Faculty of Science

Mātai Pūtaiao Rorohiko Undergraduate Computer Science

Computing technology permeates our lives, and with that comes the demand for specialists to imagine, develop and maintain that technology. As a Computer Science student at the University of Auckland, you'll be prepared to meet that demand.

What is Computer Science?

Computer scientists have an impact on how our society advances by developing and maintaining these systems: whether it be for our home, work, learning or entertainment environments.

We'll cover:

- How information is stored in computers (data structures and management)
- How computers are told what to do (algorithms and programming languages)
- How systems work (computer architecture and system software)
- How computers are connected (data communications, networks and hypermedia)
- Some ways in which computers can be used (applications)
- What computers can do, and their limitations (computability and complexity theory)

What you will learn

Studying Computer Science gives you an understanding of the conceptual building blocks of computers, software, and communications between computers. You'll tackle topics as diverse as algorithms, artificial intelligence, programming languages and networks, and you'll develop sought-after skills in logical thinking, problem-solving and analysis.

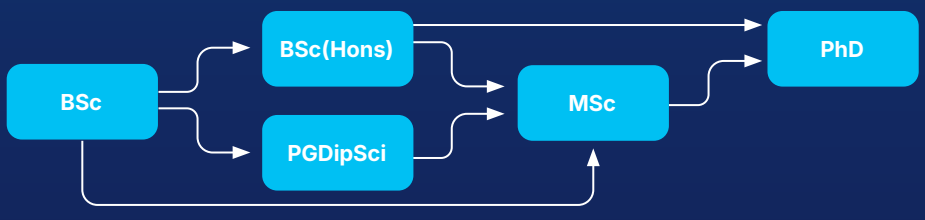
You don't need to have taken any particular subject at high school to study Computer Science with us, but digital technologies, mathematics and physics provide helpful background knowledge.

Choosing a subject

With so many options it's sometimes hard to choose what you want to study, but we've got you covered. You can study a double major with our Bachelor of Science to gain a broader base of skills and knowledge.

Complementary majors include:

- Management
- Logic and Computation
- Mathematics
- Physics
- Psychology
- Statistics



Waipapa Taumata Rau
University of Auckland

Career opportunities

Be everywhere in today's world

Computing technology has become an ever-growing part of human life, affecting many aspects of our day.

Computers are indispensable in fields such as education, medicine, commerce and engineering – as well as leisure. We can't imagine what we would do without them, and the innovations just keep on coming.

As the demand for new technology continues to grow and change, Computer Science is always at the forefront of developments and industry is keen to employ our graduates.

By studying Computer Science, you may have an impact on how our society advances by developing and maintaining software and systems.

You can look forward to working in many exciting areas, in an ever-widening variety of roles.

Our Computer Science graduates have been employed in the following jobs:

- Software engineer, Electronic Arts
- Application engineer, Datacom Systems Ltd
- Developer (Dynamics AX), UXC Eclipse
- Agile architect, Vocus Group NZ
- Technical consultant, Davanti Consulting
- Product development engineer, Fisher & Paykel Healthcare
- Linux system administrator, Solarix Networks Ltd
- Security analyst, SKYCITY Entertainment Group
- Software engineer, Microsoft

What you will study

- Software fundamentals
- Database systems
- Artificial intelligence
- Human-computer interaction
- Computer graphics
- Cybersecurity and cryptography
- Advanced design and analysis of algorithms
- Global data communications
- Data mining and machine learning
- Web, mobile and enterprise computing

Find out more about how your degree will be structured and what courses you need to take at

auckland.ac.nz/science/ug-comp-sci

Applications close on 8 December.

"I've found that research is like exploring the deep ocean, and I have always enjoyed sailing in the dark blue. The feeling of uncovering the truth makes all the hard work worth it. My favourite part of PhD life is that I have the freedom to spend three years on a research topic that interests me. I'm very lucky to be driven by my interests while young, and my efforts have led to a series of scholarly works that I am proud of. "

Yang Chen
PhD in Computer Science

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Faculty of Science

Mātai Pūtaiao Raraunga Undergraduate Data Science

Data scientists drive innovation and improve success in many areas: start-ups and established businesses, Government, science, media, broadcast and cultural events.

What is data science?

Data science applies techniques from computer science, statistics, and mathematics to drive insights in a particular domain, such as entertainment or finance. For that purpose, data scientists gather data from various sources, prepare the data for analysis, apply analytical techniques such as machine learning, statistical modeling or data warehousing, and visualise the results to an audience.

Birthplace of R

The Department of Statistics is the birthplace of the R Project. Founded in 1996 by Associate Professors Robert Gentleman and Ross Ihaka. R is a programming language and environment for statistical computing and graphics. It is taught around the world and is used by Ivy League universities, Google, Uber, and many more organisations.

What you will learn

Both Computer Science and Statistics make significant contributions to the Data Science specialisation.

Studying Data Science at the University of Auckland exposes you to the latest research and thinking in areas such as data wrangling, managing databases, machine learning, and predictive modeling.

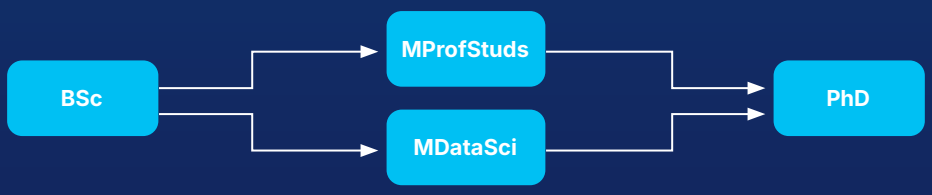
Data Science students develop an enthusiasm for ideas, discovery and learning, and intellectual curiosity – do you have what it takes to turn data into information, knowledge and innovative products?

How you will learn

You will learn principles that will allow you to quickly adapt to many technology changes in your future career. You will learn data science hands-on, not only to understand state-of-the-art, but also apply it.

Dedicated students run our Data Science Club hosting many talks from data science leaders and running networking events. Our vibrant industry advisory group connects students with our local industry through guest lectures, projects, events, and internships.

We also offer a Master of Data Science that will allow you to take your studies further and advance your career.



Entry to the MProfStuds requires either a 4-year bachelors, an honours degree, or a bachelors degree plus a one-year professional qualification or three years' of relevant work experience.

Waipapa Taumata Rau
University of Auckland

Career opportunities

Data Science is an area of study which gives individuals the ability to manage and analyse big data, and drive innovation in organisations across all industries.

The last decade has seen an explosion in the amount of data available. It has evolved into one of the most important assets for many employers. The ability to turn data into actionable insights and innovative products often separates success from failure.

Currently, there is an unmet demand for graduates in the field of data science. As a data scientist, you will have the skill set to drive innovation and affect the success of a diverse range of businesses and organisations.

There is a range of career opportunities available to you as you become a responsible citizen in a data-rich world.

Jobs for our Data Science graduates include:

- Data Scientist
- Data Analyst
- Data Engineer
- Decision Scientist
- Insights Analyst
- Risk Analyst
- Solutions Architect
- Business Intelligence Analyst
- Database Administrator
- Data Governance Engineer
- Data Strategy Analyst
- Data Architect
- Database Administrator
- Developer
- Information Officer
- Insight Manager
- Statistician

What you can study

- Data analysis and data technologies
- Database systems
- Programming and algorithmics
- Artificial intelligence
- Statistical modelling and computing

Find out more about how your degree will be structured and what courses you need to take at

auckland.ac.nz/science/ug-data-sci

Applications close on 8 December.

"I really loved the blend of Statistics and Computer Science that Data Science offered; the programme gives you a solid skill set in both areas. This is extremely useful as it opens up so many career paths and gives you a lot to choose from depending on which skills you enjoy more."

Jasmine Chhor
BSc in Data Science

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Faculty of Science

Mātai Pūtaiao Kōrero Matawhenua Undergraduate Geographic Information Science

If you've ever dropped a pin into Google Maps, or found the shortest route using the public transport network, then you've engaged with Geographic Information Science (GIScience). GIScience is the study of the data structures and techniques used to capture, process and visualise geographic information.

What you will learn

As a GIS student you'll be taught how to use data collected by satellites and drones, government-sourced data, and social media platforms to examine a wide range of social and natural processes. You'll use modelling techniques to analyse data-intensive contexts, and you'll try to answer questions like:

- What is the relationship between urban inequality and disease?
- What are the effects of sea level rise on coastal areas? How do resources flow across a busy transportation system?
- What are the risks of exposure to air pollution?
- How to map crime hotspots?
- What are the flood and landslide risks in different areas of New Zealand?
- What would be the best location to build a new wind farm or a hospital in the country?
- What does human movement tell us about disease transmission?
- What can we do to understand social dynamics and can we predict and map the effects of climate change?

This undergraduate major will provide you with the knowledge and skills to design and conduct appropriate analyses, and experience of working with cutting-edge tools and datasets. GIScience will also help you tackle the hardest challenges facing society.

You don't need a background in geography or computing at high school to study Geographic Information Science with us. The major embraces the latest GIS technologies and ways of thinking to enable you to apply your knowledge from a range of subjects.

First and second year courses do not have prerequisites but the third year courses build upon the knowledge gained in year one and two. The programme can be entered at the second year level without prerequisite knowledge.

Choosing a subject

With so many options it's sometimes hard to choose what you want to study, but we've got you covered. You can study a double major with our Bachelor of Science to gain a broader base of skills and knowledge.

Complementary majors include:

- Computer Science
- Earth Science
- Environment Science
- Geography
- Marine Science
- Statistics

Waipapa Taumata Rau
University of Auckland

Career opportunities

A career for a rapidly changing world

It is estimated that 80% of data collected has some spatial component, whether it's a city name, a street address or even a precise set of coordinates.

Professionals in a wide range of fields use GIS tools to turn geographic data into maps, tables and other kinds of information needed to make informed decisions.

In a rapidly changing world, detailed, up-to-date geographic data are indispensable for governance, for commerce, and for research intended to improve our understanding of social and environmental systems.

As a GIScience graduate you'll possess sound theoretical knowledge and be able to demonstrate independent technical proficiency across the social, ecological and physical domains of GIScience application.

You could be employed by a large corporation or a local, regional or the national government. You could also work as a consultant with plenty of opportunities for travel.

Jobs related to Geographic Information Science include:

- Cartographer
- Climate scientist
- Conservationist
- Data scientist
- Geographer
- Geospatial database developer
- GIS Analyst
- GIS technician
- GIS software developer
- Mapping and surveying technician
- Spatial data scientist

What you can study

- Spatial thinking
- Geography of the human environment
- Earth surface processes and landforms
- Programming techniques
- Remote sensing

Find out more about how your degree will be structured and what courses you need to take at

auckland.ac.nz/science/ug-geo-info

Applications close on 8 December.

"I've been able to understand and investigate the world's complex natural and social processes, the problems we face into the future, and most importantly, how we can be the solution. Even if you have many passions, you'll be able to gain new insights and ways of showcasing them through learning and understanding GIS, as there are so many opportunities to use creativity and merge your own ideas and interests into practical assignments."

Taryn Smith
BSc in Geographic Information Science and Environmental Science.

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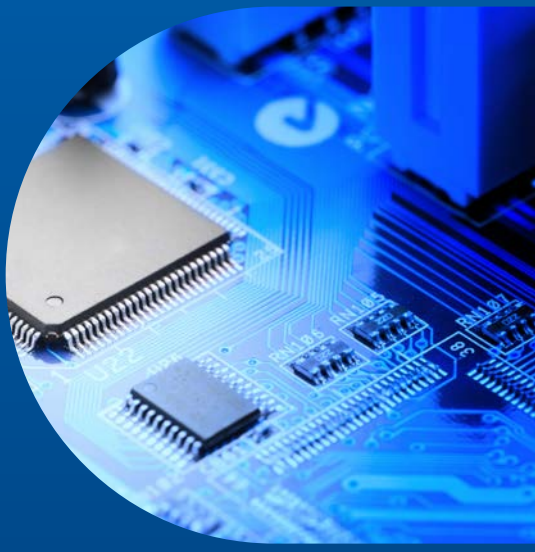
Faculty of Science

Mātai Whakahaere Mōhiohio me Hangarau
Undergraduate Information and Technology Management



If you're keen to combine computing skills with current business practice, then Information and Technology Management is the ideal major for you. You'll study how technology and information management are applied in the commercial sector, focusing on the analysis and design of systems for businesses.

What is Information and Technology Management?

Information and Technology Management is a subject jointly taught by the Faculty of Science and the Business School.

It revolves around applications of technology and information management in the commercial sector, focusing on the analysis and design of information systems for business. You'll learn how information and communications technology can be used to achieve strategic business goals, and how you can use cutting-edge products to solve important organisational problems.

What you will learn

As an Information and Technology Management student you'll take courses that allow you to understand information management from a systems, data handling, and process perspective.

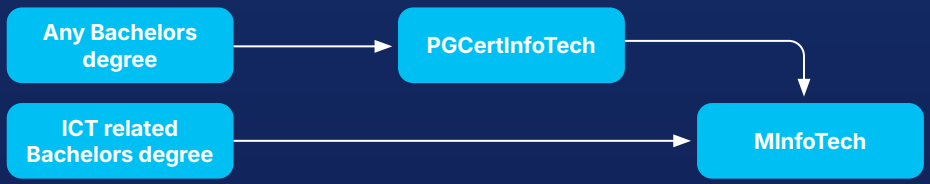
You don't have to have studied any sort of computing at high school to be able to study Information and Technology Management with us, but digital technologies, physics, mathematics and/or statistics provide helpful background knowledge.

Choosing a subject

With so many options it's sometimes hard to choose what you want to study, but we've got you covered. You can study a double major with our Bachelor of Science to gain a broader base of skills and knowledge.

Complementary majors include:

- Computer Science
- Logic and Computation
- Mathematics
- Physics
- Psychology
- Statistics



Waipapa Taumata Rau University of Auckland

Career opportunities

An ever-widening variety of roles

Information and Technology Management is a prime force driving the software and systems of the modern online realm – and one of the fastest-growing fields in the world.

With a major in Information and Technology Management, an exciting range of career opportunities are open to you in an array of industries.

As a graduate you could be involved with how information and communications technology can be used to achieve strategic goals.

You will be equipped to develop creative and innovative solutions, using cutting-edge products to resolve important problems in government, businesses and non-profit organisations.

Our Information and Technology Management graduates have been employed in the following jobs:

- Customer support and training representative, Cin7
- IT advisor, KPMG New Zealand
- Technical consultant, Olympic Software NZ Ltd
- Enterprise risk services consultant, Deloitte Limited
- CRM developer, New Zealand Tertiary College

Other positions and roles include:

- Application developer
- Infrastructure architect
- Database administrator
- Research Assistant, Counties Manukau DHB

What you can study

- Analysis of business systems
- Business intelligence
- Data communications
- Database systems
- Information security
- Information systems design

Find out more about how your degree will be structured and what courses you need to take at

auckland.ac.nz/science/ug-info-techmanagement

Applications close on 8 December.

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Faculty of Science

Mātai Arorau, Mahi rorohiko
Undergraduate Logic and Computation

Do you have a flexible mind capable of creative, speculative thought, precise calculation and practical problem-solving? If you're interested in mathematical logic and its connections to computer science, linguistics or philosophy, a major in Logic and Computation could be the ideal choice for you.

What you will learn

This major is relevant both to theoretical philosophy and the foundations of computer science. It can also be useful for technological applications in artificial intelligence. You'll have the chance to gain sound practical knowledge of programming and logical analysis, and to develop the conceptual, analytical and communication skills needed for a deeper theoretical understanding of the discipline. You'll also study the philosophical and linguistic issues at the root of the science of computation. Logic and Computation is available as a major in the Bachelor of Arts (BA) as well.

There's no need for having studied any sort of computing at high school to be able to major in Logic and Computation. Digital technologies, physics, mathematics and/ or statistics provide helpful background knowledge, but are not essential.

Recommendations

There are no particular prerequisites at the undergraduate level, but familiarity with mathematical thinking will help a lot.

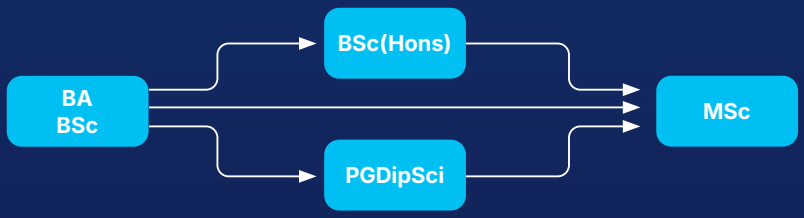
For Logic and Computation we recommend the capstone course LOGICOMP 399.

Choosing a subject

With so many options it's sometimes hard to choose what you want to study, but we've got you covered. You can study a double major with our Bachelor of Science to gain a broader base of skills and knowledge.

Complementary majors include:

- Computer Science
- Information and Technology Management
- Mathematics
- Physics
- Psychology
- Statistics



Waipapa Taumata Rau
University of Auckland

Career opportunities

A rare combination of skills

Can you imagine life without your smartphone, your computer, or your gaming console? Computing technology is everywhere in everyday life. Every industry is becoming more and more dependent on computing technology and the market for experts in that field continues to expand and diversify.

Logic and Computation provides the link between theoretical thinking and real-world problems. As a graduate you'll acquire computing and programming knowledge, analytical and critical thinking, communication and problem-solving skills that you can apply to investigating complex problems.

With this mixture of practical and theoretical expertise from both the arts and the sciences, you'll leave prepared for a wide range of careers. This is a rare and versatile combination of abilities that are highly valued and sought after in the business world.

Jobs related to Logic and Computation include:

- Business, systems or security analyst
- Cloud systems or software engineer
- Computer consultant
- Data, e-commerce solutions, software, information architect
- Database developer or administrator
- Digital designer
- Front end, game, systems or web developer

What you can study

- Algorithms
- Artificial intelligence
- Critical thinking
- Grammar and syntax
- Logic and rationality
- Pragmatics

Find out more about how your degree will be structured and what courses you need to take at

auckland.ac.nz/science/ug-logic-comp

Applications close on 8 December.

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Faculty of Science

Mātauranga Pāngarau Undergraduate Mathematics

Mathematics has many faces. It can be challenging, powerful, fascinating, even mysterious – but above all it is useful. Wherever problems need to be solved, mathematics has a role to play.

About the department

The Department of Mathematics has an excellent reputation. Our staff include world leaders in many areas of theoretical and applied mathematics. We are known for high-quality teaching and we have a strong focus on student wellbeing and achievement.

Our degrees and diplomas enjoy widespread recognition from employers in New Zealand and throughout the world. Staff in the department serve their communities by being involved in a wide range of projects and organisations.

Whatever your background or interests in Mathematics may be, we welcome you to our department. If you need assistance with course advice, please contact us and our friendly staff will help you. We look forward to meeting you.

What you will learn

Mathematics makes essential contributions to the biological, information and physical sciences, economics, engineering and finance, but can also be applied to communications, linguistics and genetics. As a Mathematics student you'll study aspects of both pure and applied mathematics, and you'll be exposed to critical and meta-mathematical thinking: skills that are highly valued by employers.

Prerequisites

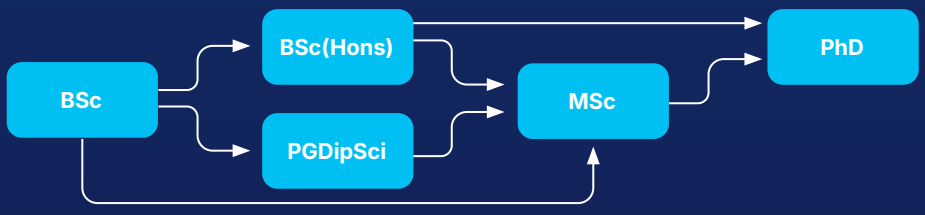
The Department of Mathematics would be glad to have you in our courses, no matter what you've studied in high school. However, if you're keen to jump straight in to some of our more advanced first-year courses, we recommend you take some calculus before starting your university studies. In particular, we recommend Year 13 differentiation and integration.

Choosing a subject

With so many options it's sometimes hard to choose what you want to study, but we've got you covered. You can study a double major with our Bachelor of Science to gain a broader base of skills and knowledge.

Complementary majors include:

- Computer Science
- Information and Technology Management
- Logic and Computation
- Physics
- Statistics



Waipapa Taumata Rau University of Auckland

Career opportunities

A versatile degree for many roles

Mathematics is part of almost every sphere of knowledge and activity in the modern world because it is the language through which nature, technology and reality are described.

Studying Mathematics provides you with the skills and frameworks needed to tackle complex problems in an ever-changing world. Your analytical abilities, comprehension of abstract concepts, and creative thinking skills will improve. These skills are highly valued in business, financial, and technical roles, and in positions of leadership and management.

Mathematics is also an ideal supporting subject for many other disciplines. Your future prospects and employability in other fields are enhanced by significant mathematical content in your degree.

Graduating with a Mathematics degree opens up career opportunities for you in industry or Government, teaching, computer development and programming, systems analysis, operations research and many other fields.

Our Mathematics graduates have been employed in the following jobs:

- Mathematical Software Group, National Institute of Science and Technology (USA)
- Consultant, Ernst and Young
- Account executive, Willis Towers Watson
- General Manager, Data and Analytics, Fonterra
- Analyst, New Zealand Treasury
- Finance officer, Te Kura
- Lecturer/Professor
- Actuarial analyst, Suncorp NZ
- Training coordinator, Air New Zealand
- Mathematician, Jane Street
- Data analyst, IPSOS NZ
- Director of Business Intelligence, NZ Trade and Enterprise

What you can study

Topics include:

- Combinatorics and Algebra
- Geometry and Topology
- Differential Equations
- Real and Complex Analysis
- Mathematics Education
- Mathematical Modelling

What skills can I gain?

- An in-depth understanding of fundamental mathematical concepts
- Analytical, computational and modelling skills
- Programming skills
- Problem-solving and critical-thinking skills

Find out more about how your degree will be structured and what courses you need to take at

auckland.ac.nz/science/ug-mathematics

Applications close on 8 December.

"Having that relationship with the tutors made me fearless when it came to learning – it helped me take more control of my study. I succeeded because I realised that fear is the only thing that stops you from growing."

Halaevalu Tu'ipulotu
BSc double major in Mathematics and Statistics

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Faculty of Science

Mātai Tatauranga Undergraduate Statistics

Are you interested in looking critically at numerical information without being misled? Do you want to be able to make sense of data, and use it to solve problems? Statistics is the human side of the computer revolution, and you could be part of it.

A navigator in the information age

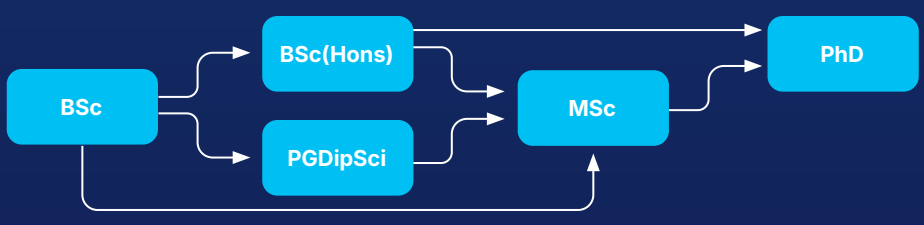
We live in an increasingly data-rich and digital world. Computers allow us to collect and store information in quantities previously impossible. Understanding statistics helps you understand our world, as it is statistics that allows us to extract meaning from seemingly incomprehensible data.

Statistics is also a fast-growing field of its own. Researchers in our department, and our graduates, tackle new questions in ecology, education, medicine, astrophysics, wine growing, and other fields, developing novel statistical methods, mathematical tools, and computational systems.

What you will learn

As a Statistics student you'll study how to ask the right questions, how to collect and analyse data, and how to present information in meaningful ways. You'll be able to choose whether you keep your major general, or whether you study one of two dedicated pathways: Applied Statistics, or Statistics and Probability.

You don't need high school statistics or mathematics to study Statistics with us – we welcome all students! However, high school statistics and/or mathematics provide helpful background knowledge. If you're interested in studying our probability courses you'll find it useful to have studied some differentiation at high school.



Prerequisites

If you are planning to take the Applied Statistics pathway or just a small number of applied statistics courses, then having some basic numeracy skills is all that is required.

If you want to gain some confidence in basic numeracy you can always start by taking STATS 100 or MATHS 102 before going on to further courses. No previous formal study in statistics is required.

Choosing a subject

With so many options it's sometimes hard to choose what you want to study, but we've got you covered. You can study a double major with our Bachelor of Science to gain a broader base of skills and knowledge.

Statistics complements all other Bachelor of Science majors, but it matches particularly well with:

- Computer Science
- Information and Technology Management
- Logic and Computation
- Mathematics
- Physics
- Psychology

Waipapa Taumata Rau University of Auckland

Career opportunities

A navigator in the information age

In one week a practicing statistician can help to investigate a case of disputed authorship, design an experiment to evaluate the effects of a new treatment for a disease, analyse a set of data gathered by an ecologist, and help a freight carrier to study work processes to find ways to make the company more profitable.

Statistics applies to almost any field; this is why some training in statistics can help make you more effective and more employable, regardless of the career direction you choose. Whatever field of statistics you specialise in, a Statistics degree will be an important step in opening up new and exciting career opportunities for you.

Our Statistics graduates have been employed in the following jobs:

- Network planning analyst, Air New Zealand
- Analyst, Goldman Sachs
- Data & Analytics Consultant, Servian
- Machine Learning Researcher, ESR
- Data Scientist, Harmonic Analytics Ltd
- Data Analyst/Consultant, Orion Health
- Data Scientist, Rokt: Ecommerce Technology Solutions
- Modelling Analyst, The Treasury - New Zealand
- Population Affairs Officer, United Nations, New York.
- Data scientist, ESR
- Digital Engineer, Tonkin + Taylor
- Research Assistant, Counties Manukau DHB

What you will study

BSc

You can choose to keep your Statistics major general, or you can choose one of these pathways:

- **Applied Statistics:** Choose this pathway if you're mainly interested in the practice of statistics.
- **Statistics and Probability:** Choose this pathway if you're interested in both the application of statistics and the theory underlying it.

Find out more about how your degree will be structured and what courses you need to take at

auckland.ac.nz/science/ug-statistics

Applications close on 8 December.

"I've been consistently impressed by the quality of teaching staff and support facilities, particularly within the statistics department. Their dedication to fostering a supportive learning environment has been pivotal in my academic journey, making the experience informative and enjoyable."

Antariksh Nag
Bachelor of Science and Bachelor of Commerce conjoint majoring in Statistics, Economics and Finance.

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