



University
of Otago

ŌTĀKOU WHAKAIHU WAKA



Sciences at Otago
Te Mātai Pūtaiao ki Ōtākou

Our people. Our place.

Our passionate students make a positive impact on our community and our physical surroundings. They learn from experts in unique environments – Otago Harbour, Fiordland, Stewart Island, Antarctica and the Pacific – and leave here with highly sought-after skills and experiences.

Study Sciences at Otago, a place where world-renowned researchers and unique natural resources combine to create a learning environment like no other.

Your future in Science starts here.



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Why Sciences at Otago?

He aha e whai ai te Pūtaiao ki Ōtākou?

Quality teaching and research

- Otago is New Zealand's most science-intensive university.
- Science lecturers are regular recipients of national teaching awards.
- #1 in New Zealand and #12 worldwide for sports-related subjects (2023 QS World Rankings).
- Ranked among the best universities in the world in the field of computer science and information systems, and number one for research in New Zealand (PBRF Quality Evaluation, latest evaluation 2018).
- Ample opportunities for volunteering and professional development, even during undergraduate training.
- From the Antarctic to the Arctic, the University of Otago is at the forefront of influential investigations that will help inform decision-making across the world. We recognise the urgency, and we are working to understand the processes and manage the effects of climate change.
- The Division of Sciences is proud to host significant research, including:

Coastal People: Southern Skies

The vision of this collaboration is flourishing wellness (mauri ora) of coastal communities. The mission is to connect, understand and restore coastal ecosystems of New Zealand and the Pacific through transformative research and local action, and by unlocking potential through new opportunities and pathways to learning. It aims to build a generation of researchers of international standing who can apply

cross-cultural and multidisciplinary methodology to support coastal economies. It will also provide a diverse cohort of future-focused, career-ready graduates for the maritime sector in Aotearoa and the Pacific.

Te Whai Ao

Dodd-Walls Centre for Photonic and Quantum Technologies

Aiming to produce the next generation of light sources for scientific and industrial applications, and harness the quantum world of atomic physics for the new wave of quantum technology.

The Dunedin Study

This study has followed the lives of 1,037 people born in Dunedin between 1 April 1972 and 31 March 1973. It is now in its sixth decade and has produced more than 1,300 publications and reports, many of which have influenced or helped inform policy makers in New Zealand and overseas.

Food Waste Innovation

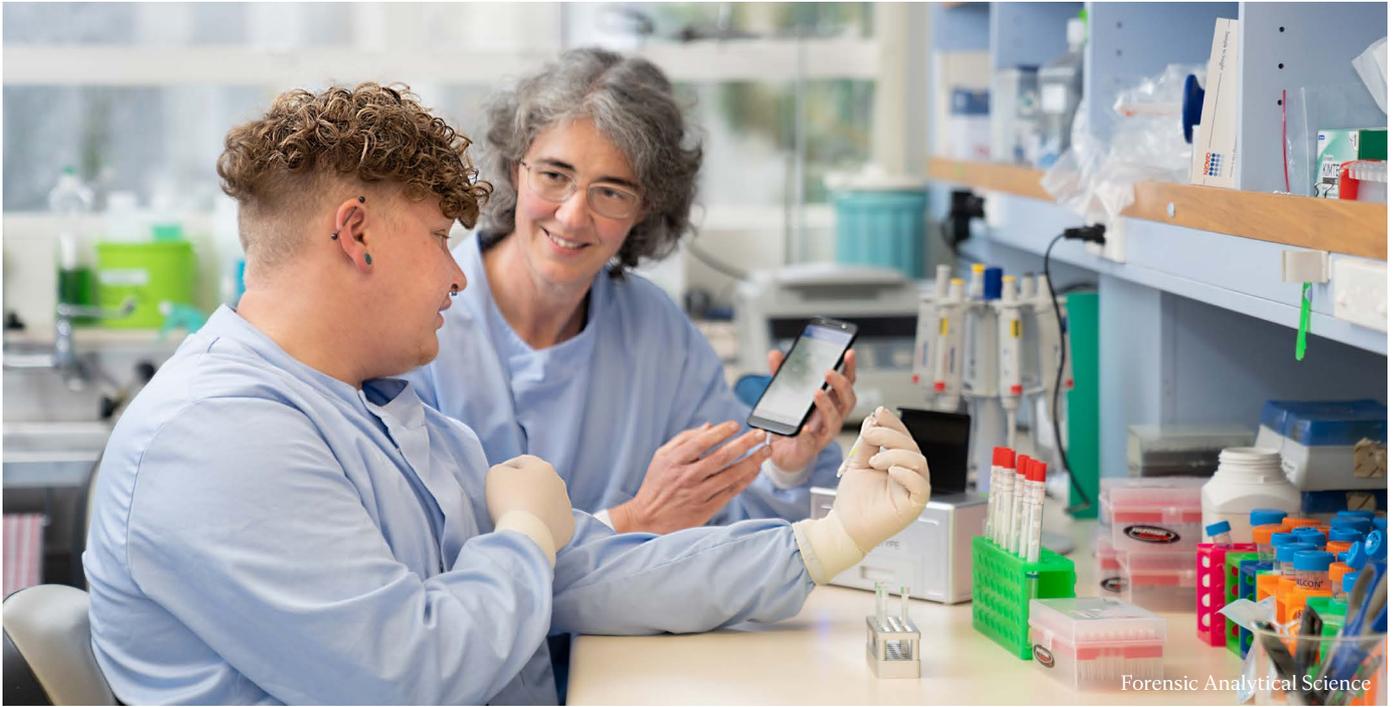
Reducing the volume and impact of food waste by harnessing the best scientific expertise to provide effective solutions to Aotearoa's food waste problems. Our research is already providing a credible evidence base for decision-makers in New Zealand.

Graduate employability

- 95% of Otago graduates go directly into work or further study.
- A Sciences degree from Otago is a world-class qualification that opens doors to a diverse range of careers.

Unique opportunities

- The only energy-focused undergraduate degree in New Zealand.
- National School of Surveying – the only tertiary professional surveying programme in New Zealand.
- Otago is the only university in New Zealand, and one of a few left in the world, with a true Zoology Department.
- Dunedin is the wildlife capital of New Zealand. The location makes for outstanding field work opportunities in this "natural laboratory".
- Our stunning, natural and unique learning environments include Otago Harbour, Fiordland, Stewart Island, Antarctica and the Pacific.
- The only university in New Zealand specialising in the science of plants. Modern Botany includes research into the biochemistry, ecology, genetics and physiology of plants, plant evolution, the role plants play in ecosystems and plant biotechnology.
- Marine Science students have access to world-class marine laboratories, fully equipped research vessels and field stations in Fiordland and Stewart Island.
- Ranked #1 in New Zealand for Earth and Environment Sciences research by the prestigious *Nature* magazine (2024, Nature Index).



Forensic Analytical Science



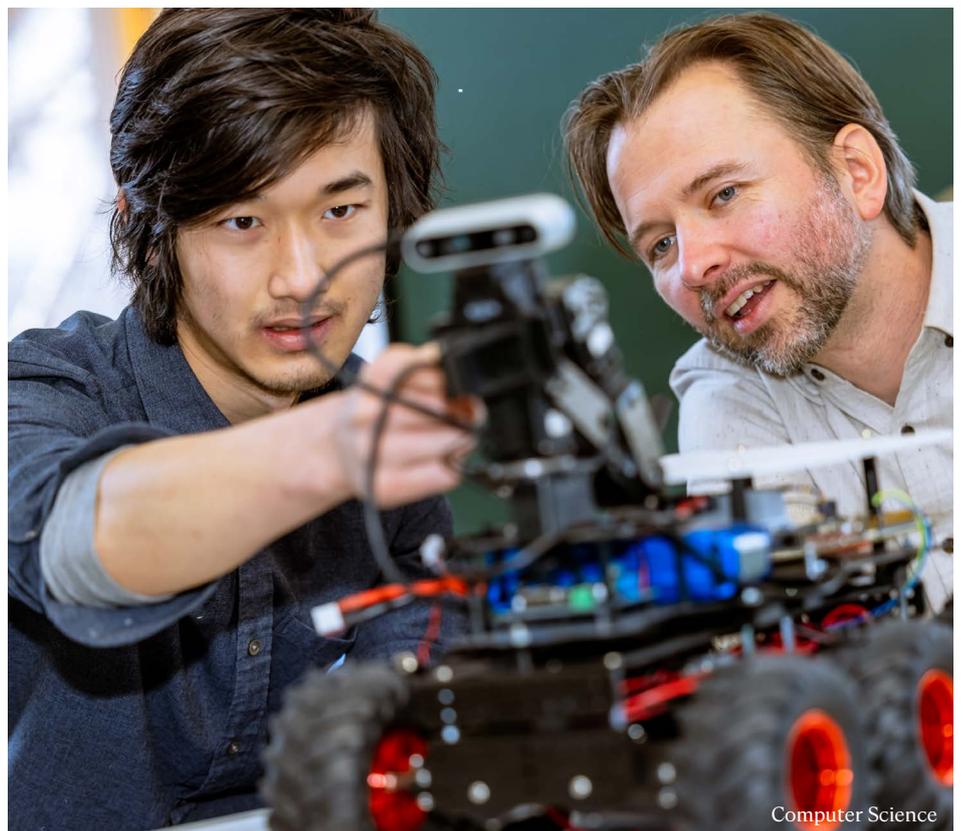
Marine Science



Food Science



Genetics



Computer Science



Botany



Surveying



Sport and Exercise Science



Chemistry

Sciences degrees and majors

Ko ngā tohu me ngā kaupapa matua

Bachelor of Science (BSc)

Agricultural Innovation
Anatomy
Aquaculture and Fisheries
Biochemistry
Botany
Chemistry
Computational Modelling*
Computer Science
Data Science
Ecology
Economics
Energy Management
Energy Science and Technology
Environment and Society*
Environmental Management
Environmental Toxicology*
Exercise and Sport Science
Food Science
Forensic Analytical Science
Genetics
Geographical Information Systems
Geography
Geology
Human Nutrition
Information Science
Land Planning and Development
Marine Science
Mathematical Statistics*
Mathematics
Microbiology
Neuroscience
Nutrition Communication*
Pathology*
Physical Activity and Health*

Pharmacology and Toxicology
Physical Education, Activity and Health
Physics
Physiology
Plant Biotechnology
Psychology
Software Engineering
Sport and Exercise Nutrition
Sport Development and Management
Sports Technology*
Statistics
Supplementary Nutritional Science*
Surveying Measurement
Zoology

(* indicates minor subject)

otago.ac.nz/sciences

Bachelor of Arts and Science (BASc)

This degree allows you to choose two major subjects – one from the Bachelor of Arts and a different one from the Bachelor of Science.

otago.ac.nz/combine

Bachelor of Commerce and Science (BComSc)

This degree allows you to choose two major subjects – one from the Bachelor of Commerce and a different one from the Bachelor of Science.

otago.ac.nz/combine

Bachelor of Surveying (BSurv)

Surveying

otago.ac.nz/surveying

Which degree is right for you?

Ko tēhea te tohu e tika ana ki a koe?

Bachelor of Science (BSc)

Science and innovation impact on all our lives. Otago offers a comprehensive range of subjects in undergraduate and postgraduate degrees leading into a host of interesting career opportunities.

Studying Science at Otago gives you the opportunity to participate and learn in an environment where cutting-edge research projects are underway all the time. It's an environment that has earned us our international reputation.

Undertaking a Science degree at Otago will give you a solid base on which to build your career and a chance to enjoy our renowned campus learning experience.

We have world-leading researchers and teachers, as well as unique field sites for environmental sciences. Our research and teaching facilities are state-of-the-art, but you can't beat having the ocean as your lab, or classes taught under the trees of one of the world's most beautiful campuses.

The Bachelor of Science (BSc) is a three-year undergraduate degree that enables you to develop your interests in a science major and related subjects. Students have the flexibility to combine their major subject with other science subjects, as well as subjects from other disciplines across the University.

otago.ac.nz/sciences

Bachelor of Surveying (BSurv)

Surveying is a varied and exciting career that has a great indoor/outdoor balance; it requires design, measurement and interpersonal skills, and the ability to sift through evidence. It is a profession that is in constant demand both in New Zealand and abroad.

The National School of Surveying at the University of Otago provides the only degrees that are recognised as the prerequisite academic education for recognition as a professional land surveyor in New Zealand.

The four-year Bachelor of Surveying meets this requirement, and the Bachelor of Science degrees in Geographic Information Systems (GIS), Surveying Measurement (SURM) and Land Planning and Development (LPDP) can satisfy this requirement when supplemented with one further year of study (usually a Diploma for Graduates).

Intending surveying students must enrol in their first year for the Surveying First Year (BSc) course. You are then required to apply for admission to second-year classes in Surveying. Numbers allowed to advance to second year does not normally exceed 70 each year.

otago.ac.nz/surveying

Bachelor of Arts and Science (BASc)

Science is rapidly changing the way we live and work. But these developments also require us to think carefully about their implications.

The BASc is a four-year degree that recognises that tackling big world issues of health, security, food production and climate change – to name just a few – requires multi-faceted solutions. These solutions may include new technology and scientific breakthroughs, but will also require an understanding of their impact on people and society.

There are no straightforward answers to questions around issues such as these. That's why our best graduates need to have an understanding of science and technology along with an understanding of the opportunities and costs that scientific developments can bring.

The BASc will enable graduates to present themselves to employers, and the world at large, as people who have real expertise in both the sciences and the humanities.

Graduates' scientific capabilities will go hand-in-hand with knowledge of human history, how people think and how societies function.

You'll choose two different majors, one from Arts and one from Sciences. Each major usually consists of between nine and 11 papers.

otago.ac.nz/combine

Bachelor of Commerce and Science (BComSc)

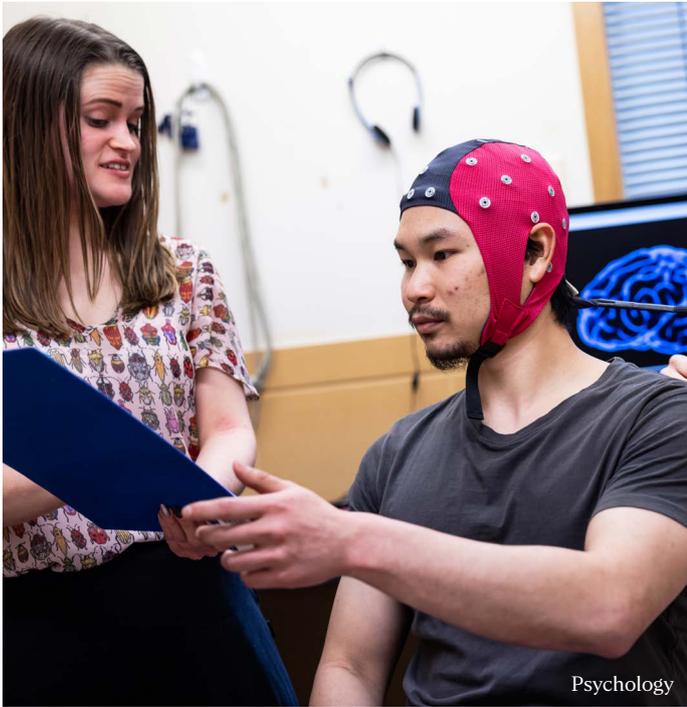
The BComSc is a specialised four-year degree for students facing a rapidly changing world. It is designed for students whose interests span science and commerce. Increasingly, graduates require a broad set of knowledge and skills, and multidisciplinary degrees like the BComSc provide both breadth and depth within a single qualification.

This means you will have a very personalised degree that will make you stand out. Employers are looking for graduates with technical expertise, transferable skills and the ability to solve problems. The BComSc degree will give you these skills.

The BComSc gives graduates professional and scientific experience. Graduates will develop proficiency across subjects and the ability to apply thinking to both the experimental and industry application of a subject, setting them up for success in areas such as nature, nutrition, animal studies and maths.

You'll choose two different majors, one from Business subjects and one from Sciences subjects. Each major usually consists of a minimum of nine papers.

otago.ac.nz/combine



Psychology



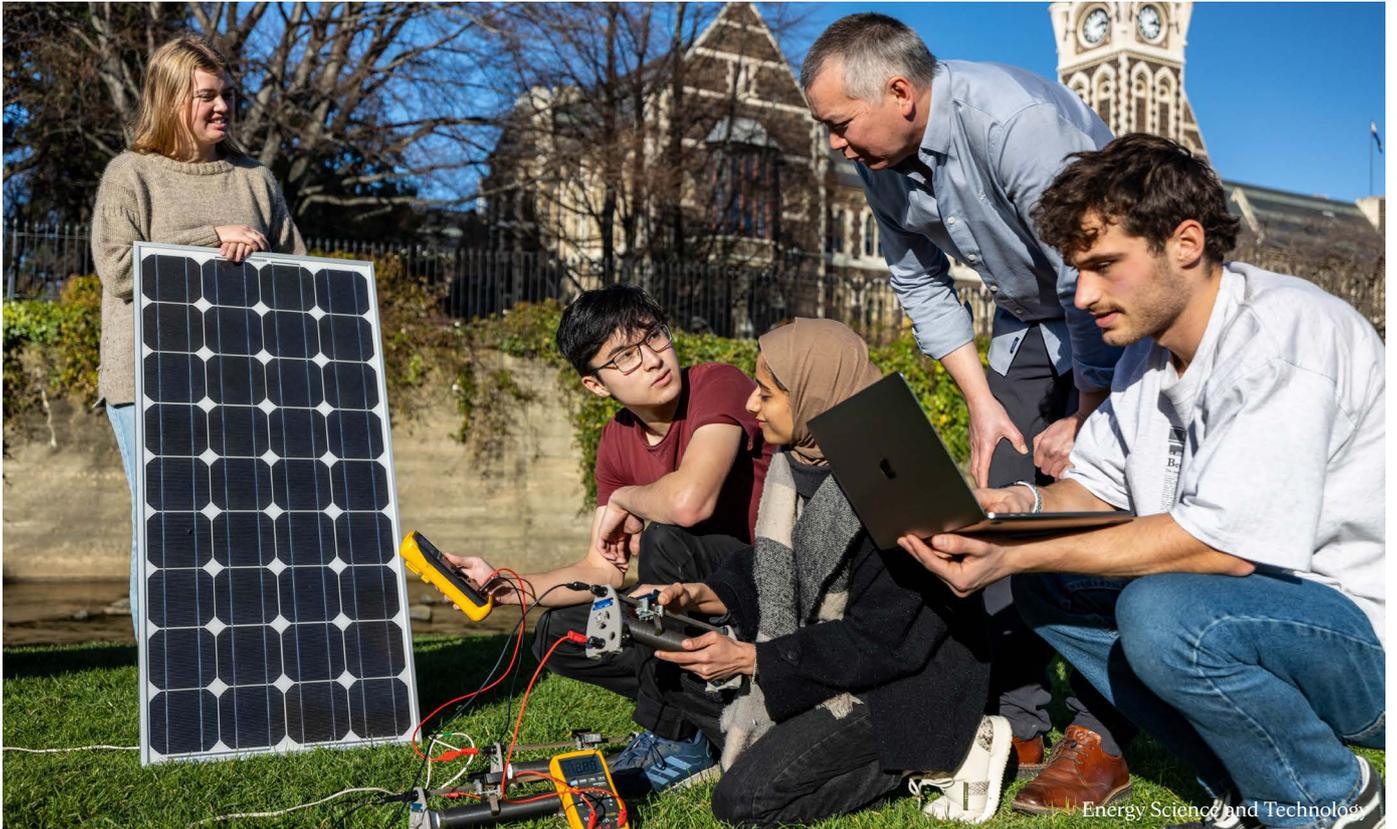
Botany



Geology



Zoology



Energy Science and Technology

Science graduate careers

Ararau mahi pūmau

You may have a broad idea of the kind of career you want – or you may have no idea at all! These lists are not meant to be exhaustive, but will give you some idea of possible careers. In many cases, a single major subject can lead to all sorts of different career pathways. Have a talk to your careers adviser at school or contact the University of Otago Career Development Centre to get a clearer direction on career options.

Human Performance and Health

- Biological laboratory technician or researcher
- Clinical and health psychology
- Clinical exercise physiologist
- Consumer and sensory food research
- Human performance consultation
- Human resources and policy development
- Māori physical education and health
- Medical and health research
- Nutrition and health promotion
- Physical activity i.e. Green Prescription
- Policy and research analyst
- Social and community work
- Sport science
- Sport and leisure industry
- Wellness consultancy

Environment and Ecological

- Biosecurity
- Conservation
- Crown Research institutes
- Eco-tourism
- Epidemiology and biostatistics
- Environmental policy development
- Land planning and urban design
- Māori organisations
- Oceanography
- Physical activity in built environments
- Product design
- Regional and local authorities
- Resource exploration and management
- Surveying
- Wildlife management

Fundamental and Applied Sciences

- Artificial intelligence
- Biomechanics and sports analysis
- Biosecurity
- Computer graphics and animation
- Electronics
- Exercise science
- Financial modelling
- Hazard management
- Health and crop improvement
- Human resources/personnel
- Laboratory technician
- Manufacturing and industrial research
- Network engineering and design
- Product development
- Quality assurance
- Quantitative analyst
- Scientific journalism
- Scientific research

Study options

Whiringa ako

The lists below show the study options related to the curriculum areas you are familiar with at school. Follow the colour coding on the opposite page to see how study options and careers match up.

Biology and Health-related study options

- ● Agricultural Innovation
- Anatomy
- ● Aquaculture and Fisheries
- ● Biochemistry
- ● Botany
- ● Chemistry
- Ecology
- ● Environmental Management
- ● Exercise and Sport Science
- Food Science
- Forensic Analytical Science
- ● Genetics
- Human Nutrition
- Marine Science
- Microbiology
- ● Neuroscience
- Pharmacology
- ● Physical Education, Activity and Health
- Physiology
- Plant Biotechnology
- ● Psychology
- Sport and Exercise Nutrition
- Sport Development and Management
- Zoology

Chemistry-related study options

- ● Agricultural Innovation
- ● Aquaculture and Fisheries
- ● Biochemistry
- ● Chemistry
- Ecology
- ● Exercise and Sport Science
- Food Science
- Forensic Analytical Science
- Genetics
- ● Geography
- ● Geology
- Human Nutrition
- Marine Science
- Microbiology
- ● Neuroscience
- Pharmacology
- Plant Biotechnology
- Sport and Exercise Nutrition

Mathematics-related study options

- ● Agricultural Innovation
- ● Aquaculture and Fisheries
- Computational Modelling
- Computer Science
- Data Science
- Economics
- ● Energy Management
- ● Energy Science and Technology
- ● Exercise and Sport Science
- ● Geographic Information Systems

- ● Geography
- ● Geology
- Information Science
- ● Land Planning and Development
- ● Marine Science
- Mathematics
- Physics
- ● Psychology
- Software Engineering
- ● Statistics
- Surveying
- Surveying and Measurement

Physics-related study options

- Computational Modelling
- Computer Science
- Data Science
- ● Energy Management
- ● Energy Science and Technology
- ● Exercise and Sport Science
- ● Geographic Information Systems
- ● Geography
- ● Geology
- Information Science
- ● Land Planning and Development
- ● Marine Science
- Mathematics
- Physics
- Surveying
- Surveying Measurement

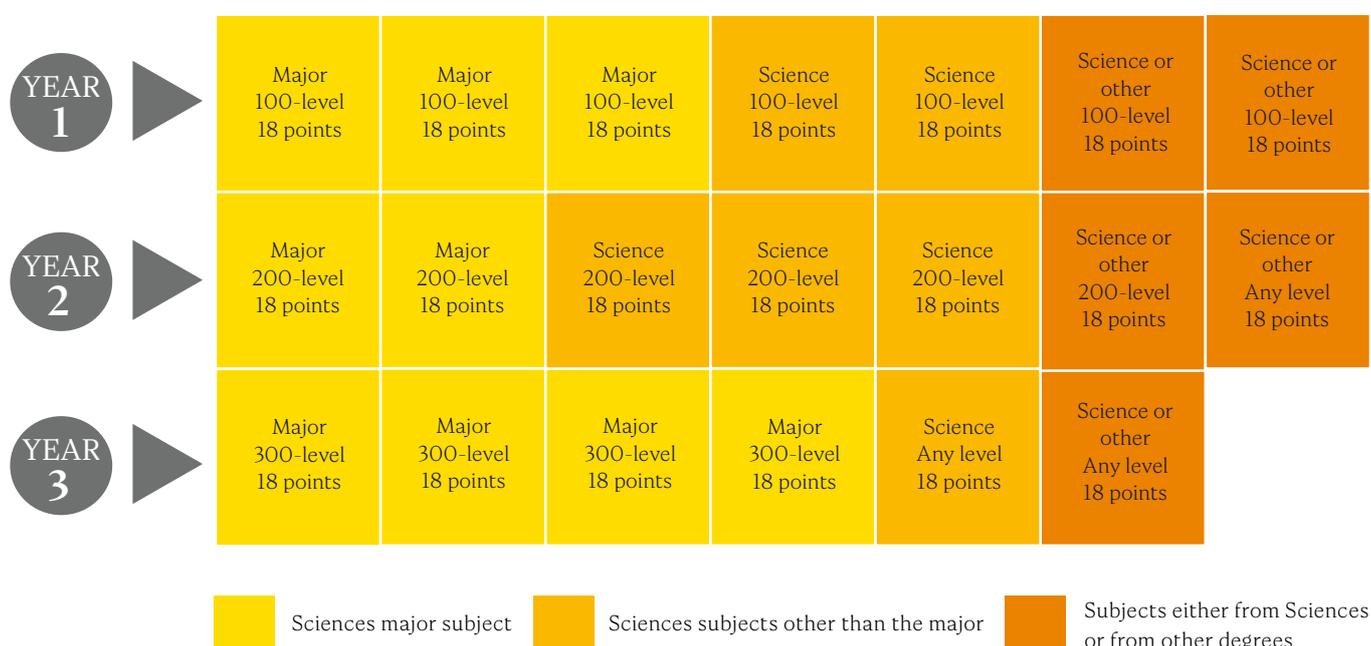
How does a bachelor's degree work?

He aha ngā whāinga o te tohu paetahi?

The BSc degree:

- Three years of full-time study (can be studied part-time).
- Made up of at least 360 points.
- Each paper is usually worth 18 points (credits), so 20 papers is the minimum total required for a degree.
- Each paper takes around 12 hours of study time each week.
- You usually study different papers in semester 1 and semester 2, and can also take papers at Summer School (January–February).
- Your degree must have at least one major subject, and can also include a minor subject.

Most general bachelors' degree programmes require you to select a major. Your major is the subject of your degree that will be the main focus of your study. That subject will have a number of papers required at each level. For example, a Bachelor of Science majoring in Marine Science would look like this:



This leaves room for a wide range of additional study. You may decide to build in a second major, or a minor (a minor is usually 90 points – 5 x 18-point papers) or fill up the spaces with a selection of unrelated interest and skills-based papers.

If you are completing a Bachelor of Science degree, a maximum of 90 points (5 x 18-point papers) can be non-Science.

It is always recommended that you talk to a course adviser.

Course advice

Otago's course advice experts can help you map out your study plans with confidence to help you achieve your goals.

If you are still at secondary school, a University of Otago Schools' Liaison Officer will visit your school at some point during the year – usually twice a year – to help you start planning your first year of study.

otago.ac.nz/liaison

Once you're on campus, course advisers are available on a drop-in basis and by appointment near the AskOtago Central Hub in the Central Library. Course advice is available as many times as you need throughout your time at Otago.

otago.ac.nz/courseadvice

What you need to do

Decide what subjects interest you

The *Undergraduate Prospectus*, *Guide to Enrolment* and our website can help you to choose subjects. You might want to select subjects you have already done at school and are good at, or subjects you haven't tried before but think look interesting. Our Schools' Liaison Officers are also available to talk to if you have any questions.

Choose papers that you think you will enjoy

Papers are like topics within each subject – the building blocks of your degree. The first courses you take are called 100-level papers or beginner papers. For example, for the Bachelor of Sciences you will need to enrol for either three or four papers in semester 1. If you're feeling confident choose four, if you want time to "find your feet" at uni, choose three.

We strongly recommend that your paper selection avoids any timetable clashes. Our course advisers can help with this.

Pick a major subject

This is the subject that you think you will specialise in within your qualification and go on to study in your second and third years.

A major subject usually takes up at least nine papers of your 20-paper degree. The *Guide to Enrolment* specifies which papers make up any specific major.

Choose at least one paper from your major subject for each semester if you can

This makes it easier to cover the requirements for the major as you progress through your degree. However, if you aren't sure what your major will be after semester 1, it's fine to continue to choose a wide range of papers that interest you in semester 2. This means that you have more choice of majors after your first year.

If you are not sure what major to choose, a good approach is to include two papers from each of three subjects in your first year

This gives you lots of choice for your major. It also means you will have no problem meeting the prerequisites (first-year papers you are required to complete) for study in the second year of your chosen major.

Consider a minor

You can also start thinking about a minor subject – but don't worry too much about doing this in your first year.

A minor is a subject you have studied at each level but not in as much depth as your major. Your minor can be a subject more commonly taken for a different degree; for example, a BSc majoring in Psychology can include Criminology as a minor subject.

Remember, Otago degrees are very flexible

You can always change your major, your minor or even your degree if you decide it isn't right for you.

Scholarships

Ngā karahipi

The University of Otago offers a variety of Sciences-specific, new entrance and undergraduate scholarships.

New entrance scholarships

Elman and Alfred Poole Southland Boys' High School and Southland Girls' High School Science Scholarships

\$5,000 annually for three years for students graduating from Southland Boys' High School and Southland Girls' High School who intend to pursue a degree and career in science.

otago.ac.nz/graduate-research/scholarships/otago014644.html

Elman Poole Southland Boys' High School and Southland Girls' High School Science and Music Scholarships

\$5,000 annually for three years for students graduating from Southland Boys' High School and Southland Girls' High School who intend to pursue a degree and career in science or and have a talent for musical performance.

otago.ac.nz/graduate-research/scholarships/otago061297.html

Kraft Heinz Food Science Scholarship

\$1,000 per year for up to three years for an entrance student studying Food Science at the University of Otago.

otago.ac.nz/graduate-research/scholarships/otago759048.html

Undergraduate scholarships

Campbell-White Scholarship

\$6,000 for a student studying full-time towards a degree of Bachelor of Surveying or Bachelor of Science majoring in Geology or Surveying.

otago.ac.nz/graduate-research/scholarships/otago014588.html

Energy Education Trust NZ Undergraduate/Honours Scholarship

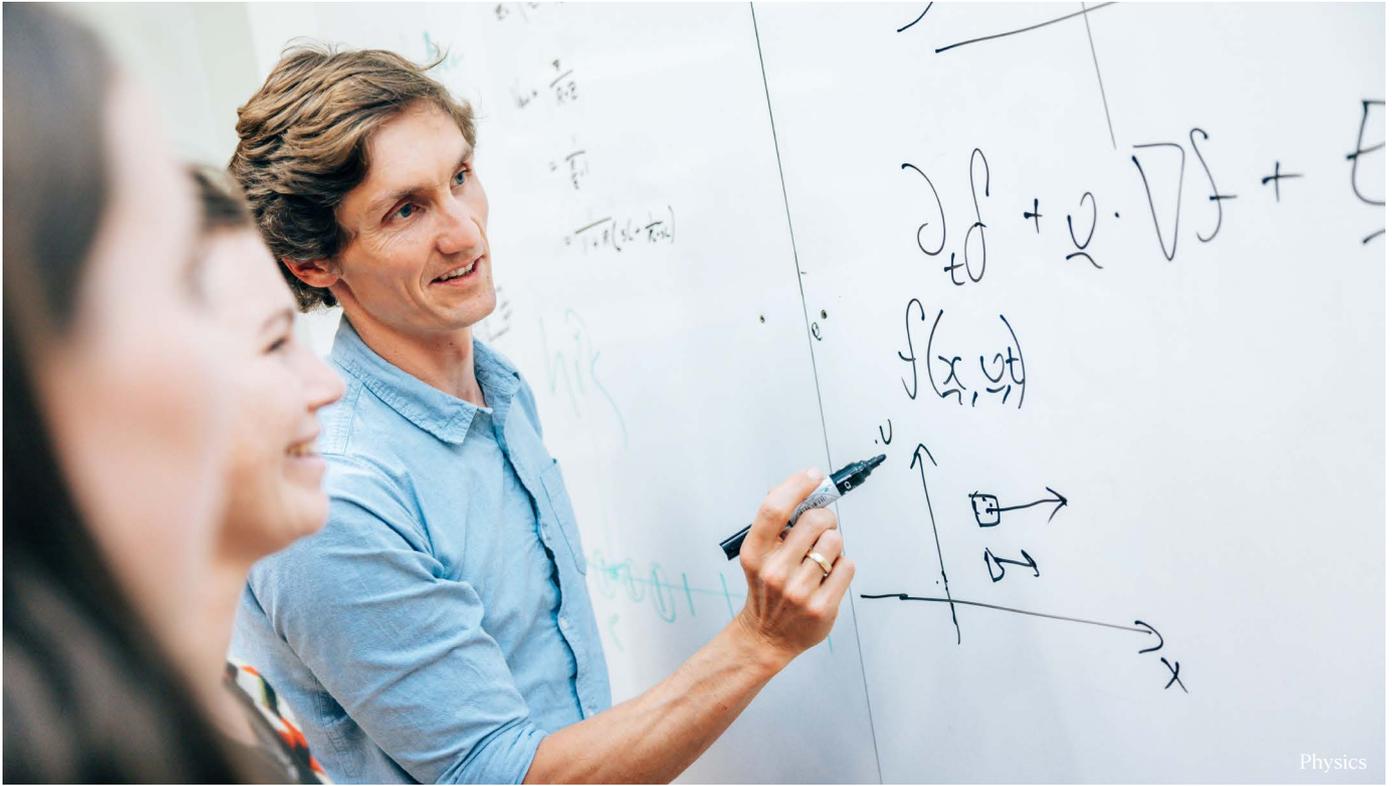
\$5,000 for students with a specific interest in energy issues.

otago.ac.nz/graduate-research/scholarships/otago014645.html

Philip Ashton Smithells Memorial Scholarship

\$3,000 for a student progressing to their third year of study for an undergraduate bachelor's degree programme within the School of Physical Education and Exercise Sciences.

otago.ac.nz/graduate-research/scholarships/otago014657.html



Physics



Food Science



Computer Science



Geology

Subject guide

Ko ngā kaupapa ako e āhei ana

Explore human health and behaviour, mental and physical wellbeing, alternative food-based solutions, environmental impacts, sustainable solutions, climate change mitigation and so much more with a Science degree from Otago.

This section lists nearly 50 subjects you can choose from for your Science qualification, including information about potential career opportunities. You can combine most majors and degrees, or add a minor to create a path that works for you.

Please note, each of the subject headings in this list is a major subject, except for those that are clearly shown to be a minor subject only. See the *Guide to Enrolment* or the University website for full course requirement information.

otago.ac.nz/sciences



List of subjects Rārangi kaupapa ako

The following summary table lists the subjects available at the University of Otago and their associated degrees. You can find more information about subjects on the following pages.

SUBJECT	MAJOR/ MINOR	DEGREES
Agricultural Innovation	M/m	BSc
Anatomy	M/m	BSc
Aquaculture and Fisheries	M/m	BSc
Biochemistry	M/m	BSc
Botany	M/m	BSc
Chemistry	M/m	BSc
Computational Modelling	m	BSc
Computer Science	M/m	BSc/BA
Data Science	M	Bsc
Ecology	M/m	BSc
Economics	M/m	BCom/BA/BSc
Energy Management	M/m	BSc
Energy Science and Technology	M	BSc
Environment and Society	m	BCom/BA/BSc
Environmental Management	M/m	Bsc
Environmental Toxicology	m	BSc
Exercise and Sport Science	M/m	Bsc
Food Science	M/m	Bsc
Forensic Analytical Science	M	BSc
Genetics	M/m	BSc
Geographic Information Systems	M/m	BSc
Geography	M/m	BSc/BA
Geology	M/m	BSc
Human Nutrition	M/m	BSc
Information Science	M/m	BCom/BA/BSc
Land Planning and Development	M/m	BSc

SUBJECT	MAJOR/ MINOR	DEGREES
Marine Science	M/m	BSc
Mathematical Statistics	m	BSc
Mathematics	M/m	BSc/BA
Microbiology	M/m	BSc
Neuroscience	M/m	BSc
Nutrition Communication	m	BSc
Pathology	m	BSc
Pharmacology and Toxicology	M/m	BSc
Physical Activity and Health	m	BSc
Physical Education, Activity and Health	M	BSc
Physics	M/m	BSc
Physiology	M/m	BSc
Plant Biotechnology	M/m	BSc
Psychology	M/m	BSc/BA
Software Engineering	M/m	BSc
Sport and Exercise Nutrition	M	BSc
Sport Development and Management	M/m	BSc/BA
Sports Technology	m	BSc
Statistics	M/m	BSc/BA
Supplementary Nutritional Science	m	BSc
Surveying		BSurv
Surveying Measurement	M	BSc
Zoology	M/m	BSc

Note: All major subjects available for the BSc are also available for the BASc and BComSc



Claire Flynn

Bachelor of Science with Honours (Statistics, Geographic Information Systems)

Meteorologist, MetService

“Part way through my third year I talked to some people from the MetService Te Ratonga Tiorangi – they were at Otago for a Science Careers Fair. They told me about their training programme for graduates, and recommended I add in some extra Physics papers and give them a call when I finished my degree!

“Maths and Statistics are really important because computer weather models will inevitably be imperfect. You need strong Maths and Stats skills to understand where the models are going wrong and how to improve them.”

Agricultural Innovation

otago.ac.nz/courses/subjects/agri.html

As population increase and climate change affects our world, sustainable food production is becoming one of the most pressing issues of our time. How do we feed a global population that is expected to reach 9.8 billion by 2050? And how can we lessen the impact of extreme weather events, greenhouse gas emissions, and the decline of soil and water quality?

By studying Agricultural Innovation, you'll help pioneer solutions to these problems. Taught by agriculture, food and environment experts, the teaching programme is primarily science-focused but also incorporates the social, environmental, and economic aspects of agriculture, including traditional and contemporary Māori agriculture and mātauranga Māori.

Your study will include laboratory work and fieldwork. Once a year, you'll visit a farm that is leading the way in sustainable practice, giving you the opportunity to observe a variety of agricultural activities first-hand.

Career opportunities

The agricultural sector is expected to generate an additional 50,000 skilled jobs by 2050, so career opportunities are plentiful. Graduates will have the expertise to work in a diverse range of sectors including biosecurity, environment protection agencies, farming or horticulture, food manufacturing, food assurance programmes, organic nutrient and fertiliser companies, regulatory agencies (regional government), and synthetic food production. Your skills could also lead to a research and development role.

Anatomy

otago.ac.nz/courses/subjects/anat.html

You can't leave home without anatomy. It holds you together, controls what you think and do, and enables you to run, jump and play.

Anatomy explores the relationship between the structure of the body and the functions it performs. Ever wondered how the body develops from just a single cell to an individual with millions of cells? Or how we transmit our desire to move from the brain to our muscles? Study Anatomy and you'll discover the answer to these questions and many more.

Through lectures and hands-on laboratory classes, you'll develop the skills needed for the scientific analysis of human and animal tissue. You'll learn how to use specialised equipment and have access to over 3,000 anatomy specimens in our WD Trotter Anatomy Museum.

Career opportunities

Our graduates can be found in medicine, dentistry, physiotherapy, nursing, and other allied health professions such as fertility, audiology, and optometry. Others have taken roles in education, government, and biomedical science-related advocacy and not-for-profits, such as the Cancer Society or Neurological Foundation, or chosen technical work in biomedical and agricultural laboratory settings. Some graduates have gone on to work in sales and marketing, as funeral directors, and even winemakers.

Aquaculture and Fisheries

otago.ac.nz/courses/subjects/aqfi.html

More than half the world's seafood now comes from aquaculture. As our global population continues to grow, the industry needs to find new ways to increase production and profitability while minimising environmental issues and waste.

You'll learn how to manage fish stocks and aquaculture operations and protect the ecosystems and environment that support them. Aquaculture is also involved with the restoration of wild fisheries and the protection of waterways.

With practical application at the core of your studies, a typical day of learning could see you gaining technical skills in the laboratory, undertaking research at the Portobello Marine Laboratory, or observing local marine habitats on one of the University's research vessels.

Career opportunities

Graduates find work in commercial aquaculture, where you could be involved in the production or management of food. You could also work in a research and advisory role for food producers, government organisations, regional councils or iwi organisations.

Biochemistry

otago.ac.nz/courses/subjects/bioc.html

Biochemists find out how the molecules in living things work. You'll focus on processes at a molecular level and use this knowledge to explain how cells and organisms behave. You'll study how cells communicate with each other and with molecules in the environment, and how they can be affected by the environment itself.

Biochemistry also looks at the biological, chemical and sometimes structural basis for disease, including genetic disorders, infection, neurodegeneration and cancer. You'll learn how diagnosis, drug design, and therapeutic treatments at the molecular level are improving health outcomes for society.

Biochemists are experimental scientists, and hands-on learning is a fundamental part of this course. You'll gain essential practical skills using specialist scientific equipment, setting you up for a wide range of career opportunities.

Career opportunities

Studying Biochemistry is ideal preparation for a career in research, product development, forensics, public health, bioinformatics, agribusiness, patent law, science policy, publishing, teaching and science communication, commerce, and marketing.

The New Zealand biotechnology industry has opportunities for biochemists in livestock improvement, the development of food crops, winemaking, the protection of native flora and fauna, and pharmaceuticals.

Since Biochemistry underpins many of the other life sciences, it allows you to specialise in a range of different subjects, including genetics, forensics, microbiology and agricultural science.

Botany

otago.ac.nz/courses/subjects/btny.html

Plants provide us with food, fibres and medicines, so knowledge about plants is fundamental to both the survival of life on Earth and the health of the planet.

Your studies will include research into the biochemistry, ecology, genetics, and physiology of plants; plant evolution; photosynthesis; the role plants play in ecosystems; and plant biotechnology. You'll cover topics from the breeding of crops using modern molecular techniques through to modelling the effects of climate change on plants.

Hands-on learning is an important element of this programme and you'll develop valuable practical skills through laboratory work and field trips. Dunedin's diverse landscape and marine environments provide ideal laboratories for botanical study and research.

Career opportunities

Botany equips you for a career in conservation, biosecurity, environmental management, crop science, biotechnology, horticulture, or agro-ecology. Graduates also take up positions in local and national government, for instance at the Department of Conservation, the Ministry of Primary Industries, and Crown Research Institutes.

Chemistry

otago.ac.nz/courses/subjects/chem.html

Chemistry underpins every aspect of life – what we see, eat, touch, smell and wear every day. It's so fundamental it's been called the central science.

Study Chemistry at Otago and you'll explore the composition, properties and transformations of matter. You'll look at how chemicals interact with each other, how to develop new materials and how to measure trace amounts of pollutants.

Grab your safety glasses because lab work is a big part of this course. You'll have access to specialist facilities and laboratories and learn how to solve chemical problems.

Career opportunities

In recent years, New Zealand has experienced a shortage of chemistry graduates, yet career opportunities remain vast and varied. Qualified chemists find themselves immersed in industries spanning chemicals, plastics, pharmaceuticals, food, textiles, and timber, where they contribute to vital areas such as research and development, quality control, marketing, sales, and management.

Chemists play leading roles in agriculture, horticulture, fisheries, water quality control, and in chemical, biochemical or medical research units. They're also sought after in central and local government agencies, to work on projects such as pollution monitoring, water purification and forensic work solving criminal cases. Chemists play a pivotal role in advancing sustainability by researching, innovating, and developing future fuels and renewable energy sources, driving the transition towards a more environmentally conscious and sustainable energy landscape.

Chemistry graduates are in continual demand in areas as diverse as finance, law, politics and sales, due to their ability to handle information and deal with complex concepts. And there is ongoing demand for secondary chemistry teachers throughout New Zealand.

Computational Modelling

(minor subject only)

otago.ac.nz/courses/subjects/como.html

Maybe you've heard that models are used to make decisions and policy in science and society, and wondered if they're right or wrong? Science, commerce and medicine require quantitative skills and modelling. If you enjoy mathematics but want to see how it is used, you need to know about modelling. If you're a scientist and want to make predictions or analyse data, you need to know about modelling.



Chris Hepburn

Director of the Aquaculture and Fisheries Programme

Co-Director Coastal People: Southern Skies

Chris Hepburn's work focuses on coastal ecosystems in southern New Zealand, and in particular the impacts of human-induced change, including elevated carbon dioxide, nutrient loading, sedimentation, fishing and invasive species. He leads a laboratory that works on diverse topics that focus on habitats and species that support mahinga kai.

Chris is Co-Director of the Centre of Research Excellence Coastal People, Southern Skies (see page 2). "CPSS will support the voice and capability of coastal communities," he says. "They are at the front-line and will provide the leadership we need as our oceans continue to change."



Taylor Davies-Colley

Bachelor of Science (Botany and Ecology), Master of Science (Botany)

Educator at Orokonui Ecosanctuary

“One thing you learn at university is how much cool research is happening – there are hundreds of people just as stoked about their thing as you are about yours.

“Hopefully my research will help to guide decisions to protect the environments in which the plants species I study live, and in doing so secure them for future generations. I also hope that through telling every person I meet about rare, carnivorous aquatic plants that can catch prey in under 10 milliseconds, I might convince them how cool botany can be!”

Otago is one of the few universities where you can learn these skills in a first-year paper. Computational modelling will change the way you think about science, and the way you think about mathematics.

Career opportunities

Career prospects in computational modelling are excellent. Opportunities abound in all areas of product development, financial modelling and business, physical and health science, animal and plant science, process engineering, food technology, design, telecommunications, data science, software development and information technology.

Computer Science

otago.ac.nz/courses/subjects/cosc.html

Whether you're interested in machine learning, computer animation, gaming, software design or robotics, studying Computer Science at Otago will give you the expertise to thrive in a constantly evolving sector.

Computing now underpins every element of our society and computer scientists are in hot demand across the world.

On this major, you'll learn how to analyse, design and implement computer algorithms and systems. You'll gain practical programming skills in industry standard languages, as well as the transferable skills that will enable you to be part of a dynamic tech team.

Love solving problems? Discover the joy in designing and implementing a complex system and then seeing it all work in front of your eyes.

Career opportunities

Our graduates have gone on to work in an exciting range of positions: making CGI movies, developing software for driverless vehicles, writing control software for Formula 1 cars, designing computer games, working as a weapons engineering officer in the Navy, and programming the latest high-performance computers.

Data Science

otago.ac.nz/courses/subjects/dasc.html

Almost every industry now accumulates vast quantities of data every day – from mobile devices, the internet, instruments and sensors. But how do we make sense of it all?

That's where data scientists come in. Data Science combines techniques and methods from computer science, information science, and statistics. Through a combination of lectures, tutorials and practical labs, you'll learn how to extract insights from large, complex data sets and

communicate this knowledge through effective modelling and visualisation.

You'll have opportunities to dive into areas that interest you, whether that's efficient computation, data storage infrastructure, data analysis or applied machine learning. You'll also gain valuable problem-solving, communication and data visualisation skills, making you a sought-after asset in any organisation.

Career opportunities

Studying Data Science leads to opportunities in fields as diverse as banking and biotechnology, entertainment and education, gaming and government, medicine and manufacturing, retail and research.

Ecology

otago.ac.nz/courses/subjects/ecol.html

Ecology is the scientific study of organisms and their relationships within and across environments. The diversity of Otago's ecosystems and organisms is reflected in the programme's teaching, which is woven through with ideas from te ao Māori. Ecology is taught by staff from across the University (Botany, Marine Science, Zoology and the Higher Education Development Centre), who teach national and international examples from marine, freshwater and terrestrial systems. All Ecology papers have fieldwork components including residential field camps for upper-year papers. Ecology's teaching emphasises transferable skills and, uniquely, active student research from day one.

Career opportunities

Pressing environmental and ecological issues combined with government and public concerns mean there is a clear need for scientifically trained ecologists. Our graduates work around New Zealand and the world for government institutions (Department of Conservation, Ministry for the Environment, Ministry for Primary Industries), Crown Research Institutes (Landcare Research, NIWA, Cawthron), regional and city councils, consultancies, tourism operations, in secondary and tertiary teaching, and for non-governmental organisations.

Economics

otago.ac.nz/courses/subjects/econ.html

Economic thinking drives decision-making in just about every area of society, from government and business policy to personal decisions. This programme will equip you with the skills to interpret, analyse and question diverse economic theories and policies in a real-life context.

Do you enjoy wrestling with tough questions? Get ready to debate complex issues around unemployment, economic growth, housing, income inequality, international trade, sustainable development and the environment. You'll learn how to analyse ideas and come to your own conclusions – valuable skills for just about any career.

Career opportunities

A degree in Economics opens doors to a range of rewarding careers in the public or private sector, whether you aspire to work as a policy analyst, a business consultant, an economics researcher, a financial adviser or a diplomat.

Energy Management / Energy Science and Technology

otago.ac.nz/courses/subjects/eman.html

Cutting carbon emissions from fossil fuels is crucial if we want to avoid the worst effects of climate change. The world needs cleaner, more sustainable ways to generate power and this programme will equip you with the knowledge and skills to drive change.

You'll delve into the science behind renewable energy, energy efficiency and carbon reduction. Through lectures, tutorials and hands-on practical classes, you'll gain a deep understanding of a range of energy sources and develop the key skills required for energy analysis in industrial and commercial settings.

Explore the challenges and opportunities surrounding carbon reduction and learn key skills in data acquisition, project management, and reporting.

Career opportunities

Our graduates have gone on to work in a diverse range of positions: designing and implementing renewable energy technologies, identifying and implementing energy efficiency and carbon reduction measures at industrial sites and commercial buildings, and developing energy and sustainability plans for government departments.

Engineering (Intermediate)

otago.ac.nz/subjects/engineering_intermediate.html

Engineering Intermediate is equivalent to the first year of the University of Canterbury's Bachelor of Engineering with Honours degree.

Your paper selection will depend on the engineering discipline you intend to specialise in at the University of Canterbury in your second year. If you're considering enrolling for Engineering Intermediate, contact a schools' liaison officer for more details.

Environment and Society

(see also Environmental Management)

otago.ac.nz/courses/subjects/envi.html

Explore the Earth's environmental systems and the impact humans have on our natural systems at global, national and regional scales. Examine environmental hazards and concerns and delve into the ethical, legislative, economic, and political responses to these issues.

Environmental Management

otago.ac.nz/courses/subjects/envm.html

When it comes to protecting the environment, we need the backing of laws and policies to make an impact. Study Environmental Management and you'll learn how to combine scientific knowledge, management methods and an understanding of environmental legislation to provide solutions to environmental problems.

You'll delve into the science behind environmental systems and problems, learn about the biological, ecological and socio-economic drivers of environmental change and gain expertise in environmental legislation.

Want to take your learning outside? You'll enrich your classroom studies with field trips and research projects, giving you experience in collecting field data and using field instruments and techniques.

Career opportunities

Graduates commonly pursue careers in government agencies, environmental consulting firms, agricultural research organisations, academic institutions, food security and export firms.

Exercise and Sport Science

otago.ac.nz/courses/subjects/exss.html

Exercise and sport science plays an important role in society, from enhancing sports performance for elite athletes to combating the negative health effects linked to physical inactivity in today's lifestyles.

You'll gain a scientific understanding of the four disciplines that underpin exercise and sport science: biomechanics, motor control/learning development, physiology and psychology. You'll explore how humans create and control movement and examine the influence of thoughts, feelings and behaviours on participation and performance in sport.

With a teaching programme aligned with accrediting bodies in New Zealand and Australia, you'll graduate with career-ready skills that will open the door to jobs in many different industries.



Yerren van Sint Annaland

Bachelor of Science with Honours (Computer Science)

Deep Learning Engineer, 45 South

"Although no university or programme can ensure academic success, I feel that I was provided with an environment that enabled and encouraged me to put the best effort into all my work – and achieve great outcomes as a result. This came from both the staff and the students within the Computer Science department who were always great to work with.

"In the first couple of years of my BSc, I found that I had a good introduction to the fundamentals of Computer Science, which included many theoretical concepts. The further I progressed in my studies, the more freedom I had to focus on the topics that interested me, which is how I eventually ended up primarily studying artificial intelligence."



Ting Wang

Associate Professor, Department of Mathematics and Statistics

Finding ways to use statistical skills to solve real-world problems is what fascinates Ting Wang. Her research field is multidisciplinary, but centers on the interface between statistics and geophysics. Her main focus is on the development of novel statistical methods to model earthquakes, slow slip events, geodetic measurements, volcanic eruptions and geomagnetic storms.

She has an active teaching role at Otago, and engaging students plays a big role in her teaching. "I run quizzes in class using web-based clickers through students' smartphones. Through these I can identify hard concepts, ask questions about the content of lectures, create group discussions, give individual feedback, and discuss the latest scientific publications relevant to the course material. It's always very fulfilling to be able to help students achieve their goals."

Career opportunities

Our graduates build careers as sport scientists, exercise physiologists, mental skills trainers, performance analysts, technique analysts, strength and conditioning trainers and personal trainers. They also find work in research and development.

Food Science

otago.ac.nz/courses/subjects/fosc.html

Food scientists play an important role in ensuring that the food we eat is safe, comes from sustainable sources, and meets our nutritional and dietary needs.

You'll explore the science behind food processing, food formation and quality and safety. You'll examine the sustainability of ingredients and manufactured products and investigate the effect food has on our health and wellbeing.

Alongside lectures, tutorials and practical laboratories, the programme includes field trips to food manufacturers and research organisations, giving you an insight into the processes and challenges faced by the food industry.

Career opportunities

There are exciting career options in food quality management, product development, sensory analysis, marketing, consumer research and the hospitality industry. Graduates also find work in research institutes, for example, Plant and Food Research, or government agencies such as the Ministry for Primary Industries.

Forensic Analytical Science

otago.ac.nz/courses/subjects/fors.html

Forensic science is so much more than what you see on TV shows! Come and study with us to find out how forensic scientists use a range of biological, chemical, and genetic techniques to reconstruct crime scenes, identify the dead, find forgeries and fake products, and help understand wildlife and environmental crime.

With a strong emphasis on problem-solving, this programme will give you transferable practical skills in fields such as DNA analysis, spectroscopy and traceability. You'll gain expertise in laboratory analysis and interpreting, evaluating and presenting evidence.

Career opportunities

Graduates work in forensic science, laboratories, government agencies, regulatory bodies tasked with managing natural resources, and research. The techniques you'll learn are fully applicable to criminal forensic work, although openings for criminal forensic scientists in New Zealand are limited and will require further study or employment experience.

Genetics

otago.ac.nz/courses/subjects/gene.html

Genetics is the study of genes and inheritance. It forms a critical component of most biological research and has the potential to help us understand human health and disease, evolution and the diversity of living things.

On this programme, you'll delve into the full diversity of life, from the molecular basis to the study of whole organisms, populations and evolution. In lab classes, you'll create genetically modified bacteria, test for genetically modified organisms in supermarket products and analyse a portion of your own DNA. Computer simulation labs will enable you to study evolutionary genetics.

You'll learn to make informed decisions about controversial topics such as genetic engineering and cloning and have opportunities to develop strong analytical and project management skills, setting yourself up for a diverse and exciting career.

Career opportunities

You could find work in health, agriculture, biotech, conservation, genomics, government departments or scientific research. Studying Genetics also provides an excellent foundation for the further training required to be a genetic counsellor or forensic scientist.

Geographic Information Systems

otago.ac.nz/courses/subjects/giss.html

Take a look around you ... notice how every feature has its own unique and precise location. These locations can be fixed by geographical coordinates and measured in one, two or three dimensions in space. The process of linking features with geo-referenced coordinates creates spatial data, and these data are stored and managed in geographic information systems (GIS).

Many aspects of our everyday lives are connected with GIS in one way or another, from Google Earth and mobile location technologies to mail delivery, electricity supply and weather forecasting.

On this programme, you'll cover topics like mobile GIS and web mapping, remote sensing (including from drones) and GNSS (GPS) positioning. You'll gain skills in project management, cartographic presentation, database design, and basic computer programming.

You'll reinforce your classroom learning through hands-on practical sessions and field trips. Plus, you'll get the chance to see how your degree relates to the workplace, with the opportunity to carry out work

experience at the end of your second and/or third year.

Career opportunities

GIS is a multi-billion dollar industry worldwide and your skills will be in high demand in public service, local government, and business. You could work in urban and regional planning, kaupapa Māori resource management and consulting, or the delivery of location-based services. Wherever location matters, GIS and spatial science are needed.

Geography

otago.ac.nz/courses/subjects/geog.html

Geographers study the environment – both physical and human – to find innovative responses to society’s most pressing issues, from climate change and migration to globalisation and inequality.

On this programme, you’ll explore the physical processes that shape the natural environment, the social and cultural processes that explain patterns of human activity, and the interactions between human activity and the natural world.

Want to learn outdoors? Alongside lectures and tutorials, you’ll have the opportunity to gain valuable practical skills through field trips and research studies. The diverse landscape surrounding Dunedin provides multiple environments to study, from river ecosystems to coastal communities.

As well as specialist knowledge, you’ll build transferable skills in communication, data collection and analysis, and project management.

Career opportunities

Geography graduates find employment in government departments, state-owned enterprises, private corporations and consultancies. They work in areas such as regional and resource planning, environmental management, natural resources (especially water) analysis, social and economic research, social services and regional development.

Geology

otago.ac.nz/courses/subjects/geol.html

Studying the Earth beneath our feet is central to our transition to a sustainable future. You’ll learn how to interpret Earth’s formational history and the evolution of its lifeforms by analysing rocks, minerals, magma, fossils, ice and water.

You’ll study how our planet’s interior interacts with the oceans and atmosphere to regulate global change and become a master of critical observation and interpretation, from the molecular to plate tectonic scales.

Geology is a hands-on science. You’ll spend time in the laboratory and out in the field, gaining specialist technical and research skills. You’ll also develop expertise in data-handling, problem-solving and teamwork.

Career opportunities

Geology graduates can enter careers related to the earth sciences, including natural hazard assessment, environmental protection and sustainability, resource evaluations (including finding the raw materials needed for the global energy transition), oceanographic and Antarctic research, geospatial analysis, and science policy and advocacy.

Human Nutrition

otago.ac.nz/courses/subjects/hunt.html

Public and media scrutiny of what we eat has never been greater. In this programme, you’ll delve into how nutrition influences health and disease.

Our programme offers a blend of lectures, practical laboratory classes and tutorials. Dive deep into topics like the biological foundations of nutrition, lifecycle nutrition, and strategies to improve the health of diverse communities. You’ll also examine cultural and social influences on dietary habits, and master the art of effective communication about nutrition and health.

Ever wondered how your own dietary habits impact your daily life? Through practical projects you’ll get to monitor your body’s response to different foods, developing strong research and analytical skills along the way.

Career opportunities

A world of opportunity awaits. Graduates pursue fulfilling careers in the health sector, government organisations, research, teaching, high-performance sport, private practice, and the food industry. You could also become a registered nutritionist, opening doors to exciting prospects in the field of nutrition and health.

Information Science

otago.ac.nz/courses/subjects/info.html

In our increasingly online world, vast amounts of data are created every day. Information scientists combine business thinking with technical skills to capture, process and communicate this information, helping people and organisations operate more efficiently.

Through a combination of lectures, tutorials and practical labs, you’ll learn how to model and interpret data to help organisations achieve their goals. You’ll gain practical programming skills in industry standard languages and hone your problem-solving skills.



Malia Vehikite

Bachelor of Science and Bachelor of Applied Science with Honours (Energy Management)

Energy and Sustainability Advisor, KiwiRail

“My studies made me aware of the importance of energy efficiency, the need for a shift towards more renewable energy and the very real issue that is climate change. I gained the knowledge and tools to help organisations understand their energy consumption and carbon emissions, and to identify opportunities to reduce/optimize through energy efficiency or switching to low-carbon energy sources. KiwiRail has a number of emission reduction targets in place and my role is focused on developing roadmaps towards those targets and tracking our progress towards success.”



Malindi Reihana-Ruka

Ngāpuhi

Bachelor of Surveying

“I chose to study Surveying because I want to make a difference and give back to my community. I hope to spend my career working with my people and the wider community where I would like to have a positive influence on safeguarding our environment, while focusing on the sustainability of our future.

“Surveying is such a variable degree, and I love its diversity. It excites me to know that I will leave Otago with so many opportunities. I can perhaps look at going into hydrographic surveying (mapping the ocean floor), urban design, engineering or cadastral surveying. The options are unbelievable!”

In your third year, you'll work on a team project with an industry partner, giving you the opportunity to apply your studies to real-life problems.

Career opportunities

Information Science graduates are in high demand because of the vital role that information systems play in modern organisations. You could find work in business management and analytics, science and data science, education, research, finance, health, manufacturing and automation, media production and user experience technology, music and entertainment, and engineering.

Land Planning and Development

otago.ac.nz/courses/subjects/ldpd.html

Built environments play a significant role in how societies function. On this programme, you'll examine how land planning and the process of land subdivision and development impact our human and natural landscapes. You'll look at how land decisions have cultural, social, legal, economic and ecosystem implications and learn how to assess the economic potential of land.

Alongside lectures and tutorials, you'll gain practical skills using computer aided draughting packages and geographic information systems. You'll undertake engineering labs, infrastructure inspections, site visits and fieldwork, giving you the opportunity to gain relevant experience before you graduate.

This degree differs from other New Zealand planning degrees in that it emphasises engineering design and land administration from both Pākehā and Māori perspectives, as well as covering essential aspects of New Zealand legislation that relate to land development.

Career opportunities

This degree provides an excellent foundation for a career in planning, land development and resource management, especially in relation to the subdivision and administration of land. You could go on to work in local government and private practice with surveyors, planners, land developers and urban designers. Students wishing to become recognised as fully qualified professional planners have the option to undertake the two-year Master of Planning (MPlan) at Otago, leading to membership of the New Zealand Planning Institute.

Marine Science

otago.ac.nz/courses/subjects/mari.html

New Zealand boasts a vast 15,000km coastline and one of the world's largest exclusive economic zones (EEZ). Despite this, our knowledge of our marine environment remains limited. You have the opportunity to change this.

Studying Marine Science is a hands-on experience. As well as attending lectures and tutorials, you'll have practical labs and field trips at sea. Alongside our research and teaching facilities in Dunedin, we have a major research laboratory on the Otago Peninsula and field stations on Stewart Island and in Doubtful Sound. A fleet of research vessels, including the expedition vessel *RV Polaris II*, provides access to local marine habitats.

The ocean is the epicentre of Earth's physical and biological processes, influencing our climate and sustaining life. The University of Otago is in the perfect place to investigate these interconnected processes and their impacts on our world. And when your workspace extends to the seashore and beyond, every day presents fresh challenges.

Career opportunities

Marine scientists are valued, not only in learning institutions, but also by governments and large corporations. Marine research can take you from the poles to the tropics, Antarctica to Fiji, and from regional councils to government agencies, such as the Department of Conservation, NIWA and the Ministry for Primary Industries. You might also work for a private consultancy firm, within the IT industry, for government science policy groups, within the educational system, in community engagement or in the media.

Mathematics

otago.ac.nz/courses/subjects/math.html

Career options in 10 years' time are likely to be very different to today but we know that many of them will involve mathematics. Our 100-level papers are designed for all students, whether you're interested in pursuing a mathematics career or you want to be a modern scientist, engineer, or innovator. A qualification in Mathematics widens your options and prepares you for change.

Career opportunities

Mathematics graduates follow diverse career paths. In finance, quantitative analysts use mathematical models for market decisions. Data science and artificial intelligence rely on mathematical algorithms for problem-solving. Engineers apply mathematical principles for design

and optimisation, and cybersecurity professionals use mathematics for digital security. Our students are in-demand and have secured excellent, interesting jobs. And they're well paid!

Microbiology

(see also Immunology)

otago.ac.nz/courses/subjects/micr.html

Microorganisms are everywhere – in our bodies, our food, the air, soil, and water. They're used to produce foods such as cheese, wine, and beer, as well as many pharmaceutical, chemical and agricultural products. They're also important for soil fertility and the decomposition of materials.

Study Microbiology and you'll learn the fundamental science of different types of microorganisms, as well as the important biotechnological, industrial, medical, food and agricultural applications.

Through lab sessions and self-directed tutorials, you'll hone your practical skills and learn how to analyse and communicate your results.

The harmful effects of some microorganisms link microbiology with immunology. Immunologists investigate how we can protect humans and animals from infectious diseases by using vaccines, and the role of the immune system in non-infectious diseases such as cancer. At Otago, you can study Microbiology as a major for the three-year Bachelor of Science degree. Or, you can study Infection and Immunity as a major for the Bachelor of Biomedical Science degree.

Career opportunities

Recent developments in fields such as biotechnology, aquaculture, molecular biology, microbial genetics, immunology and medicine have increased the demand for Microbiology and Immunology graduates. Along with the traditional areas of teaching and research, you could go on to work in medical or veterinary laboratories, biotechnological and agricultural industries or in government agencies.

Neuroscience

otago.ac.nz/courses/subjects/neur.html

The brain is a final frontier... a last great unknown. Neuroscientists are its explorers. They try to understand how the brain functions, how it deals with injury or damage, and how it develops and changes over time.

What they find helps neurologists, psychiatrists and clinical psychologists – and provides important models for high-level information processing and robotics. Knowing how the brain perceives stimuli and controls movement helps those

working on human performance, from sports science to space medicine

On this programme, you'll study the nervous system from structure to function, development to degeneration, in health and in disease. You'll take a blend of anatomy, biochemistry, computer science, pharmacology, physiology, psychology and zoology papers, with the opportunity to shape your degree to suit your interests and career goals.

Teaching takes place in lectures and laboratory sessions, with the chance to work on group projects in your third year. You'll be taught by internationally recognised neuroscientists with a wide variety of research interests.

Career opportunities

Majoring in Neuroscience prepares you to work as a laboratory technician, research assistant, research manager or policy analyst. It also provides a useful first degree if you later want to specialise in medicine, pharmacy, physiotherapy, optometry, audiology or nursing. If you're planning on becoming a neuroscientist, you'll need to go on to postgraduate study.

Pharmacology and Toxicology

otago.ac.nz/courses/subjects/phal.html

Pharmacologists study the effects of drugs on biological systems and their use in medicines to treat disease. As new diseases emerge and older medicines fail to work, pharmacology can help us develop better and safer drugs.

By studying Pharmacology, you'll explore a variety of sciences, such as biochemistry, chemistry, physiology, microbiology and genetics. You'll look at how drugs produce their effects on the body and the effect of the body on the drug. You'll also delve into Toxicology and examine the harmful effects of chemicals on the human body. Alongside lectures and tutorials, you'll gain essential practical skills through laboratory sessions and clinical trials.

Career opportunities

A good knowledge of pharmacology and toxicology is an important part of the training for medical doctors, pharmacists, dentists, nurses and physiotherapists. Scientists such as physiologists, biochemists, zoologists and psychologists also find pharmacology useful. Graduates of Pharmacology and Toxicology go on to a wide range of careers in research, governmental, administration, and advisory positions. Major employers include the National Poisons Centre, MedSafe, Pharmac, the Ministry of Health, Crown Research Institutes, universities, and pharmaceutical companies.



Mei Peng

Senior Lecturer, Department of Food Science

Sensory Scientist

With a research background in experimental psychology (psychophysics), Mei Peng is interested in sensory, cognitive and behavioural factors driving people's food choices and intake.

In particular, Mei focuses her research on individual differences in sensory processing and their links to pathological eating behaviours and obesity, using both behavioural and neuroimaging techniques.

In 2020, Mei joined a group of 550 researchers from 35 countries looking at the effects of COVID-19 on smell and taste. The study revealed that sudden loss of smell and taste can often be the first symptoms of the virus. "We were pleased that the Ministry of Health followed our suggestion to add loss of smell and taste to the case definition of COVID-19," she says.



Hitaua Arahanga-Doyle

Ngāi Tahu, Te Āti Haunui a Pāpārangī

Lecturer, Department of Psychology

Reflecting on his transition from taurira to kaiako in the Department of Psychology, Hitaua says that culturally, Otago is where he came to learn how to become an adult.

“The transition period from high school to university is massive, but the environment that is fostered and facilitated at Otago means that I didn’t go through that by myself. I met lifelong friends that were, and still are, a huge part of any successes that I am fortunate enough to receive.”

Physical Education, Activity and Health

otago.ac.nz/courses/subjects/peah.html

Do you want to make a positive difference to the health and wellbeing of individuals and communities through physical education and physical activity? This programme is designed to empower you with the knowledge and skills needed to make a positive impact in the world of physical activity, health, and wellbeing.

We’re committed to nurturing knowledgeable, adaptable, ethical, and reflective practitioners with the leadership skills, passion, and cultural understanding to enrich the lives of people and communities.

You’ll learn about the intricacies of human physiology and how it’s enhanced by physical activity, how our psychology can help and hinder participation, how to structure socially and culturally appropriate environments that support people of all ages to be physically active, and the role that the physical environment plays in physical activity and health.

The major has a focus on Māori physical education and health, emphasising the important roles of hauora, Te Tiriti o Waitangi, and te ao Māori in supporting health and wellbeing.

Our programme incorporates practical learning, providing exciting opportunities for you to apply your knowledge in real-world settings. Whether through walking labs, placements, practicums, or community outreach initiatives, you’ll gain valuable hands-on experience while making a positive impact on the lives of others.

Join us in shaping a healthier, more active world. Discover your potential and make a difference with a degree in Physical Education, Activity, and Health.

Career opportunities

A degree in Physical Education, Activity and Health opens doors to a wide range of careers in education and health settings. Specific roles could include a health coach, exercise programme adviser, sports coach, or a health and fitness professional in a gym setting. Interested in shaping the minds of future generations? Or passionate about using exercise as medicine? This degree is also a pathway into a Master of Teaching and Learning to become a physical education and health teacher, or a postgraduate degree in clinical exercise physiology to become an accredited clinical exercise physiologist.

Physics

otago.ac.nz/courses/subjects/phsi.html

Physics has applications in virtually every sphere of human activity, from medicine to sustainable energy production. It has been central to the development of modern technologies such as cell phones, GPS positioning, and MRI scanners that we benefit from in everyday life. As a physicist, you’ll be equipped with highly transferable skills in problem solving and critical thinking, as well as technical and experimental capabilities.

Career opportunities

The numeric and problem-solving skills gained through your studies are highly sought after by employers from both the public and private sectors. Our graduates’ job titles include analyst, numerical modeller, research scientist, consultant, financial banker, software developer, data scientist, and laser engineer.

Physiology

otago.ac.nz/courses/subjects/phsl.html

Physiology is the study of how our bodies work at the molecular, cellular, and organ systems levels. Understanding human physiology is a key part of knowing ourselves. And of course, knowing what’s normal is crucial to understanding the abnormalities that lead to disease, and enabling the development of effective treatments.

Otago offers Physiology as a major for the Bachelor of Science. You’ll study human body systems, biochemistry, biology and/or biological physics, gaining a high-level of knowledge of all human body systems – including the brain and nervous system, heart, blood circulation, lungs and breathing, and the movement of substances in and out of the body and cells through the digestive system and kidneys.

Learning takes place in lectures, group tutorials and hands-on laboratory sessions. From using specialist equipment to testing for disease or disorders, to measuring and analysing organ function – you’ll graduate with the scientific knowledge and clinical skills to respond to global health challenges and set yourself up for a challenging and rewarding career.

Career opportunities

Physiologists work in a variety of industries, including public and private hospitals, health clinics, allied health professions (e.g. optometry and audiology) and rehabilitation centres. Alternatively, you could pursue opportunities in aviation and space industries, education, sport or research institutes, government agencies, pharmaceutical and biotechnology companies, or the defence forces.

Plant Biotechnology

otago.ac.nz/courses/subjects/plbi.html

Plant biotechnology has revolutionised agriculture to address global challenges. Using techniques like genetic engineering and selective breeding, scientists manipulate the genetic makeup of plants to increase crop yields, improve their resistance to pests and diseases, and improve their nutritional content.

This dynamic field, encompassing plant physiology, biochemistry and molecular biology, plays a vital role in sustainable food production, environmental conservation, and the creation of resilient crops to meet the demands of a growing world population.

Career opportunities

Graduates will find opportunities in at least three of the Crown Research Institutes (dealing with horticultural, arable, pastoral and forestry products), private sector companies, university research groups and in secondary and tertiary teaching.

Psychology

otago.ac.nz/courses/subjects/psyc.html

Psychology examines the behavioural, perceptual, mental and emotional processes taking place in our brains. Studying Psychology will give you the skills to understand, explain and predict human behaviour, making you a great choice for employers in a diverse range of careers.

You'll examine how our abilities change with age, and what might underlie abnormal behaviour. You'll investigate how we process and store information using our senses and memory and learn how our experiences shape our behaviour.

You'll also learn how behaviour relates to the functioning of the brain, and why things such as drugs, hormone levels and lack of sleep can influence the way we behave. Applied psychologists use this knowledge to address problems as diverse as sleep disorders, industrial relations, phobias, drug rehabilitation, aircraft safety and hyperactivity.

The Department of Psychology is one of the most popular at Otago and has won numerous awards for excellence in teaching and research.

Career opportunities

Graduates often work across community, health, industry, policy and research areas. You might work in industries like marketing, management or HR – all careers where understanding human thought and behaviour is highly beneficial. If you want a career as a clinical psychologist, you'll need to undertake specialised postgraduate training. Clinical psychologists work in health, justice, education, industry and private practice.

Software Engineering

otago.ac.nz/courses/subjects/seng.html

Apps, software and technology are embedded in our everyday lives. They control our clocks, washing machines, motor vehicles, traffic lights, the electric power to our homes, and the essential processes of our production economy.

These computer systems are complex and can no longer be thought of as standalone entities. They are typically components of much larger, complex systems involving hardware, software, people, and all the unpredictable events in the natural world. So, it's essential that those building these complex systems be equipped with advanced techniques not taught in ordinary computer programming courses.

On this programme, you'll learn about databases, software development, and strategies for using computers to solve real-life problems. You'll cover systems design and development, where you'll assess software on issues like usability and visual appeal, and learn how to manage and co-ordinate a software project, taking into account modelling, costing, risk, organisation and resourcing.

Career opportunities

Software engineers are among the highest-paid professionals in most countries of the world. They're in demand at software and tech companies as well as organisations that develop information systems. You could work in government, telecommunications, the chemical and biomedical industries, financial institutions, agribusiness, engineering and manufacturing, or the healthcare sector. There's also enormous scope for start-up businesses – anything from designing a new app to developing innovative software to meet the needs of a sector or client.

Sport and Exercise Nutrition

otago.ac.nz/courses/subjects/spnu.html

The relationship between diet, physical activity, exercise, and athletic performance is increasingly recognised and of growing interest in the fields of sport, nutrition and human health.

In this programme, you'll delve into the theory of human nutrition and sport and exercise science, covering topics like human body systems and biochemistry. You'll also gain practical experience in hands-on labs, practical sessions, tutorials, and workshops.

This is the only programme in New Zealand offering a combined study of nutrition and physical education, meaning you'll graduate with a unique perspective and deeper understanding of how nutrition impacts both health and sporting performance.



Nichola Salmond

Bachelor of Science (Ecology and Marine Science), Master of Science (Marine Science)

Marine Ecology Technician, NIWA

"Following my MSc in Marine Science, focusing on estuarine ecology, I began working at NIWA in Hamilton, as a Marine Ecology Technician. As part of this role, I work alongside scientists and other technicians to collect, process and analyse an array of environmental samples that help to inform councils and scientists about the health of coastal ecosystems and how they are changing. This work helps to determine how what we do on land affects our estuaries and harbours.

"The hands-on application of theoretical concepts through fieldwork and laboratory experiments undertaken during my BSc and MSc at Otago gave me valuable skills that I apply to my role every day."



Vanisha Mishra-Vakaoti

Teaching Fellow, and Co-ordinator, Pacific Student and Community- Support – Sciences

Vanisha Mishra-Vakaoti's background is in psychology and social research, with a particular interest in issues concerning children and young people. Having spent most of her career working as a research and teaching consultant with a firm focus on the Pacific, she has taken up a new role at Otago.

“The Division of Sciences is the first to integrate an academic position into the Pacific student and community support space. I'm incredibly proud, and grateful that they took this step. It sends a clear signal that exceptional student support needs to be grounded in academic and pastoral approaches.

“My role allows me to support our later year undergraduate students into postgraduate studies, and hopefully support more students into masters' and PhD programmes. My role is not just to get students to pass grades, but to ensure that they can thrive.”

Career opportunities

Across the healthcare industry and sports sector, there is a growing demand for graduates with a combined understanding of nutrition, health, and physical activity. With this degree you could pursue careers in high performance sport, consultancy, non-governmental organisations, product development, or research.

Sport Development and Management

otago.ac.nz/courses/subjects/spdm.html

Sport is used as a development tool across many sectors and areas of the community. On this programme, you'll examine the people, institutions and policies that influence the structure, management and experience of sport. You'll focus on three main areas:

- The quality of organisations and societal conditions that support sport participation.
- The psychological variables that help sporting development and performance.
- The impact of sport on community objectives such as wellness, social integration and economic renewal.

At 300-level, you'll have the opportunity to gain hands-on industry experience through working with a school or community sport organisation, or undertaking applied research in the New Zealand Centre for Sport Policy and Politics.

The Sport Development and Management degree is the only programme of its kind in Aotearoa. It's available as a Bachelor of Arts or Bachelor of Science, so you can adapt your learning to your strengths and interests.

Career opportunities

Careers in this sector include sport development officers, administrators and managers in national/regional sports organisations, community trusts, commercial sports entities, government ministries and local councils. The programme also provides pathways into teaching, coaching, youth work, sports marketing and sports journalism.

Sports Technology

(minor subject only)

otago.ac.nz/courses/subjects/spte.html

Sports technology is an integral part of modern sport. Encompassing the use of advanced analysis tools, hi-tech sportswear, and innovative training equipment and programmes, it offers opportunities for enhancing performance, preventing injury, and improving our understanding of the human body.

In your first year, you'll study core papers in human physiology, anatomy and sport science. In your second year and above, you'll build on these topics to gain high-level knowledge of different human body systems – including exercise physiology, biomechanics and motor control – while specialising in either design (computer science papers) or analysis (statistics and data sciences papers).

The importance of sports technology is well recognised across many fields, including computer science, medicine, nutrition, PE, physics, physiology, physiotherapy and psychology. Through this minor, you'll gain the practical skills and technical knowledge needed for opportunities across these – and other – diverse sectors as the field continues to develop.

Career opportunities

You could pursue a career in sports performance analysis, in technique analysis, or in the research and development of sports equipment and clothing. Opportunities also exist in app design and software programming, or in sports management.

Statistics

otago.ac.nz/courses/subject/stat.html

Statisticians find information in data and apply this knowledge to real-life scenarios. Statistical techniques are used in just about every field, from evaluating the environmental effects of pollutants to helping researchers evaluate new drugs and medical procedures.

You'll learn how to design experiments and surveys, analyse data, and extract meaningful information. You'll gain expertise in statistical computing, quantitative reasoning and mathematical modelling – all skills that will make you highly employable.

Your teaching will be enhanced by the varied research interests of our staff, which include ecology, bioinformatics, biostatistics, quantitative genetics and problems such as disease spread and seismic and volcanic hazards.

Career opportunities

Statisticians are in short supply and demand for their skills are growing. Employers include banks and insurance companies, consulting firms, Crown Research Institutes, government departments, and companies such as Fonterra, Meridian Energy, and Spark.

Surveying

otago.ac.nz/courses/subjects/surv.html

Gain an internationally recognised skill with great employment prospects. Study Surveying and you'll become a specialist in precise measurement and an expert in land law and land ownership.

You'll learn how to subdivide land and assess its development potential, undertake city and environmental planning, design urban infrastructure, and prepare resource consents. You'll even gain the skills to map the ocean floor!

Alongside lectures, you'll hone your technical skills in practical classes, computer labs and on field trips, and gain expertise in the use of technology such as GPS and laser instruments.

Surveyors and geospatial professionals are in high demand and most BSurv graduates gain full-time employment before they complete the final year of their degree.

Career opportunities

The BSurv degree is the only academic qualification offered in New Zealand that leads to licensing by the Cadastral Surveyors Licensing Board – a licence to carry out land title surveys that is also recognised in all Australian states. It can also lead to professional membership of Surveying + Spatial NZ (formerly the NZ Institute of Surveyors).

Career opportunities are varied. You could work for a private sector company involved in defining land boundaries, mapping and designing subdivisions (including roads, stormwater and sewerage systems), and preparing resource consents. Or you might work for a government agency or a local authority in their policy planning or GIS departments.

Surveying Measurement

otago.ac.nz/courses/subjects/surv.html

The BSc degree in Surveying Measurement focuses on the precise measurement of position applied to land, the sea floor and built structures. This degree may also be used as a basis for becoming an internationally qualified hydrographic surveyor.

Career opportunities

Career opportunities exist wherever there is a need for accurate spatial information or precise position measurement. Graduates may specialise in engineering surveying including road and building set out, underground mining or tunnelling, and hydrographic surveying. As these skills are internationally generic and may be applied in any country and in a variety of contexts, they are particularly useful for international students who will not be practising surveying in New Zealand.

Zoology

otago.ac.nz/courses/subjects/zool.html

Zoologists work to protect endangered species and wildlife from the pressures of habitat loss, disease, invasive species, and climate change. By studying animals at every level, from their DNA to their role in ecosystems, zoologists help maintain the biodiversity that could be crucial to our own survival.

On this programme, you'll be taught by ecologists, physiologists, developmental biologists, geneticists, evolutionary biologists, mathematicians, and even filmmakers, giving you a breadth of knowledge in a wide range of fields.

Alongside lectures and tutorials, you'll gain valuable hands-on skills through lab work, field trips and research studies. Dunedin's diverse natural surroundings provide an extraordinary range of native wildlife and habitats for study, including marine environments, mountains, grasslands and wetlands.

The first year of your degree will teach you the basics: you'll learn about molecular biology, genetics, bacteria and viruses, and theories of evolution with a strong focus on the wildlife of New Zealand and their conservation challenges. From second year onwards, you'll have the option to tailor your study around your interests or career aspirations.

Career opportunities

A degree in Zoology could take you around the world. You could work for a government department in research, management, pest control or policy development, or in the medical, veterinary and biotechnology fields. Other career paths include eco-tourism, secondary school teaching, and wildlife and fisheries management.

Hands-on experience for secondary students

Alongside the community engagement programmes developed by individual departments, the Division of Sciences has developed three important programmes to support secondary school students: Otago Science Academy, Science Wānanga and what has now evolved into Hands-on at Otago.

Otago Science Academy

The Science Academy is an exciting programme aimed at Year 13 students from rural/provincial and formerly lower decile schools with a passion for science and the potential to excel in their final year NCEA and/or scholarship science exams. It provides you with the opportunity to work alongside, and be challenged by, leading scientists across a wide range of disciplines.

You will attend two residential science camps on the University of Otago campus – a summer science camp in January and a winter science camp in July. Between science camps you will work collaboratively in small teams on a science communication project that you will present at the end of the July camp. Following the July camp you will be supported by our online tutors, who will present 10 online tutorials targeted at NCEA/scholarship physics, chemistry and biology in the run up to your externals at the end of the year.

otago.ac.nz/ouassa/index

Tuia i Hawaiki, tuia i te Uru – Science Wānanga

Tuia i Hawaiki, tuia i te Uru – weaving together the strengths of western science (te Uru) and mātāuranga Māori (i Hawaiki) to navigate new ways forward for our people and to bring the best of both worlds together.

A three-day noho marae full of fun, interactive science activities for rangatahi Māori Years 7–10 students.

Staying on marae with university student tuākana, scientists and kaumatua, rangatahi Māori get to hang out and do real science in their local communities. The supportive partnerships between iwi, kura and Te Whare Wānanga o Ōtākou, the Division of Sciences, are the strength of the programme.

Wānanga encourage us all to explore the connections between science, mātāuranga Māori and our lives, especially the links between human health and environmental health. If you're a Māori student who's passionate about the world around you, we'll help you get to where you want to be.

The below statement is one of the whakatauki we have embedded to guide our kaupapa.

“Poipōia te kākano kia puawai – nurture the seed and it will blossom.”

otago.ac.nz/science-wananga



Hands-on at Otago

Experience a week of the Otago student life over the summer holidays.

Each morning, students participate in a research project in one university department. Allocation to these projects is based on the five projects you selected at registration. For each project we also try to achieve a good balance of skills and backgrounds, while accommodating the specific requirements of individual projects and supervisors.

The Taster programme allows students to have a small taste of a variety of other research activities, both on and off campus, during the afternoon programme. Each afternoon Taster comprises two hours of interactive, fun opportunities for students to see researchers in action in real-life situations.

The learning programme is balanced by a variety of social and recreational activities in the afternoons and evenings.

otago.ac.nz/hands-on-at-otago

Contact us Whakapā mai

AskOtago

AskOtago is your one-stop shop for all questions about studying at Otago.

You can find answers with our searchable knowledgebase, or call, email or chat with us.

You can also find us at our hub in the Information Services Building, or at one of our other hubs around campus.

ask.otago.ac.nz

Schools' Liaison Officers

Our liaison staff visit secondary schools around New Zealand to provide you with information and advice about courses and life at Otago.

otago.ac.nz/liaison

Course advice

Course advice is available as many times as you need throughout your time at Otago.

otago.ac.nz/courseadvice

Useful additional information

Your future in Science starts at Otago

otago.ac.nz/sciences

General information for new students

otago.ac.nz/future-students

Applying to study at Otago

otago.ac.nz/enrolment

Accommodation at Otago

otago.ac.nz/accommodation

Locals Programme

otago.ac.nz/locals

Te Huka Mātauraka / the Māori Centre

otago.ac.nz/maoricentre

Pacific Islands Centre

otago.ac.nz/pacific

The Division of Sciences Māori and Pacific support offices provide ongoing support to students throughout their academic studies.

Māori Sciences@Ōtākou

Nau mai haere mai ki Te Rohe a Akikāroa – Welcome to the Division of Sciences!

Māori Sciences@Otago are committed to nurturing and supporting taurira Māori in all aspects of their journey at Ōtākou Whakaihu Waka. We are a dedicated team who provide a range of programmes, workshops, activities and support services to engage taurira Māori in Sciences, foster whanaungatanga with other taurira and create a culturally safe space for them to thrive and succeed.

otago.ac.nz/sciences/maori

Sciences Pacific Student Support

The Pacific Student and Community Support team – Sciences is committed to improving access, retention, and course completion for Pacific students. Our aim is to grow successful Pacific Sciences students by providing an environment in which they can achieve their academic aspirations while maintaining their cultural identity. We provide academic skills support (for undergraduate through to postgraduate studies), academic progress guidance and academic and social engagement opportunities for students. The team endeavours to support students in all facets of their academic journey at the University of Otago.

otago.ac.nz/sciences/pacific

While all information in this booklet is, as far as possible, up to date and accurate at the time of production, the University reserves the right to change courses and course requirements, and to make any other alterations, as may be deemed necessary.

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