MATHEMATICS AND APPLIED MATHEMATICS

POSTGRADUATE HANDBOOK

2017

THE UNIVERSITY OF
AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
N E W   Z E A L A N D

SCIENCE

Welcome to the Department of Mathematics

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

If you enjoyed your experience as an undergraduate student in Mathematics or Applied Mathematics and would like to enhance your skills and get a taste of cutting-edge research, you should consider pursuing postgraduate studies.

As a postgraduate student in Mathematics and Applied Mathematics, you can specialise in an area of your choice and develop your studies in depth. The department offers four postgraduate programmes – Bachelor of Science (or Arts) Honours, masters degrees (Master of Science or Arts), a Postgraduate Diploma in Science, and a PhD programme.

A postgraduate qualification will provide you with advanced knowledge in Mathematics. The experience of writing a dissertation or thesis provides skills that are in demand by many employers. Graduates from the department take up positions in business, government, industry, research, planning and environmental organisations.

We will be pleased to welcome you as a postgraduate student in our department.

BERND KRAUSKOPF
Head of Department
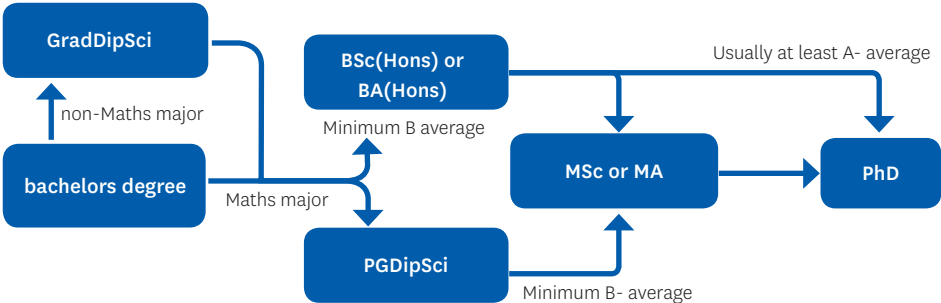
Our subject is ranked in the top 100 worldwide

QS World University Rankings by subject 2016

TOP
100
in the world

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Mathematics

18

Best student city in the world

QS Best Student Cities 2016

Postgraduate study options in Mathematics

Why study Mathematics?

A postgraduate degree in Mathematics or Applied Mathematics can help you increase your level of knowledge and understanding across a broader and deeper range of topics. It can help you improve and intensify your range of abilities, such as in modelling, computation, and problem-solving, and develop your intuition. The programmes on offer give you an opportunity to learn about research, even do your own research, make new discoveries and develop new ways of looking at things. They can also give you an exciting and rewarding experience of presenting your new findings. These are highly valuable personal skills that can open new career horizons, and enhance your earning potential in the modern world.


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GradDipSci
        ↑ non-Maths major
bachelors degree ── Maths major

BSc(Hons) or BA(Hons)
    Minimum B average

Usually at least A- average

MSc or MA ──→ PhD

PGDipSci
    Minimum B- average
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Graduate Diploma in Science (GradDipSci)

This is a one-year diploma that can provide an undergraduate major in Mathematics or Applied Mathematics for students who have a degree without such a major.

1 The average number of years it takes to complete a Graduate Diploma in Science

For more information and advice contact:
pgadvice@math.auckland.ac.nz

Bachelor of Science (Honours) – Mathematics or Applied Mathematics
Bachelor of Arts (Honours) – Mathematics

Prerequisites

- For the Bachelor of Science (Honours): Bachelor of Science majoring in Mathematics or Applied Mathematics

- For the Bachelor of Arts (Honours): Bachelor of Arts majoring in Mathematics

- Completed compulsory undergraduate courses

  - Mathematics – MATHS 332 and either MATHS 320 or MATHS 328 (or equivalent)

  - Applied Mathematics – MATHS 340 and MATHS 361 (or equivalent)

- Gained at least a B average over 45 points at above Stage II in Mathematics

- Passed at least another 45 points in courses above Stage II in any subject *(BSc(Hons) only)*

1 The average number of years it takes to complete a Bachelor of Science (Honours) degree

Programme structure

This is a one-year degree which may also be taken part-time over two years.

- 90 points from 700-level courses (six courses)

- 30 points from MATHS 776 (Dissertation)

For more information and advice contact: honsadvice@math.acukland.ac.nz or visit www.math.auckland.ac.nz/hons-pgdipsci

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Postgraduate Diploma in Science (PGDipSci)

Prerequisites

A Bachelor of Science majoring in Mathematics (including MATHS 332 and either MATHS 320 or MATHS 328) or a major in Applied Mathematics

Programme structure

This is a one-year diploma which may also be taken part-time, over four years or less.

- 120 points from 700-level courses (eight courses)

1 The average number of years it takes to complete a Postgraduate Diploma in Science

For more information and advice contact: honsadvice@math.auckland.ac.nz or visit www.math.auckland.ac.nz/hons-pgdipsci

Master of Science (MSc) – Mathematics or Applied Mathematics
Master of Arts (MA) – Mathematics

1

The average number of years it takes to complete a Master of Science

Prerequisites (MSc)

- BSc(Hons) or PGDipSci in Mathematics or Applied Mathematics

- At least a B- average in 90 points taken for the BSc(Hons) or PGDipSci (for the PGDipSci, at least 75 points must be at 700 level or from a dissertation).

Prerequisites (MA)

- BA(Hons) or PGDipArts in Mathematics

- At least a GPA of 5 over the programme

Programme structure

This is a one-year degree which may also be taken part-time over two years.

Option 1

- 120 point thesis

Option 2 (Mathematics only)

- 90 point research portfolio

- 30 points from Maths 700-level courses

Start Dates: 1 December, 1 March and 15 July.

Before you can enrol into either an MSc or MA you must receive departmental approval. This will require you to have found a research project and a qualified staff member who is willing to supervise you.

For more information and advice contact: pgadvice@math.auckland.ac.nz or visit www.math.auckland.ac.nz/masters

Doctor of Philosophy (PhD)

Quick facts

Points per degree: 360 points

Full-time study: 3-4 years

Part-time study: 6-8 years

Degree structure: research

Taught at: City Campus

Application closing dates: apply at anytime

Start date: start at anytime

For more information, go to www.science.auckland.ac.nz/phd

Entry to PhD

Entry into the PhD programme requires a relevant BSc(Hons) degree with first class or second class (division 1) honours or an MSc degree with first or second class honours from a recognised institution. It is normally expected that this preparation includes a strand of research.

For more information and advice contact: phdadvice@math.auckland.ac.nz or visit www.math.auckland.ac.nz/phd

Tutoring and marking

Enrolled students can apply to be employed as a tutor or marker for the department. Enquiries should go to markers-tutors@math.auckland.ac.nz

Postgraduate Mathematics courses offered in 2017

Course code	Title	Semester
707	Special Topics in Mathematics Education: Mathematic Processes	S1
712	Teaching and Learning in Algebra	S2
713	Logic and Set Theory	S2
714	Number Theory	S2
715	Graph Theory and Combinatorics	S1
720	Group Theory	S1
730	Measure Theory and Integration	S1
731	Functional Analysis	S2
740	Complex Analysis	S2
750	Topology	S2
761	Dynamical Systems	S2
762	Nonlinear Partial Differential Equations	S2
763	Advanced Partial Differential Equations	S1
764	Mathematical Biology	S2
766	Inverse Problems	S2
769	Stochastic Differential and Difference Equations	S1
770	Advanced Numerical Analysis	S1
783	Advanced Topics in Mathematics: Foundations of Algebraic Geometry	S1

For course descriptions and prerequisite information, go to www.math.auckland.ac.nz/pgcourses

Information on possible research projects and their supervisors for honours, masters and doctorates can be found at www.math.auckland.ac.nz/pgprojects

Careers in Mathematics

Academia and research

Actuarial and business analysis

Biostatistics and biotechnology

Data science

Government (e.g.,
IRD, Defence, Security Intelligence)

Economic analysis

Information systems and technology

Financial services (e.g., banks, investment funds, insurance)

Modelling (e.g., engineering, industry, logistics, meteorology and many other areas)

Operations research

Risk management

Software development (e.g., programming, AI, robotics)

Statistical analysis

Sustainability analysis

Teaching

Telecommunications industry

*Meet **John Holt** – his background includes a BSc, MSc and PhD in Mathematics.*

"Studying Applied Mathematics at the University of Auckland was a fantastic experience – I loved the environment, and it has been great to come away with a qualification that is highly sought after and internationally recognised. My programme of study also equipped me with a methodical approach to problem solving that employers really value – opening up an abundance of career opportunities across a variety of industries. I now work at COMPAC, where I use the algorithms I learnt and code writing skills I developed as a student in order to help solve real-world problems."

Kate O'Byrne completed a PhD in Applied Mathematics.

Helpful information

Academic dates	www.auckland.ac.nz/dates
Accommodation	www.accommodation.auckland.ac.nz
Apply for postgraduate study	www.auckland.ac.nz/applynow
Career Development and Employment Services	www.cdes.auckland.ac.nz
Childcare	www.auckland.ac.nz/childcare
Degree planning and course advice	www.science.auckland.ac.nz/student-centre
Disability Services	www.disability.auckland.ac.nz
General Education	www.auckland.ac.nz/generaleducation
How to enrol	www.auckland.ac.nz/enrolment
Information for postgraduate students	www.postgraduate.ac.nz
International students	www.international.auckland.ac.nz
Libraries and Learning Services	www.library.auckland.ac.nz
Māori and Pacific students	www.science.auckland.ac.nz/tuakana
Need help?	www.askauckland.ac.nz
Postgraduate Students' Association	www.pgsa.org.nz
Rainbow Science Network for LGBTI students	www.science.auckland.ac.nz/rainbowscience
Scholarships, awards and fees	www.scholarships.auckland.ac.nz
	www.auckland.ac.nz/fees
	www.auckland.ac.nz/studentloansandallowances
Support for Science students	www.science.auckland.ac.nz/support

Questions about Mathematics? Email pgscience@auckland.ac.nz

THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

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