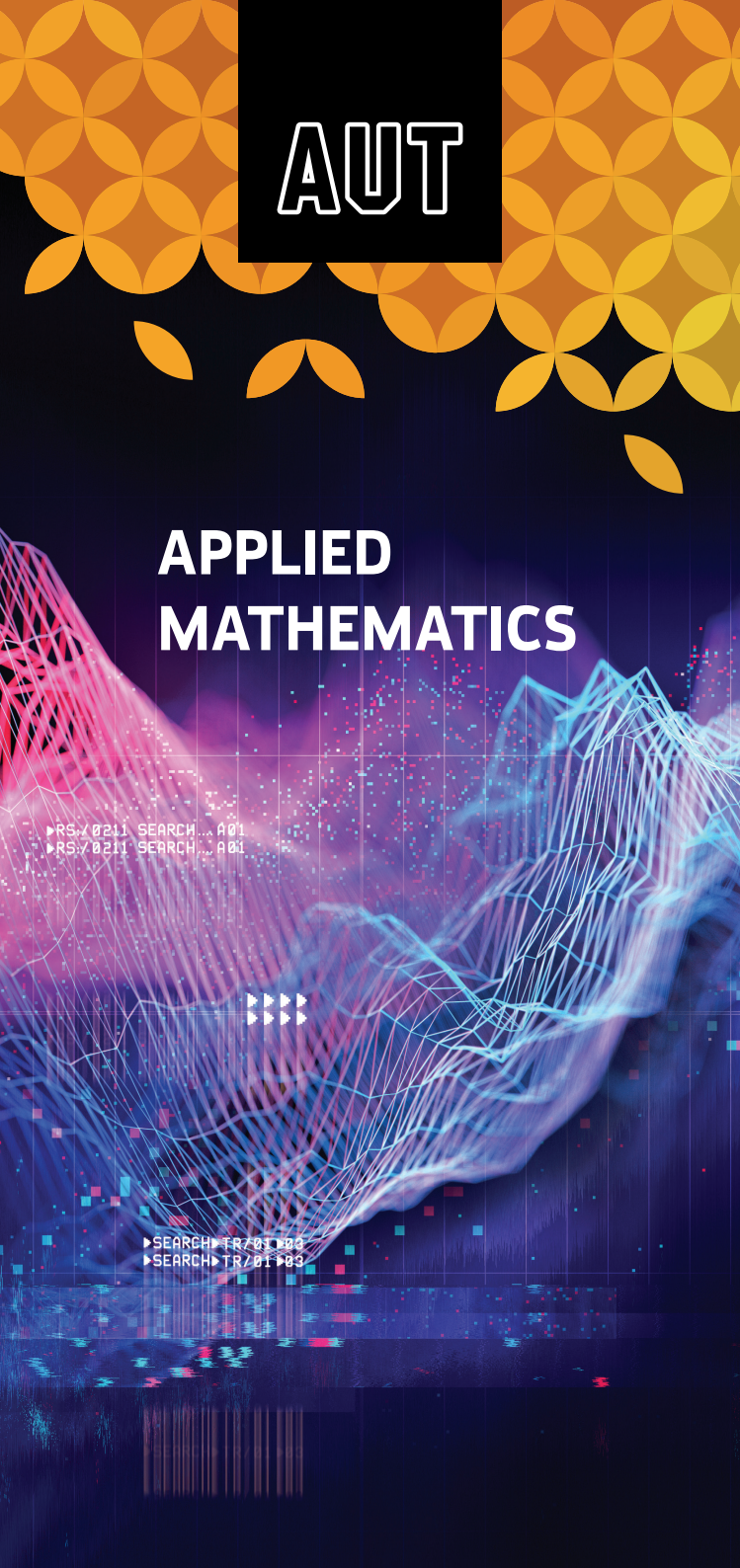
AUT

APPLIED MATHEMATICS



APPLIED MATHEMATICS

Mathematics is at the foundation of most scientific and engineering disciplines, and it arises whenever there are challenging problems involving quantity, structure, space, or change.

Applied mathematics is the branch of mathematics that applies mathematical techniques to solve problems outside of mathematics – such as in biology, business, computing, financial markets, mechanical and structural engineering.

At AUT, you'll study much of the fundamental mathematics that is taught at other universities, such as calculus and algebra. However, you'll also develop strong computational and modelling skills, and make extensive use of computer technology. This equips you to use mathematics in the real world.

COURSE STRUCTURE

As part of the Applied Mathematics major in the Bachelor of Mathematical Sciences, your study includes the following papers:

Year 1

- Differential and Integral Calculus
- Algebra and Discrete Mathematics
- Programming for Engineering Applications
- Applied Statistics
- Mathematical Concepts
- Applied Communication
- Introductory Astronomy
- Object Oriented Applications
- Physics 1

You can also choose up to two elective papers.

Year 2

You complete the following two papers:

- Multivariate Calculus – looks at vector calculus in multiple variables and its applications
- Differential Equations – investigates modelling and techniques for solving ordinary and systems of differential equations

Then choose one of:

- Linear Algebra – studies vector and matrix algebra with an emphasis on its applications to areas such as approximations, optimisation
- Financial Mathematics – focuses on the elements of actuarial mathematics and financial assets, securities, annuities, mortality laws, life annuities, life insurance policy values, money market and financial derivatives.

You can also choose up to five elective papers.

Year 3

The final year covers advanced industry-relevant skills in applied mathematics.

You complete the following papers:

- Numerical Analysis – combines mathematical and computation techniques to numerically solve problems that cannot be analytically solved.
- Linear Partial Differential Equations – models and solves a comprehensive range of practical problems including physics by using partial differential equations.
- Research project – investigate a scientific problem and develop skills in experimental design; literature searching; the collection, treatment, interpretation and reporting of results.

Then choose one of:

- Financial Modelling and Computation – prepares students for the workforce by investigating advanced mathematical models in the area of financial mathematics. A range of mathematical concepts and analytical techniques are used to solve financial problems.
- Industrial mathematics – uses mathematical theories and techniques to solve problems in business, engineering and physical sciences. Software such as MatLab and R are used to apply and verify the models that are applied to practical situations.

You can also choose up to three elective papers.

LEARNING OUTCOMES

- A sound understanding of the main body of knowledge in the component disciplines of applied mathematics
- A sound knowledge of the theoretical basis for applications involving analytics and computing in applied mathematics
- Ability to model a computer, engineering, science or business problem and to develop a successful solution
- Practical skills to select and use appropriate mathematical software proficiently

CAREER OPPORTUNITIES

Applied mathematics graduates are valued in industry as they have deep logical, analytical and computational skills that are important for many careers.

Some of the career opportunities include:

- Actuary
- Control buyer/purchasing agent
- Industrial engineering scientist
- Market and financial analyst
- Mathematician
- Research analyst and associate
- Teacher or university lecturer

Many students choose to take a double major combining Applied Mathematics with another major, such as Computer Science or Analytics. Choosing a double major or extensive electives from business or engineering opens the door to interesting career options that are unavailable to other graduates.

POSTGRADUATE STUDY

Postgraduate papers cover more advanced topics in applied mathematics such as computational modelling, optimisation, applied modern algebra, specialist topics in mathematical finance, and advanced numerical analysis. You'll also conduct independent research toward a dissertation under the supervision of senior staff.

ENTRY REQUIREMENTS

- University Entrance or equivalent
- Preference will be given to applicants with one or more NCEA level 3 subjects from Calculus, Mathematics or Statistics.
- Passes in Physics and Computing at NCEA level 3 are an advantage. If you are not from the NCEA system, your study needs to be equivalent to it.
- An interview may be required prior to an offer of place.

What if I do not meet these entry requirements?

If you do not meet the entry requirements, you may enrol in AUT's Certificate in Science and Technology (CertScT). This involves one semester of catch-up papers.

If you do not have University Entrance, you can enter the bachelor's degree after successful completion of one semester or one complete year of the Certificate in Science and Technology.

What if I already have a bachelor's degree?

If you have a degree in another discipline you can enrol in a Graduate Certificate in Mathematical Sciences or the Graduate Diploma in Mathematical Sciences.

WHEN TO APPLY

You should apply prior to December for Semester 1 and prior to May for Semester 2. Late applications will be considered subject to availability.

APPLY ONLINE

https://register.aut.ac.nz/

MORE INFORMATION

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