TE AKA MĀTUATUA
SCHOOL OF SCIENCE
Study towards one of our internationally-recognised science qualifications with the support of our friendly and approachable staff. With excellent facilities and smaller class sizes, you’ll get a more personalised learning experience and graduate with practical skills that are in-demand by employers.

The foundation of every scientist’s training is a comprehensive undergraduate degree. With around 1400 undergraduate students, we are big enough to offer a wide range of science subjects while still being small enough to know each of our students by name. Our flexible degree programmes allow students to tailor their learning experience to suit their career ambitions, providing the ideal preparation for employment or further study.

We offer two undergraduate degrees, the Bachelor of Science (BSc), and the Bachelor of Science (Technology) [BSc(Tech)]. The BSc(Tech) degree is unique to the University of Waikato, giving students the chance to gain practical, relevant work experience as part of their undergraduate studies.

Haere mai ki Te Aka Mātuatua - Welcome to the School of Science

Kia ora koutou. As Dean, it is my pleasure to welcome you to Te Aka Mātuatua - School of Science, at the University of Waikato.

Whether you’re thinking about studying science or have a research question that needs answering, we would love to partner with you in your science journey. We cover a broad range of science disciplines with a unifying commitment to te taumata pūtaiao or the pursuit of outstanding science.

Across our Hamilton and Tauranga campuses, our students and staff have access to some pretty unique natural environments and world-class facilities.

So please join with us to connect your science, your environment and your future.

Margaret Barbour
Dean of Te Aka Mātuatua - School of Science
ENTRY REQUIREMENTS

Obtaining University Entrance will give you admission to either the BSc or BSc(Tech). Some of our majors have specific paper prerequisites based on NCEA Level 3. These will not impact on your ability to start your degree, though may require an additional bridging paper. These will be listed under the relevant subjects where applicable.

FACILITIES

As a Science student at the University of Waikato, you will have access to the University’s well-equipped laboratories using the most up-to-date equipment and software and will have the opportunity to examine features in the field and undertake field investigations using a wide range of techniques. You’ll be working alongside, and learning from, well-respected researchers, industry professionals and academics.

Key

H - Hamilton Campus
T - Tauranga Campus

SUBJECTS AVAILABLE AS MAJORS

- Aquaculture H
- Biology* H
  - Ecology and Biodiversity H T
  - Molecular and Cellular Biology H
- Chemistry H
- Earth Sciences H
- Environmental Sciences H T
- Materials Science H

SUBJECTS AVAILABLE AS MINORS

- Animal Behaviour H
- Biochemistry H
- Coastal Processes H T
- Geology H
- Hydrology H
- Soil Science H

* You can complete a major in either Ecology and Biodiversity or Molecular and Cellular Biology
By studying Aquaculture as a major at the University of Waikato’s Tauranga campus, you will be at the centre of the fastest growing aquaculture region in Aotearoa.

Aquaculture involves studying the underlying reproductive physiology and developmental biology of early life cycle strategies used by aquatic animal species. This knowledge is examined for its use in the husbandry, breeding and sustainable production of species in aquaculture.

As a University of Waikato aquaculture student, you will be able to understand and apply your knowledge of marine ecology, marine biosecurity and legislation relating to sustainable aquaculture. You will understand the key principles and practices in the aquaculture of fish, invertebrates, and algae.

You will also be able to identify opportunities, issues, and solutions relevant to the aquaculture industry in Aotearoa and “Blue Economy”, including the need to create diverse aquaculture projects that are both profitable and ecologically sustainable.

ENTRY REQUIREMENTS

All students with University Entrance can enrol directly into year 1 of the Aquaculture major. We also offer a pathway into year 3 of the programme for students who have completed the NZ Diploma in Environmental Management (Level 6) at Toi Ohomai Institute of Technology.

CAREER OPPORTUNITES

Students with a major in Aquaculture tend to find employment in a range of primary industries (particularly marine and coastal-based activities), and future employers include the aquaculture and marine bioproduct industry, local and national government bodies (such as the Department of Conservation and Regional Councils) and Crown Research Institutes (such as NIWA, AgResearch and Plant & Food Research).
Chemistry is fundamental to our understanding of all branches of science and for a wide range of industries. A degree in Chemistry from the University of Waikato means you’ll gain an excellent grasp of Chemistry theory, supported by a strong emphasis on practical expertise.

Employers recognise Waikato Chemistry graduates for their analytical and problem solving skills as well as for their high level of practical abilities – including hands-on bench and modern instrumentation skills.

A Chemistry qualification from Waikato appeals to a wide range of employers including analytical, forensic, industrial, environmental and medical laboratories. There is a shortage of Chemistry graduates in New Zealand and overseas and a critical shortage of qualified Chemistry teachers.

Better building materials and textiles, improved medical aids, new alloys, more productive agriculture, better environmental control and remediation – all rely on the chemical expertise you’ll gain from studying at Waikato.

The structure of our chemistry major includes a range of theoretical, applied, quantitative and qualitative aspects. It will develop your analytical and problem-solving skills, which can be applied to many other disciplines.

### ENTRY REQUIREMENTS

To directly enrol in the Chemistry major, students require University Entrance and 16 or more credits in NCEA Level 3 Chemistry. For students with fewer than 16 credits in NCEA Level 3 Chemistry, we offer CHEMY100 - Chemistry in Context, as a pathway into the Chemistry major.

### CAREER OPPORTUNITIES

- Biochemist
- Biosecurity Officer
- Chemical Technologist
- Environmental Scientist
- Food Technologist
- Forensic Scientist
- Marine Studies
- Material Science
- Microbiologist
The demand for experts in Earth Sciences continues to grow as we look to better manage our soil, water, minerals, energy and coastal and marine resources, as well as understand natural hazards such as floods, earthquakes, tsunami, landslides and volcanic eruptions.

The University of Waikato is uniquely placed to offer a thorough grounding in all aspects of the Earth Sciences. We are situated close to both North Island coasts, a short drive from the active Taupo Volcanic Zone, at the heart of the richest farming region in Aotearoa, and have our longest river on our doorstep.

We are a leader in teaching and research related to the Earth’s environment, and offer you a learning experience that goes beyond the laboratory and lecture room - and out into the world.

The Earth Sciences major at Waikato consists of four main sub-disciplines: geology, soil science, hydrology and coastal processes. The first two years concentrate on fundamental knowledge and skills across all subdisciplines. In your final year, you’ll have the option to specialise in a specific area.

**CAREER OPPORTUNITIES**

- Coastal Engineer
- Coastal Resource Manager
- Engineering Geologist
- Environmental Consultant
- Geologist
- Hydrologist
- Soil Conservator
- Volcanologist
- Water Resource Manager
- Hazard Manager
In studying Ecology and Biodiversity you’ll learn about the distribution, abundance and biology of organisms and their role in New Zealand’s most important ecosystems.

The University of Waikato has a particularly strong reputation for our research in restoration of terrestrial and freshwater ecosystems, taking advantage of our close proximity to the Rotorua lakes, the Waikato River, and peat lakes and wetlands of the Waikato Region. Other areas of research include animal behaviour, Antarctic ecology, estuarine and coastal marine biology, forest ecology, plant and animal physiology, plant systematics, and urban ecology.

Our location provides quick access to a broad range of terrestrial, freshwater and coastal marine environments.

You’ll gain knowledge of ecological and biological theory, and the practical skills for field identification, surveying, and experimentation with plants, animals and microbes across a broad range of ecosystems. You’ll gain understanding of the principles of biological classification and be able to name and classify common organisms found in the ecosystems of Aotearoa.

ENTRY REQUIREMENTS
All students with University Entrance can enrol directly into year 1 of the Ecology & Biodiversity major. We also offer a pathway into year 3 of the programme for students who have completed the NZ Diploma in Environmental Management (Level 6) at Toi Ohomai Institute of Technology.

CAREER OPPORTUNITES
- Biodiversity Management
- Biosecurity and Customs Officer
- Conservation Ranger
- Research Associate
- Laboratory Technician
- Resource Manager
- Pest Management Advisor
- Field Researcher
- Technical Officer
- Ecologist
- Agricultural Technician
- Land Management Officer
The pressure on our environment is increasing as the human population grows. Environmental Sciences provide a basis for understanding environmental problems, and finding solutions to them.

The growing human population is expected to exceed 9 billion within the next 40 years. The need to provide for increasing human demands, while protecting and sustainably managing the environment, is one of our greatest global challenges. Environmental Science is at the core of this challenge.

A major in Environmental Sciences at Waikato encompasses ecology, Earth sciences, and environmental chemistry as well as many other disciplines. It is about understanding and managing human impacts on our land, biodiversity, freshwater, oceans, atmosphere and climate while providing the food, water, energy, and mineral resource needs that are critical to our survival.

At Waikato we take a strong interdisciplinary approach so you will gain skills in applying the biological, chemical and Earth sciences to understand and manage the impacts of human activities on the environment.

The Waikato and Bay of Plenty regions are great places in which to base your Environmental Science studies. We have easy access to a wide range of natural environments as well as some of the most intensive farming and processing industries in New Zealand. Our field trips and study examples include coastal estuarine environments, the Waikato and Waihou Rivers and a wide range of lakes. World heritage listed Whangamarino wetland, leading international examples of predator pest control at Maungatautari, and many native forest ecological restoration sites are all within easy reach of the University of Waikato.

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**CAREER OPPORTUNITES**

- Agricultural Adviser
- Biosecurity Officer
- Coastal Resource Manager
- Consent Planner
- Environmental Analyst
- Environmental Scientist
- Hydrologist
- Oceanographer
- Water Resource Manager
Explore the world of metals, polymers, ceramics, composites and semiconductors. From levitating trains to electronic paper, there are some exciting developments underway in the world of Materials Science that you could be a part of!

Materials Science focuses on understanding the intrinsic structure of a material and the control of its structure through processing. It studies the relationship of the engineering properties of the three main classes of materials (metals, polymers and ceramics) as well as composites and semiconductors.

Materials Scientists are in high demand internationally – particularly within the thriving polymer/plastics, metals, ceramics and composites industries. Your detailed understanding of material properties will help you to make important decisions on how to develop new materials and which materials should be used for specific products or applications.

**ENTRY REQUIREMENTS**
A major in Materials Science requires CHEMY101 Structure and Spectroscopy which is open to students who have 16 credits in NCEA Level 3 Chemistry.

**CAREER OPPORTUNITIES**
- Materials Production Scientist/Consultant
- Materials Failure Analyst
- Life Cycle Analysis Scientist/Consultant
- Sustainable Development Scientist/Consultant
- Corrosion Consultant
- Failure Analysis Consultant
- Metallurgical Manufacturing Scientist/Consultant
- Composites Manufacturing Scientist/Consultant
- Wood Manufacturing Scientist/Consultant
- Sustainable Materials Scientist/Consultant
Molecular and Cellular Biology is an interdisciplinary field combining biochemistry, microbiology, genetics and physiology to study how cells function at the molecular level.

Molecular and Cellular Biology explores the complex mechanisms that coordinate the essential systems that define a living cell and that allow cells to have differentiated properties. This knowledge is used to look at how unicellular and multicellular organisms function and how it can provide researchers with crucial insights into the basis of human and animal diseases.

Along with relevant subject knowledge, you will also gain a range of critical thinking skills, and practical learning experiences from our range of challenging and innovative papers and programmes. There is a significant laboratory component to the Molecular and Cellular Biology major, where you will learn relevant skills and be exposed to some of the latest techniques available.

Teaching is research-led, and you can expect to be taught by world-class researchers. Research strengths within Molecular and Cellular Biology include active programmes within molecular biology, structural biology and protein engineering, neuroendocrine processes that underlie food intake and biomedical related research relevant to veterinary and human medicine.

CAREER OPPORTUNITIES

- Agricultural Researcher
- Plant and Food Researcher
- Biochemist
- Biotechnologist
- Quarantine Officer
- Chemical Analyst
- Laboratory Technician
A minor is a good way to add a complimentary focus area to your degree. You can complete a minor subject by successfully taking four papers (60 points) in the same subject in place of elective papers. Te Aka Matuatua offers six minors:

**ANIMAL BEHAVIOUR**
Knowledge of Animal Behaviour is important for anyone interested in areas such as conservation biology of native birds, the control of pest species, evolutionary biology, population ecology and the efficient management of farm animals.

**BIOCHEMISTRY**
Biochemistry - the study of life in chemical terms - is one of the fastest growing areas of modern science. You’ll learn about the fundamental molecules of life - proteins, lipids, carbohydrates and nucleic acids - seeking to understand how they interact with living organisms, both in health and disease.

**COASTAL PROCESSES**
Examine the processes and factors that control landforms, resources and hazards, evaluate human effects, and identify and assess options to avoid or mitigate adverse impacts.

**GEOLOGY**
Modern society is very dependent on mineral and energy resources, including aggregates and cement for construction, metals for manufacturing, rare earths for electronics and batteries, and energy for operating equipments. The Geology minor provides the basic knowledge and skills required to understand the distribution of these resources on the Earth, evaluate the potential resources, and develop methods to maximise the utilisation of these resources while minimising the impacts on the environment.

**HYDROLOGY**
By studying Hydrology at the University of Waikato, you’ll understand the key components of water storage and water movement in and beneath the surface of the Earth, and the role of water in weather and climate. You’ll also learn about flood and drought hazards. Importantly, the Hydrology minor focuses on assessing the impacts of climate change on water resources, which is an area of frequent media coverage recently with floods, droughts and the exporting of bottled water.

**SOIL SCIENCE**
The growing global population is very dependent on increasing production of food and fibre from soils around the world. With a Soil Science minor you’ll gain the knowledge and skills to understand the distribution of different soil types, evaluate their characteristics, and develop methods to combat degradation and depletion of productive soils, and associated reduction in water quality - due to historical pressures and mismanagement.
BACHELOR OF SCIENCE (BSC)

Y1
100 level Major 100 level Major One from List A: Science Fundamentals One from List A: Science Fundamentals One from List C: Science Numeracy Elective Elective

Y2
200 level Major 200 level Major 200 level Major 200 level Major One from List C: Science Numeracy Elective Elective Elective

Y3
300 level Major 300 level Major 300 level Major SCIEN305 Science and Mātauranga Māori One from List B: Work-Integrated Learning Elective Elective Elective

BACHELOR OF SCIENCE (TECHNOLOGY) BSC (TECH)

Y1
100 level Major 100 level Major One from List A: Science Fundamentals One from List A: Science Fundamentals One from List C: Science Numeracy Elective Elective

Y2
200 level Major 200 level Major 200 level Major 200 level Major SCIEN270 Prep for the Professional Workplace One from List C: Science Numeracy Elective Elective

Y3
300 level Major 300 level Major 300 level Major SCIEN371 Science Work Placement (30 points) SCIEN305 Science and Mātauranga Māori Elective Elective

CONTACT US:
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For more information or entry requirements scan the qr code or visit waikato.ac.nz.