introduction to differential geometry via the study of differentiable manifolds, tangent spaces and vector fields, differential forms, Stokes theorem, Frenet formulae, quadratic forms on surfaces, and the Gauss-Bonet theorems.

MATHS 740 COMPLEX ANALYSIS

15 points

SI C

Recommended Preparation: MATHS 332 or 333

Analytic and harmonic functions, complex integration, hyperbolic geometry, conformal mappings, normal families, the Riemann mapping theorem, Mittag-Leffler and Weierstrass Theorems.

MATHS 745 CHAOS, FRACTALS AND BIFURCATIONS

Chaos, fractals and bifurcation, and their commercial, medical and scientific application. Discrete iterations, including the Julia and Mandelbrot sets, iterated function systems and higher-dimensional strange attractors. Quantum chaos and complexity theory are also discussed.

MATHS 750 TOPOLOGY

15 point SLC

Recommend Preparation: MATHS 332, 333 or 353

Aspects of point-set and algebraic topology: properties and construction of topological spaces, continuous mappings, axioms of separation, countability, connectivity and compactness, metrisation, some euclidean space topology, covering spaces, the fundamental group, homology groups, fixedpoint theorems, and applications.

MATHS 761 ORDINARY DIFFERENTIAL EQUATIONS & DYNAMICAL SYSTEMS 15 points S2 C

Recommended Preparation: MATHS 361 and either MATHS 362 or 363

Analytical and numerical techniques for determining the qualitative properties of solutions to nonlinear differential equations. Topics covered include: recurrent dynamics, asymptotic stability, structural stability, the Smale horseshoe and chaos, local and global bifurcations. This paper is also offered for graduate students in Physics.

MATHS 763 PARTIAL DIFFERENTIAL EQUATIONS

15 points

SI C

Recommended Preparation: MATHS 361 and MATHS 362

A study of partial differential equations frequently arising in applications. This course studies Hilbert space and approximate methods for analytic and numerical solutions of PDE. Analytic methods include Green's functions, boundary integral equations and variational formulations. Numerical methods include the Boundary Element Method and in some years the Finite Element Method.

MATHS 769

ADVANCED MATHEMATICAL MODELLING 15 points

SI C

Recommended Preparation: MATHS 361 and MATHS 362

In this course we model systems taken from a variety of areas such as financial mathematics, fluid mechanics and population dynamics. Most f the systems studied are modelled with partial differential equations or stochastic differential equations and this makes the course a good application-based setting for learning about PDEs and DSEs.

MATHS 770 ADVANCED NUMERICAL ANALYSIS

SI C

Recommended Preparation: MATHS 270 and one of MATHS 361, MATHS 362 or MATHS 363

Advanced techniques in numerical linear algebra, numerical ordinary and partial differential equations and numerical quadrature. The construction and analysis of algorithms for the solution of numerical problems.

MATHS 775 MATHEMATICAL SOFTWARE

Not currently offered S2 C

Discrete and continuous simulations are used to teach the effective use of mathematical software. The simulations include examples of games and traffic models, together with examples from economics, chemistry and astronomy.

MATHS 781 ADVANCED TOPIC(S) IN MATHEMATICS 1 15 points S1 C MATHS 782 ADVANCED TOPIC(S) IN MATHEMATICS 2 15 points S1 C MATHS 783 ADVANCED TOPIC(S) IN MATHEMATICS 3 15 points S2 C This course can be taken as either

a) a special topic project course (It is necessary to find a supervisor and get the approval of the Postgraduate Advisor before enrolling; or
b) a course on Lie Groups and Lie Algebras, given by Dr. Arkadii Slinko and Dr. Tom ter Elst. Prerequisite: Maths 320 and 332

MATHS 784 ADVANCED TOPIC(S) IN MATHEMATICS 4 15 points

S2 C

Each of the courses "Advanced Topic in Mathematics" deals with some special topic in from pure mathematics. See the Postgraduate Advisor in the Department of Mathematics for more information.

This course can be taken as either a) a special topic project course (It is necessary to find a supervisor and get the approval of the Postgraduate Advisor before enrolling; or b) "Applied Functional Analysis", a course taught by Prof. Boris Pavlov that builds on the content of Maths 332, 333 and 362, introducing modern methods of solving partial differential equations:

MATHS 786 ADVANCED TOPIC(S) IN APPLIED MATHEMATICS 1

15 points a) c) SI C b) S2 C This course can be taken as either a) a special topic project course (It is necessary to find a supervisor and get the approval of the Postgraduate Advisor before enrolling; or b) "Mathematical Biology", a course taught by Dr. David Bryant on mathematical physiology and bioinformatics.

Please contact either Prof. Sneyd or Dr. Bryant to confirm the lecture times.

MATHS 787 ADVANCED TOPIC(S) IN APPLIED MATHEMATICS 2

15 points
S2 C
This course can be taken as either

a) a special topic project course (It is necessary to find a supervisor and get the approval of the Postgraduate Advisor before enrolling; or
b) a course on Numerical methods for differential equations. Interested students are welcome to contact Prof. John Butcher for further information.

MATHS 788 ADVANCED TOPIC(S) IN APPLIED MATHEMATICS 3 15 points

SI C

This course involved mathematical modelling, mainly with partial differential equations. Driven by applications, it offers an interesting way to learn about PDEs and stochastic differential equations. The course is usually taught at Tamaki and lecture hours are chosen at the beginning of semester to suit all students enrolled. Please contact Dr. Steve Taylor (taylor@math.auckland. ac.nz) if you are taking this course. Topics are drawn from the following: I. First order PDEs, conservation laws and shocks. Applications to traffic flow and gas dynamics. 2. Financial mathematics including a study of stochastic differential equations and the Black-Scholes PDE for the value of financial assets, 3, An introduction to fluid mechanics.

MATHS 789 ADVANCED TOPIC(S) IN APPLIED MATHEMATICS 4

15 points S2 C

Each of the courses "Advanced Topic(s) in Applied Mathematics deals with some special topic from applied and computational mathematics. See the Postgraduate Advisor in the Department of Mathematics for more information.

MATHS 791 HONOURS DISSERTATION IN MATHEMATICS/APPLIED MATHEMATICS 15 points

MATHS 792 PROJECT IN MATHEMATICS 1 30 points S1 C MATHS 793 PROJECT IN MATHEMATICS 2 15 points S2 C

MATHS 794 PROJECT IN MATHEMATICS 3 30 points

S2 C

Each of the project courses involves participation in a research project or investigation in some topic from pure or applied mathematics, under the supervision of one or more staff members, and presentation by the student of the results in a seminar. See the Postgraduate Advisor in the Department of Mathematics for more information.

MATHS 795 MSC THESIS IN APPLIED MATHEMATICS

120 points

Students must enrol in MATHS 795A and 795B (60 points each) to complete this course. See the Postgraduate Advisor in the Department of Mathematics for more information.

MATHS 796 MSC THESIS IN MATHEMATICS

120 points Students must enrol in MATHS 796A

Course. See the Postgraduate Advisor in

course. See the Postgraduate Advisor in the Department of Mathematics for more

SPRES AND PROJECTS

MATHS 797 RESEARCH PORTFOLIO IN MATHEMATICS

120 points

information

Students must enrol in MATHS 797A and 797B (60 points each) to complete this course. See the Postgraduate Advisor in the Department of Mathematics for more information.

MATHS 799A&B MSC IN MATHEMATICS/APPLIED MATHEMATICS (PART-TIME) 30 points

In addition to the courses listed above, there may be some special topic courses offered in Mathematics and Mathematics Education if the need or demand arises. Please contact the Graduate Students Coordinator if you have any requests or suggestions for additional courses or subjects.

Furthermore, it is possible to do up two courses that are reading or project courses. These courses are supervised study in a topic in Mathematics or Applied Mathematics. In a reading course, you will usually be required to

2007	POSTGRADUATE COU	JRSES C) verview
MATHS	TITLE	POINT VALUE	PREREQUISITES (P) OR RECOMMENDED PREPARATION
SUMMER SC	CHOOL		
707 #	Special Topic in Mathematics Education	15	
708 #	Special Topic in Mathematics Education 2	15	
709 #	Special Topic in Mathematics Education 3	15	
710 #	Special Topic in Mathematics Education 4	15	
711 #	Special Topic in Mathematics Education 5	30	
784 #	Advanced Topic in Mathematics 4	15	
681 #	Postgraduate Topic in Mathematics 1	15	
694 #	Postgraduate Diploma Project I	15	
705	Socio-Political Issues in Mathematics Education	15	MATHS 302
712	Mathematics and Learning	15	MATHS 302
715	Graph Theory and Combinatorics	15	P: MATHS 326 or 320
720	Groups, Fields and Galois Theor	15	MATHS 320
730	Measure Theory and Integration	15	MATHS 332
740	Complex Analysis	15	MATHS 333
750	Topology	15	MATHS 332
745	Chaos, Fractals and Bifurcations	15	MATHS 253
763	Partial Differential Equations	15	MATHS 361/362
770	Advanced Inumerical Analysis Advanced Topic in Mathematics I	15	MATHS 270
701 #	Advanced Topic in Mathematics 7	15	
786 #*	Advanced Topic in Applied Mathematics I	15	
788 #	Advanced Topic in Applied Mathematics 2	15	
791 #	Honours Dissertation in Mathematics	15	
792 #	Project in Mathematics 2	30	
SEMESTER 2			
682 #	Postgraduate Topic in Mathematics 2	15	
695 #	Postgraduate Diploma Project 2	15	
695 # 701 707	Postgraduate Diploma Project 2 Research Issues in Mathematics Education	15 15	MATHS 302
695 # 701 706 707 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education Special Topic in Mathematics Education	15 15 15	MATHS 302 MATHS 302
695 # 701 706 707 # 708 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education Special Topic in Mathematics Education 1 Special Topic in Mathematics Education 2	15 15 15	MATHS 302 MATHS 302
695 # 701 706 707 # 708 # 709 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education Special Topic in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3	15 15 15 15 15	MATHS 302 MATHS 302
695 # 701 706 707 # 708 # 709 # 710 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education Special Topic in Mathematics Education 1 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4	15 15 15 15 15 15	MATHS 302 MATHS 302
695 # 701 706 707 # 708 # 709 # 710 # 713	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education Special Topic in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory	15 15 15 15 15 15 15	MATHS 302 MATHS 302
695 # 701 706 707 # 708 # 709 # 710 # 713 714	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education Special Topic in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory	15 15 15 15 15 15 15 15	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320
695 # 701 706 707 # 708 # 709 # 710 # 713 714 721	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education Special Topic in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations	15 15 15 15 15 15 15 15 15	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320
695 # 701 706 707 # 708 # 709 # 710 # 713 714 721 731	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education Special Topic in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis	15 15 15 15 15 15 15 15 15 15	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332
695 # 701 706 707 # 708 # 709 # 710 # 713 714 721 731 761	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education I Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems	15 15 15 15 15 15 15 15 15 15	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362
695 # 701 706 707 # 708 # 709 # 710 # 713 714 721 731 761 769	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education Special Topic in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Mathematical Modelling	15 15 15 15 15 15 15 15 15 15 15 15	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361
695 # 701 706 707 # 708 # 709 # 710 # 713 714 713 714 731 731 761 769 783 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education Special Topic in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Mathematical Modelling Advanced Topic in Mathematics 3	15 15 15 15 15 15 15 15 15 15 15 15	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361
695 # 701 706 707 # 708 # 709 # 710 # 713 714 713 714 731 761 769 783 # 764 769	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education Special Topic in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Mathematical Modelling Advanced Topic in Mathematics 4 Advanced Topic in Mathematics 4	15 15 15 15 15 15 15 15 15 15 15 15 15	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361
695 # 701 706 707 # 709 # 710 # 713 714 721 731 761 769 783 # 784 # 786 #* 787 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education I Special Topic in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Mathematics 1 Advanced Topic in Mathematics 4 Advanced Topic in Applied Mathematics 1	15 15 15 15 15 15 15 15 15 15 15 15 15 1	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361
695 # 701 706 # 707 # 709 # 710 # 710 # 714 721 731 761 769 783 # 784 # 786 #* 786 #* 787 # 789 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education I Special Topic in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Mathematics 3 Advanced Topic in Mathematics 4 Advanced Topic in Applied Mathematics 1 Advanced Topic in Applied Mathematics 2 Advanced Topic in Applied Mathematics 4	15 15 15 15 15 15 15 15 15 15 15 15 15 1	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361
695 # 701 706 # 707 # 709 # 710 # 713 714 721 731 761 769 783 # 784 # 786 #* 787 # 787 # 789 # 783 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education I Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Topic in Mathematics 3 Advanced Topic in Mathematics 4 Advanced Topic in Applied Mathematics 1 Advanced Topic in Applied Mathematics 4 Project in Mathematics 3	15 15 15 15 15 15 15 15 15 15 15 15 15 1	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361
695 # 701 706 # 707 # 709 # 710 # 713 714 721 731 761 763 783 # 784 # 784 # 786 #* 787 # 787 # 789 # 793 # 794 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Topic in Mathematics 3 Advanced Topic in Mathematics 4 Advanced Topic in Applied Mathematics 1 Advanced Topic in Applied Mathematics 4 Project in Mathematics 3 Project in Mathematics 3	15 15 15 15 15 15 15 15 15 15 15 15 15 1	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361
695 # 701 706 707 # 708 # 709 # 710 # 713 714 721 731 761 769 783 # 784 # 786 #* 787 # 789 # 789 # 789 # 789 # 789 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Mathematics 1 Advanced Topic in Mathematics 3 Advanced Topic in Mathematics 4 Advanced Topic in Applied Mathematics 1 Advanced Topic in Applied Mathematics 4 Project in Mathematics 4 Project in Mathematics 4	15 15 15 15 15 15 15 15 15 15 15 15 15 1	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361
695 # 701 706 # 707 # 708 # 709 # 710 # 713 714 721 731 761 769 783 # 784 # 786 #* 787 # 789 # 780 # 789 # 780 # 7	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education I Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Topic in Mathematics 3 Advanced Topic in Mathematics 4 Advanced Topic in Applied Mathematics 1 Advanced Topic in Applied Mathematics 4 Project in Mathematics 4 Project in Mathematics 4 TERS	15 15 15 15 15 15 15 15 15 15 15 15 15 1	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361
695 # 701 706 707 # 708 # 709 # 710 # 713 714 721 731 761 769 783 # 784 # 786 #* 787 # 786 #* 787 # 789 # 793 # 793 # 793 # 794 # 80TH SEMES 690 # 691 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education I Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Mathematical Modelling Advanced Topic in Mathematics 3 Advanced Topic in Applied Mathematics I Advanced Topic in Applied Mathematics 1 Advanced Topic in Applied Mathematics 4 Project in Mathematics 3 Project in Mathematics 4 Tersev Graduate Diploma Dissertation (Mathematics) Postgraduate Diploma Dissertation (Mathematics)	15 15 15 15 15 15 15 15 15 15 15 15 15 1	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361
695 # 701 706 707 # 709 # 710 # 713 714 713 714 721 731 761 769 783 # 784 # 787 # 787 # 789 # 787 # 789 # 787 # 789 # 787 # 789 # 789 # 787 # 789 # 793 # 793 # 794 # 800 # 600 # 6	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education I Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Topic in Mathematics 3 Advanced Topic in Mathematics 4 Advanced Topic in Applied Mathematics 1 Advanced Topic in Applied Mathematics 2 Advanced Topic in Applied Mathematics 2 Advanced Topic in Applied Mathematics 3 Project in Mathematics 4 TERS Graduate Diploma Dissertation (Mathematics) Graduate Diploma Dissertation (Mathematics)	15 15 15 15 15 15 15 15 15 15 15 15 15 1	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361
695 # 701 706 707 # 708 # 709 # 710 # 713 714 713 714 731 761 769 783 # 783 # 784 # 787 # 789 # 793 # 794 # BOTH SEMES 690 # 691 # 692 # 693 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Mathematical Modelling Advanced Topic in Mathematics 3 Advanced Topic in Mathematics 4 Advanced Topic in Mathematics 4 Advanced Topic in Applied Mathematics 1 Advanced Topic in Applied Mathematics 3 Project in Mathematics 3 Project in Mathematics 4 Terse Graduate Diploma Dissertation (Mathematics) Postgraduate Diploma Dissertation (Applied Mathematics)	15 15 15 15 15 15 15 15 15 15 15 15 15 1	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361
695 # 701 706 707 # 708 # 709 # 710 # 711 711 714 721 731 761 769 783 # 784 # 786 #* 787 # 788 # 787 # 788 # 789 # 793 # 793 # 794 # BOTH SEMES 690 # 691 # 692 # 693 # 710 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Mathematics 3 Advanced Topic in Mathematics 4 Advanced Topic in Mathematics 4 Advanced Topic in Applied Mathematics 1 Advanced Topic in Applied Mathematics 2 Advanced Topic in Applied Mathematics 3 Project in Mathematics 4 Project in Mathematics 4 Project in Mathematics 4 TERS* Graduate Diploma Dissertation (Mathematics) Postgraduate Diploma Dissertation (Applied Mathematics) Special Topic in Mathematics (Applied Mathematics) Postgraduate Diploma Dissertation (Applied Mathematics)	15 15 15 15 15 15 15 15 15 15 15 15 15 1	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361
695 # 701 706 707 # 709 # 710 # 713 714 721 731 761 769 783 # 784 # 786 #* 787 # 787 # 787 # 793 # 793 # 794 # BOTH SEMES 690 # 692 # 693 # 711 # 790 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Topic in Mathematics 3 Advanced Topic in Mathematics 4 Advanced Topic in Applied Mathematics 1 Advanced Topic in Applied Mathematics 2 Advanced Topic in Applied Mathematics 4 Project in Mathematics 3 Project in Mathematics 4 TERS* Graduate Diploma Dissertation (Mathematics) Postgraduate Diploma Dissertation (Applied Mathematics) Special Topic in Mathematics Education 5 Part-time Research Portfolio (transition students only) Mos Theorie in Applied Mathematics 1 Patters in Mathematics Education 5 Part-time Research Portfolio (transition students only)	15 15 15 15 15 15 15 15 15 15 15 15 15 1	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361
695 # 701 706 707 # 708 # 709 # 710 # 713 714 721 731 761 769 783 # 784 # 786 #* 787 # 789 # 789 # 789 # 793 # 794 # BOTH SEMES 690 # 691 # 692 # 693 # 711 # 790 # 796 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Topic in Mathematics 3 Advanced Topic in Mathematics 3 Advanced Topic in Mathematics 4 Advanced Topic in Applied Mathematics 1 Advanced Topic in Applied Mathematics 2 Advanced Topic in Applied Mathematics 4 Project in Mathematics 3 Project in Mathematics 4 TERS Graduate Diploma Dissertation (Mathematics) Postgraduate Diploma Dissertation (Applied Mathematics) Special Topic in Mathematics (Applied Mathematics) Postgraduate Diploma Dissertation (Applied Mathematics) Special Topic in Mathematics Education 5 Part-time Research Portfolio (transition students only) MSC Thesic in Aptiend Mathematics	15 15 15 15 15 15 15 15 15 15 15 15 15 1	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361
695 # 701 706 707 # 708 # 709 # 710 # 713 714 721 731 761 769 783 # 784 # 786 # * 787 # 789 # 789 # 789 # 789 # 789 # 793 # 794 # BOTH SEMES 690 # 691 # 693 # 711 # 790 # 795 # 798 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Topic in Mathematics 3 Advanced Topic in Mathematics 4 Advanced Topic in Mathematics 4 Advanced Topic in Applied Mathematics 1 Advanced Topic in Applied Mathematics 2 Advanced Topic in Applied Mathematics 4 Project in Mathematics 4 Project in Mathematics 4 TERS Graduate Diploma Dissertation (Mathematics) Postgraduate Diploma Dissertation (Applied Mathematics) Postgraduate Diploma Dissertation (Applied Mathematics) Special Topic in Mathematics Education 5 Part-time Research Portfolio (transition students only) MSc Thesis in Applied Mathematics MSC Thesis in Mathematics	15 15 15 15 15 15 15 15 15 15 15 15 15 1	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361
695 # 701 706 707 # 708 # 709 # 710 # 713 714 721 731 761 769 783 # 786 # 787 # 786 # 787 # 788 # 787 # 788 # 787 # 789 # 793 # 794 # BOTH SEMES 690 # 691 # 692 # 693 # 711 # 790 # 795 # 796 # 799 #	Postgraduate Diploma Project 2 Research Issues in Mathematics Education Technology in Mathematics Education 1 Special Topic in Mathematics Education 2 Special Topic in Mathematics Education 3 Special Topic in Mathematics Education 4 Logic and Set Theory Number Theory Rings, Modules, Algebras and Representations Functional Analysis Ordinary Differential Equations & Dynamic Systems Advanced Topic in Mathematics 3 Advanced Topic in Mathematics 1 Advanced Topic in Applied Mathematics 1 Advanced Topic in Applied Mathematics 4 Project in Mathematics 4 Project in Mathematics 4 TERS Graduate Diploma Dissertation (Mathematics) Graduate Diploma Dissertation (Mathematics) Special Topic in Applied Mathematics) Special Topic in Mathematics 4 Project in Mathematics 5 Postgraduate Diploma Dissertation (Applied Mathematics) Special Topic in Mathematics Education 5 Part-time Research Portfolio (transition students only) MSC Thesis in Mathematics Research Portfolio in Mathematics Part-time MSC Thesis in Mathematics Part-time MSc Thesis in Mathematics	15 15 15 15 15 15 15 15 15 15 15 15 15 1	MATHS 302 MATHS 302 P: B+ in MATHS 328 or 320 MATHS 320 MATHS 332 MATHS 361/362 MATHS 361

* students must enrol for both A and B components of the course in consecutive semesters

indicates courses for which a supervisor must be found

A FEW STAFF RESEARCH PROFILES

A/Prof. Jianbei An (Algebra and Combinatorics



group) has received his PhD from the University of Illinois. He has been associated with the Mathematics Department since 1992 and has been recently working on the Alperin weight conjecture, the Alperin-McKay conjecture,

the Dade conjecture for some finite groups.

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Dr. Hannah Bartholomew (Mathematics Education Unit) graduated with a BSc (Hons)



in mathematics, an MSc in pure mathematics and a PhD in mathematics education, and has been involved in a range of research projects in mathematics education. Her research interests are broadly sociological, and include

gender issues in mathematics education; the formation of students' identities as learners of mathematics; the impact of grouping students by ability; and the ways in which these issues intersect with the types of understandings that students develop in and about mathematics. **Projects:**

Mathematics Enhancement Project. Hannah has been concerned with engaging teachers from low-decile schools in research, as a means of professional development. She has become particularly interested in the role that emotions play in shaping teachers' professional identities.

Pangarau AIM (Achieving in Mathematics). This longitudinal study will follow the progress and feelings about maths of a group of Maori students as they move through High School. The students were all doing well at maths at intermediate school, and the project will investigate the social, emotional and educational factors which have an impact on their choices regarding mathematics. A/Prof. Bill Barton (Head of Department, Mathematics Education Unit)



Bill Barton graduated with an MSc in mathematics, an MPhil in Education and a PhD in mathematics education with a dissertation on Ethnomathematics. He has taught mathematics in Africa, and in NZ secondary schools,

including bilingual (Maori/English) teaching. In the early 1980s he made two series of television programmes on mathematics. His research interests are in the connections between mathematics and culture (especially language). He has written extensively in this area of culture and mathematics, is Associate Editor of Educational Studies in Mathematics, and is Vice-President of the Executive of the International Commission on Mathematical Instruction.

Projects:

Language and Mathematics: Is mathematics the same when it is undertaken in different languages? A Marsden-funded project addressing this question in research mathematics is in its final stages, and a book on investigations using indigenous languages is in press. A joint project with University of Sao Paulo and University of British Columbia with indigenous mathematics teachers is in process.

Mathematics Enhancement Project: A multifaceted project in low-decile schools in Manukau with the aim of enhancing achievement and participation in mathematics for senior students. The current focus of this project (and subject of joint work with Oxford University and University of Michigan) is mathematical knowledge for teaching.

00 00 00

00 00 00

A/Prof. Paul Bonnington (Algebra and Combinatorics group)



My research interests lie mainly in combinatorics, graph theory and discrete geometry. These subjects have direct applications to computer science, bioinformatics, electrical engineering, and commerce. Many problems in combinatorics are easy to state,

but often difficult to solve. For example, the famous Four-Colour problem, regarding 4-colouring regions of a map, motivated much of modern graph theory. This problem was eventually solved in 1976 with the aid of a supercomputer. While some of my current research looks at implementing similar innovative computer techniques to understand important combinatorial problems, I do tend to focus heavily on theoretical approaches: my first book was devoted to a purely theoretical analysis of the major area of Topological Graph Theory.

Projects:

- * Topological graph theory (Reading)
- * Combinatorial Proofs from 'The Book' (Reading)

00 00 00

Dr. David Bryant (Applied Mathematics Unit)



David Bryant is a Senior Lecturer in Mathematical Biology.

Dr Bryant works on computational, statistical and mathematical aspects of evolutionary biology. As a mathematician, develops and applies tools from many

diverse areas of mathematics and statistics. As an evolutionary biologist, he works developing tools for genetic analysis, reconstruction of evolutionary history, and evolutionary ecology. He is co-author of the SplitsTree package, software used for visualising of evolutionary patterns in genetic data.

Dr Bryant obtained a Ph.D. under Prof. Mike Steel, University of Canterbury, in 1997. After 3-4 years postdoc work in France, Germany and Canada, he took up a position at McGill University, Montreal, Canada, joint between the school of computer science and the department of mathematics and statistics. He was awarded tenure in 2005, and took up his position at University of Auckland in July of that year.

Dr Bryant is an associate member of the Canadian Institute for Advanced Research and the Allan Wilson Centre for Molecular Ecology and Evolution. His current research interest is in developing tools for studying rapid speciation and adaptions of organisms in response to climate and environmental changes.

00 00 00

Emeritus Prof. John C. Butcher



Prof. Butcher's research interests are in numerical methods for ordinary differential equations. In particular he is a specialist in Runge-Kutta methods and general linear methods and his contributed widely to the theory of order conditions

and of both linear and non-linear stability. His present projects include the derivation, analysis and practical implementation of methods possessing the "Inherent Runge-Kutta Stability" property. He is on the editorial board of "Applied Numerical Mathematics" and "Numerical Algorithms". In addition to a PhD, he has a DSc degree for publications in numerical analysis; he is a Fellow of the Royal Society of New Zealand and of the New Zealand Mathematical Society. He is the recipient of the New Zealand Mathematical Society Research Award and the Hector Medal of the RSNZ. He is the author of two books on numerical methods for differential equations and more than 130 research papers.

00 00 00

A/Prof. Bruce Calvert (Analysis and Geometry Group)



has received his PhD from the University of Chicago and has been associated with the Department since 1971. Bruce Calvert is interested in nonlinear analysis and related issues. His recent work is on monotone and unicursal resistive networks. Other recent

work is on the Downs-Thomson effect in traffic flow, treated as a random process. Other work is on geometrical characterizations of Minkoski space and Lp spaces in terms of projections which have norm one. Earlier work is on various topics in nonlinear operators in Banach lattices in paticular, semigroups of nonlinear operators and T-monotone operators with examples of elliptic boundary value problems.

00 00 00

Prof. Marston Conder (Algebra and Combinatorics Group)



Marston Conder is Co-Director (with our Distinguished Alumni Professor Vaughan Jones) of the New Zealand Institute of Mathematics and its Applications (the NZIMA). He is especially interested in the fields of combinatorial

group theory, graph theory, discrete computation, and the symmetries of maps and surfaces.

Marston has won a number of prestigious awards (including the Senior Mathematical Prize at Oxford, a Fellowship of the Alexander von Humboldt Foundation, and a Hood Fellowship), and was elected a Fellow of the Royal Society of New Zealand in 1998 and awarded a DSc degree by Oxford University the following year. He is currently also the President of the Academy of the Royal Society of New Zealand.

Projects:

a) the determination of all chiral and reflexible regular maps on surfaces of genus up to 100 leading to the discovery (and proof) that infinitely many surfaces carry no chiral map and no regular map without multiple edges,

b) discovery of the first known examples of finite chiral 5-polytopes,

c) finding presentations for the alternating and symmetric groups with fixed numbers of generators and relations, and

d) construction of Cayley graphs with largest possible symmetry groups.

00 00 00

Dr. Colin Fox (Applied Mathematics Unit)



Dr. Colin Fox is a Senior Lecturer in Applied Mathematics and Head of the Acoustics Research Centre (located in the School of Architecture). His research in Bayesian statistical methods for inverse problems is currently centred on efficient

sampling algorithms for computational inference, particularly where data modelling requires solution of a complex physical model. He also leads a team developing mathematical models for building acoustics, with industrial applications. For more than a decade he ran a field program in Antarctica measuring ocean wave propagation in sea ice, and produced novel mathematical models that predict formation and breakup of sea ice. Colin received his PhD in the Radio Astronomy group in Cambridge University, and has held visiting positions at numerous universities including the Centro de Investigación en Matemáticas in Guanajuato, Mexico, the University of Washington in Seattle, USA, and the Université du Maine in Le Mans, France.

Projects offered

* Mechanics of Antarctic sea ice (Thesis Project)

* Sampling methods for inverse problems in PDEs (Thesis Project)

* Modelling sound transmission in timber flanking structures (Thesis Project)

00 00 00

Prof. David Gauld (Analysis and Geometry Group)



My research interests are in set theoretic topology, especially applications to non-metrisable

manifolds, and topological properties of manifolds near the limit of metrisability. If you are interested in my collection

of 100 topological properties equivalent to metrisability for a manifold go to http://www.math.auckland.ac.nz/~qauld/research/metrisability.pdf

I have had four students complete their PhD degrees under my supervision, currently have a fifth PhD student and expect a sixth to arrive in Auckland in the next couple of months or so.

Here are some results I have discovered very recently with coauthors from Auckland, India, Oman and Switzerland:

- A topological manifold is metrisable if and only if the space of real-valued functions with the compact-open topology is Volterra. Volterra spaces are something Zbiggie Piotrowski and I introduced in the 1990s and developed with Sina Greenwood. It is a generalisation of the Baire property. Of course a manifold is also metrisable if and only if the space of real-valued functions with the compact-open topology is Baire.

- Up to isotopy homeomorphisms of powers of the long ray and line behave just like homeomorphisms which permute the axes (and possibly reverse directions in the case of the line).

00 00 00

A/Prof. Rod Gover (Analysis and Geometry Group)



Rod Gover has received his MSc form Canterbury and his DPhil from Oxford. He joined the Deparrtment in 1999 and has 'supervised a PhD student who graduated in 2006. He presently advises 2 PhD and an MSc stu-

dent. His research interests include differential geometry, twistor theory and mathematical physics. He is especially focussed on a class of differential geometries known as parabolic geometries. This class includes conformal geometries, CR geometries (which turn up in complex analysis), quaternionic geometries, projective differential geometries and many other structures.

Projects offered

- * Classical invariant theory (Reading)
- * Riemannian geometry (Reading)

* Conformal or CR differential geometry (Reading and/or Project)

00 00 00

Dr. Sina Greenwood (Analysis and Geometry Group)



Sina Greenwood is a Senior ecturer. Her primary area of research is set theoretic topology and in particular nonmetrisable manifolds and discrete dynamical systems. She is currently addressing a question. which

arises naturally from fixed point theorems in topology: if f is an arbitrary self-map on a set X and P is some topological property, under what conditions can one endow X with a topology that satisfies P and with respect to which f is continuous? Her present focus is the case where P is connected compact Hausdorff.

She is also working on Brunnian links and her current goal in this area is to classify non-simple and also generalised Brunnian links. She is interested in how these links occur in protein molecules.

A second area of interest relates to the advancement of Maori (please add macron) and Pasifika students. She is involved in a research project tracking Northland Maori students through high school to find out what factors influence their decisions to pursue mathematics. Another project involves a collaboration with the National University of Samoa. The objectives are to investigate the way Samoan tertiary students relate to mathematics, and examine the cultural factors within an educational institution that affect their success in mathematics.

00 00 00

Dr. Vivien Kirk (Applied Mathematics Unit)



Dr Vivien Kirk is a Senior Lecturer in the Department and is currently Head of the Applied Mathematics Unit within the Department. Her research interests are in dynamical systems,

being primarily concerned with understanding the qualitative

behaviour of solutions to nonlinear differential equations. She is interested in applying dynamical systems techniques to mathematical models arising in a variety of physical and biological systems, with recent work being particularly in the area of mathematical models of cellular calcium dynamics. Vivien has a Masters degree in Physics from the University of Auckland and a PhD in Applied Maths from the University of Cambridge. Vivien's current projects include: analysis of some new global bifurcations recently found in mathematical models of calcium dynamics; global bifurcations in systems with symmetry; and, bifurcation analysis of systems with two or more time scales.

oo oo oo Dr. Mike Meylan (Applied Mathematics)



Michael Meylan is a Senior Lecturer. He completed his Ph.D. under Vernon Squire in 1993 which was concerned with modelling ice floes using linear wave theory. He has worked on various problem connected with

linear water wave theory in the subsequent time. He is currently interested in Linear Wave theory applied to water waves, wave propagation in ice infested seas. He runs a website concerning his research at **http://www.wikiwaves.org.** Mike supervised two PhD students (one of them already graduated) and proposes projets on the following topics:

* Time dependent linear water wave scattering (Project)

* Wave scattering in the Marginal Ice Zone (Thesis Project)

00 00 00

Dr Warren Moors (Analysis and Geometry)



Warren Moors is a Senior Lecturer. He received his PhD from Newcastle and his broad research interests ar ein functional analysis.

00 00 00

Prof. Eamonn O'Brien (Algebra and Combinatorics Group)



Eamonn O'Brien is a Professor of Mathematics. His primary research interests are algorithmicandcomputational aspects of group theory. He has published about 50 research papers in leading international journals, various conference

papers, chapters in books, and is coauthor of a "Handbook for Computational Group Theory". Implementations of his algorithms are distributed world-wide with the leading computational algebra systems.

Eamonn received a BSc in 1983 from the National University of Ireland (Galway) and a PhD from the Australian National University in 1988.

He was a Research Fellow in Canberra from 1990-1995, a Humboldt Foundation Research Fellow in Germany from 1995-1997, and joined the Department in 1997.

Eamonn's research projects include aspects of finitely-presented groups, p-groups, and linear groups.

Reading courses and projects offered

* Automorphism groups of finite groups (Reading and/or Project)

* Computational aspects of group representation theory (Reading and/or Project)

* Finitely-presented groups (Reading and/or Project)

00 00 00

Prof. Boris Pavlov (Analysis and Geometry Group)



Boris Pavlov is a professor of mathematics. He received his MS, PhD and Doctor of Science degrees from the Leningrad State University. He is a specialist in Analysis and Mathematical Physics, a participant of Congresses of Mathematics in Poland 1983 and

in Japan 1991, a receiver of first Leningrad University prize for research (1984) and Fellow of the Royal Society of New Zealand.(2004)

His highest achievements are:

1. Spectral theory of singular differential non-selfadjoint operators.

2. Symmetric Functional Model for dissipative operators.

3. Riesz -basis property of exponentials on a finite interval.

4. Operator interpretation of critical zeros of Riemann zeta-function

5. Theory of the shift operator on a Riemann surface.

6. Zero-range potentials with inner structure and solvable models.

7. Fitting of zero-range solvable model based on rational approximation of the Dirichle-to-Neumann map of the original Hamiltonian.

8. Modified analytic perturbation procedure for operators with continuous spectrum.

Reading courses and projects offered

* Differential operators (Reading)

* Harmonic analysis on the unit disc and Riemann surfaces (Reading)

*Spectral problems of mathematical physics, nonselfadjoint operators and harmonic analysis (Project)

00 00 00

Dr. Maxine Pfannkuch (Mathematics Education Unit)



Maxine Pfannkuch has been involved in mathematics education in New Zealand for about 30 years. After graduating with an MSc in mathematics, she trained as a secondary teacher and then taught at

that level. She has been Head of Department of mathematics at Avondale College, mathematics adviser for the Northern region and a senior lecturer at the Auckland College of Education where she was in charge of secondary mathematics teacher training. Currently Maxine is a senior lecturer in the Mathematics Education Unit at The University of Auckland where she completed a doctorate in statistics education. Her main research area is focussed upon the development of students' statistical thinking. She is an Associate Editor of the Statistics Education Research Journal and was convenor for SRTL-4, an international forum on Statistical Reasoning, Thinking and Literacy. Maxine is currently involved in the development of the school statistics curriculum.

Current and recent research projects:

School Project – **Developing students' statistical thinking.** This ongoing project combines teacher development with studies on the development of Year 10 to 13 students' statistical thinking in schools.

University Project – **Developing students'** statistical literacy. This project involved designing teaching units specifically aimed at developing Stage One statistics students' statistical literacy and then assessing their effectiveness.

00 00 00

Prof. Ivan Reilly (Mathematics Education Unit)



Ivan Reilly is Professor of Mathematics and Mathematics Education in the Department of Mathematics at the University of Auckland, where he has been teaching for about 35 years. He graduated MSc in Mathematics and BA in Geography at Victoria

University of Wellington (VUW), and AM, PhD in Mathematics at the University of Illinois. In 1991 he was awarded a DSc for his research in Mathematics by VUW. In 1992 he was the main player in the creation of the Mathematics Education Unit within the then Department of Mathematics and Statistics of the University of Auckland. He continues to write research papers in Topology as well as in Mathematics Education. His main interests in the latter are undergraduate mathematics teaching and learning, talented students especially at high school, and language and mathematical concepts. Ivan was co-convenor of DELTA03, the Fourth Southern Hemisphere Conference on Undergraduate Mathematics Teaching and Learning, Queenstown, New Zealand, November 2003.

Current and recent research projects:

Topology and Language. This Marsden-funded international project investigates whether research mathematicians understand the base concepts of their field in different ways depending on the language in which they work. Pilot development of instruments is complete and full data collection is currentl; y taking place.

Undergraduate Mathematics for Talented High School Students. This project involves designing and delivering (in two modes—traditional and distance) a course for university credit for talented final year high school students. An assessment of the effectiveness of such a course is part of the project.

00 00 00

Dr. Philip Sharp (Applied Mathematics Unit)



Philip Sharp is a senior lecturer. He received his BSc(Hons) in Physics and Mathematics from Canterbury and completed a PhD in fluid dynamics at the same University. He joined the Department in 1993 after nice years where

he held academic positions at the University of Toronto and Queen's University, Canada. Philip is an an Applied Mathematician who specialises in the development of numerical integrators for differential equations and the use of simulations to model the Solar System. He has a passion for Astronomy and gives courses on Astronomy through the Centre for Continuing Education at the University of Auckland.

Project courses and theses offered in numerical analysis and computational astronomy. oo oo oo

Dr. Arkadii Slinko (Applied Mathematics Unit)

Arkadii Slinko is a Senior Lecturer. He received his



PhD and bSc degrees from the Sobolev Institute of Mathematics) and has joined the Department in 1993. His current research interests are in

Mathematical Econom-

ics and, in particular, Social

Choice Theory, Decision Theory and mathematical theories of allocation of discrete resources (current)

Cluster analysis and applications (current)

• Design of experiments and random matrices (current)

• Mathematics education of gifted students and mathematics competitions (current) .

Arkadii is a coordinator for the New Zealand Mathematics Olympiad.

Reading courses and projects offered

* Mathematics of Voting and Political Competition (Thesis Project)

* Combinatorial Problems in Decision Theory (Thesis Project)

* Mathematics of Simple Games (Thesis Project)

00 00 00

Prof. James Sneyd



James Sneyd is the Professor of Applied Mathematics and is interested in body parts. His research is in the general area of mathematical physiology, with a particular focus on cell signalling and cell biology. For example, one current project is the study of asthma in airway

smooth muscle, while another project involves the study of how saliva secretion works. Or doesn't.

Mathematically, this involves the construction and numerical solution of reaction-diffusion equations. Put that way, it sounds really boring, but it isn't. It's actually a lot of fun, building up models and analysing them.

James works closely with a number of experimen-

tal laboratories in the US, which means that his students often get to travel to the US to see how things are done.

James has never performed any scientific experiments on students, and is even reluctant to kill mice.

00 00 00

A/Prof. Mike Thomas (Mathematics Education Unit)



Mike Thomas has published research papers in the fields of secondary algebra, technology use in algebra, calculus and linear algebra, and advanced mathematical thinking. He has completed the supervision of

four PhD students and currently has six others. Mike was convenor of TIME 2000, an international technology conference, and of MERGA 25. He is on the Editorial Board of the Mathematics Education Research Journal and is editor of the New Zealand Mathematics Magazine.

Current and Recent Research Projects:

1. Neuropsychological Aspects of Brain Function and Mathematical Thinking: This project uses fMRI scans to investigate ways in which the brain processes mathematical thinking about concepts and procedures, and the possible influences on learning related to representational thinking.

2. Research, with international collaboration, on the nature of advanced mathematical thinking and how it may be developed by school and university students.

3. Research considering the ways in which CAS calculators and computers may be used to improve secondary and university students' mathematical understanding.



OVERWIEV OF STAFF RESEARCH INTERESTS

Here are the research interests of members of the department, ordered by the 2000 Mathematics Subject Classification. You are welcome to visit the personal homepages or the websites of the various research groups and seminars, for further information.

01: History and biography

Dr Garry Tee, Research Fellow Numerical analysis, the history of science.

03: Mathematical logic and foundations

Dr Arkadii Slinko, Senior Lecturer Applied Algebra with particular interest in mathematics of voting and decision making

05: Combinatorics

A/Prof C. Paul Bonnington Associate Professor Topological graph theory, infinite graphs, computational graph theory.

Prof Marston Conder Professor Combinatorial group theory, graph theory, discrete computation, symmetries of maps and surfaces

Dr Paul Hafner Senior Lecturer Ordered fields, bilinear forms, computations with groups and graphs.

A/Prof Josef Sirán Associate Professor Algebraic graph theory. Combinatorics. Group theory.

Dr Arkadii Slinko Senior Lecturer Applied algebra and combinatorics with particular interest in mathematics of voting and decision making in general

Dr Jamie Sneddon Senior Tutor Planar digraphs; minors; tournaments.

06: Order, lattices, ordered algebraic structures

Dr Arkadii Slinko Senior Lecturer Applied algebra and combinatorics with particular interest in mathematics of voting and decision making in general 13: Commutative rings and algebras

Dr David Smith Senior Lecturer Commutative ring theory

15: Linear and multilinear algebra; matrix theory

Dr Arkadii Slinko Senior Lecturer Applied algebra and combinatorics with particular interest in mathematics of voting and decision making in general

17: Nonassociative rings and algebras

Dr Arkadii Slinko Senior Lecturer Applied algebra and combinatorics with particular interest in mathematics of voting and decision making in general

20: Group theory and generalizations

A/Prof Jianbei An Associate Professor Modular representation theory of finite groups

A/Prof C. Paul Bonnington Associate Professor Topological graph theory, infinite graphs, computational graph theory.

Dr Laura Ciobanu Post-Doctoral Fellow Computational, combinatorial and geometric group theory

Prof Marston Conder Professor Combinatorial group theory, graph theory, discrete computation, symmetries of maps and surfaces

Prof Eamonn O'Brien Professor Group theory, computational algebra.

22: Topological groups, Lie groups

Dr Tom ter Elst Lecturer Harmonic analysis, operator theory, geometric analysis, subelliptic and degenerate operators, PDE.

31: Potential theory

A/Prof Bruce Calvert Associate Professor Nonlinear functional analysis, networkflows.

32: Several complex variables and analytic spaces

A/Prof Rod Gover Associate Professor Differential geometry and its relationship to representation theory. Applications to analysis on manifolds, PDE theory and Mathematical Physics. Conformal, CR and related structures.

35: Partial differential equations

Dr Hyuck Chung Post-Doctoral Fellow Building acoustics. Linear wave theory. Partial differential equations

Dr Colin Fox Senior Lecturer Semi-analytic methods in scattering, Bayesian methods for inverse problems, Sound transmission in light timber-framed buildings

A/Prof Rod Gover Associate Professor Differential geometry and its relationship to representation theory. Applications to analysis on manifolds, PDE theory and Mathematical Physics. Conformal, CR and related structures.

Dr Mike Meylan Senior Lecturer Linear Wave theory applied to water waves, wave propagation in ice infested seas

Prof Boris Pavlov Professor Spectral problems of Mathematical Physics. Quantum theory. Solvable models in Quantum Mechanics. Resonance

Dr Stephen Taylor Senior Lecturer Partial differential equations, control theory for PDEs, quantum chemistry, industrial mathematics

Dr Tom ter Elst Lecturer Harmonic analysis, operator theory, geometric analysis, subelliptic and degenerate operators, PDE.

Dr Shixiao Wang Lecturer Nonlinear partial differential equation, fluid dynamics and industrial mathematics.

37: Dynamical systems and ergodic

theory Dr Vivien Kirk Senior Lecturer Dynamical systems, particularly nonlinear ODEs; theory of local and global bifurcations; symmetry and bifurcations. Prof James Sneyd Professor Mathematical physiology, nonlinear dynamical systems.

41: Approximations and expansions

Dr Shayne Waldron Senior Lecturer ApproximationTheory, polynomial interpolation, numerical methods.

43: Abstract harmonic analysis

Dr Tom ter Elst Lecturer Harmonic analysis, operator theory, geometric analysis, subelliptic and degenerate operators, PDE.

46: Functional analysis

A/Prof Rod Gover Associate Professor Differential geometry and its relationship to representation theory. Applications to analysis on manifolds, PDE theory and Mathematical Physics. Conformal, CR and related structures.

Dr Warren Moors Senior Lecturer Functional Analysis

Dr Tom ter Elst Lecturer Harmonic analysis, operator theory, geometric analysis, subelliptic and degenerate operators, PDE.

Dr Shixiao Wang Lecturer Nonlinear partial differential equation, fluid dynamics and industrial mathematics.

47: Operator theory

A/Prof Bruce Calvert Associate Professor Non-linear functional analysis, networkflows.

A/Prof Rod Gover Associate Professor Differential geometry and its relationship to representation theory. Applications to analysis on manifolds, PDE theory and Mathematical Physics. Conformal, CR and related structures.

Prof Boris Pavlov Professor Spectral problems of Mathematical Physics. Quantum theory. Solvable models in Quantum Mechanics. Resonance

Dr Tom ter Elst Lecturer Harmonic analysis,

operator theory, geometric analysis, subelliptic and degenerate operators, PDE.

51: Geometry

Dr Arkadii Slinko Senior Lecturer Applied algebra and combinatorics with particular interest in mathematics of voting and decision making in general

53: Differential geometry

A/Prof Rod Gover Associate Professor Differential geometry and its relationship to representation theory. Applications to analysis on manifolds, PDE theory and Mathematical Physics. Conformal, CR and related structures.

Dr Paul-Andi Nagy Research Fellow differential geometry and mathematical physics

54: General topology

Prof David Gauld Professor Set-Theoretic topology, especially applications to topological manifolds. Volterra spaces.

Dr Sina Greenwood Lecturer Set theoretic topology, nonmetrisable manifolds and discrete dynamical systems.

57: Manifolds and cell complexes

A/Prof Paul Bonnington Associate Professor Topological graph theory, infinite graphs, computational graph theory.

Prof Marston Conder Professor Combinatorial group theory, graph theory, discrete computation, symmetries of maps and surfaces

Prof David Gauld Professor Set-Theoretic topology, especially applications to topological manifolds. Volterra spaces.

58: Global analysis, analysis on manifolds

A/Prof Rod Gover Associate Professor Differential geometry and its relationship to representation theory. Applications to analysis on manifolds, PDE theory and Mathematical Physics. Conformal, CR and related structures. Dr Tom ter Elst Lecturer Harmonic analysis, operator theory, geometric analysis, subelliptic and degenerate operators, PDE.

60: Probability theory and stochastic processes

Dr David Bryant Senior Lecturer Evolutionary biology, bioinformatics, probabilistic models, algorithms

Dr Arkadii Slinko Senior Lecturer Applied algebra and combinatorics with particular interest in mathematics of voting and decision making in general

62: Statistics

Dr David Bryant Senior Lecturer Evolutionary biology, bioinformatics, probabilistic models, algorithms

Dr Colin Fox Senior Lecturer Semi-analytic methods in scattering, Bayesian methods for inverse problems, Sound transmission in light timber-framed buildings

65: Numerical analysis Prof John Butcher

Professor Numerical methods for ordinary differential equations and other aspects of numerical analysis.

Dr Robert Peng Kong Chan Senior Lecturer Numerical methods for stiff ordinary differential equations, differential-algebraic equations and oscillatory Hamiltonian problems, scientific computation.

Dr Allison Heard Senior Tutor Numerical solution of ordinary differential equations, stability of numerical methods

Dr Philip Sharp Senior Lecturer Astronomical simulations, developing and testing numerical methods for initial value ordinary differential equations.

Dr Shayne Waldron Senior Lecturer Approximation Theory, polynomial interpolation, numerical methods.

68: Computer science

Dr Arkadii Slinko Senior Lecturer Applied algebra and combinatorics with particular interest in mathematics of voting and decision making in general

74: Mechanics of deformable solids

Dr Colin Fox Senior Lecturer Semi-analytic methods in scattering, Bayesian methods for inverse problems, Sound transmission in light timber-framed buildings

Dr Mike Meylan Senior Lecturer Linear Wave theory applied to water waves, wave propagation in ice infested seas

Dr Stephen Taylor Senior Lecturer Partial differential equations, control theory for PDEs, quantum chemistry, industrial mathematics

76: Fluid mechanics

Dr Mike Meylan Senior Lecturer Linear Wave theory applied to water waves, wave propagation in ice infested seas

Dr Shixiao Wang Lecturer Nonlinear partial differential equation, fluid dynamics and industrial mathematics.

81: Quantum theory

Prof Boris Pavlov Professor Spectral problems of Mathematical Physics. Quantum theory. Solvable models in Quantum Mechanics. Resonance

Dr Stephen Taylor Senior Lecturer Partial differential equations, control theory for PDEs, quantum chemistry, industrial mathematics

91: Game theory, economics, social and behavioral sciences

Dr Arkadii Slinko Senior Lecturer Applied algebra and combinatorics with particular interest in mathematics of voting and decision making in general

92: Biology and other natural sciences

Dr David Bryant Senior Lecturer Evolutionary biology, bioinformatics, probabilistic models,

algorithms

Prof James Sneyd Professor Mathematical physiology, nonlinear dynamical systems.

93: Systems theory; control

Prof James Sneyd Professor Mathematical physiology, nonlinear dynamical systems.

Dr Stephen Taylor Senior Lecturer Partial differential equations, control theory for PDEs, quantum chemistry, industrial mathematics

94: Information and communication, circuits A/Prof Bruce Calvert Associate Professor Non-linear functional analysis, networkflows.

97: Mathematics education

Dr Hannah Bartholomew Lecturer Gender issues in mathematics education, the formation of students' identities as learners of mathematics, ability grouping, undergraduate mathematics education.

A/Prof Bill Barton Associate Professor Language and mathematics, ethnomathematics, teacher development.

Dr Maxine Pfannkuch Senior Lecturer Assessment in Mathematics Education, statistical thinking.

Prof Ivan Reilly Professor General topology,curriculum development, gifted students, the secondary/tertiary interface, undergraduate mathematics education.

Dr Arkadii Slinko Senior Lecturer Applied algebra and combinatorics with particular interest in mathematics of voting and decision making in general

A/Prof Michael Thomas Associate Professor Technology in Mathematics Education, secondary school algebra and calculus, proof, problem-solving, mathematical thinking.

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 ClockTower, 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. 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,

CHAPLAINCY Chaplains at Maclaurin Chapel and Newman

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



IMPORTANT LOCATIONS

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.

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 I 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 Information Commons where students may borrow prescribed and recommended material.

Other Library Services

- I. Inter-Campus Library Delivery Service This will assist you in getting books and articles held at another campus or in Off-Campus Storage.
- 2. InterlibraryLoanandDocumentDelivery 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 PINprotected account that is accessed using your student ID card.

- 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.

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