Welcome

Whether it’s adapting to climate change, turning waste into high-value products, improving treatment for diseases or developing technologies for the next generation, science and engineering contribute to almost every aspect of our lives.

New Zealand and the world need people with curious minds who are willing to ask the hard questions and who will work towards creating a brighter future.

The grand challenges facing society demand research that transcends disciplinary boundaries, requiring an increased flexibility in the ways we seek to understand the world and prepare our students for the future.

The Faculty of Science & Engineering is designed as a cohesive cross-disciplinary unit providing greater opportunities in teaching and research. We offer flexible, innovative degrees that produce multi-skilled, adaptable graduates who are ready for the challenges of today and have the skills to tackle the obstacles of tomorrow.

Our staff have acquired national and international reputations in their subjects and place emphasis on maintaining a good balance between the growth areas of science and technological application.

Combined with some of the world’s most advanced laboratory equipment, our staff are well placed to address many of the challenges as outlined by New Zealand’s National Science Challenges and the UN’s Millennium Development Goals.

Professor Chad Hewitt
Dean – Science
University of Waikato
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Get in touch:

School of Science
Phone: +64 7 838 4148
Email: science@waikato.ac.nz

Faculty of Science & Engineering
Toll free: 0800 438 254
Phone: +64 7 838 4625
Email: science@waikato.ac.nz
Website: sci.waikato.ac.nz
Facebook: WaikatoScienceEngineering

The University of Waikato
Toll free: 0800 WAIKATO
Website: waikato.ac.nz

Get advice
Free advice is available at any time. Call us if you'd like help to:
• Find the best degree for you
• Choose your papers
• Plan your timetable
• Complete your application to enrol

Apply to enrol
Apply to enrol online at waikato.ac.nz/enrol
From the natural environment, to our own health and wellbeing, to the technology we use in our everyday lives – science is everywhere.

It is scientists who will solve tomorrow’s problems and the future is calling for the next generation of curious minds that can do just that.

If you’re intrigued by the world around you and enjoy biology, chemistry, earth sciences or environmental sciences, a degree in science may be what you’re looking for.

Career options
A science degree will open doors to some of the world’s fastest growing industries and most exciting research areas, including the sustainable management of environmental resources.

Scientists also play a vital role within non-government organisations (NGOs), and local and central government.

Career options include:
- Agritechnology
- Biomedical research
- Biotechnology
- Coastal and land use planning
- Electronics
- Environmental management
- Food and dairy
- Iron and steel manufacturing
- Oil and gas
- Petrochemicals and plastics
- Pharmaceuticals
- Pulp, paper and wood
- Renewable energy
- Restoration ecology
- Software development
- Telecommunications

Why study science?
The University of Waikato’s Faculty of Science & Engineering offers innovative and relevant degrees to ensure you graduate with the theory, technical ability and leadership capability to be successful in the science industry.

World-class research
The University of Waikato is known for research excellence in environmental science, climate change, sustainable land use, biomedical innovation and sustainable industry.

A lot of our scientific research involves collaboration with businesses, other research institutes and local authorities, and it impacts development all over New Zealand and around the world.

Part of our success comes from our investment in world-class research equipment and facilities, most of which is available to students during their studies.

Laboratories and facilities
The School of Science is home to a suite of well-equipped laboratories, where you will spend a significant amount of time during your studies.

Most science papers include weekly laboratory sessions, giving you the chance to put what you’ve learnt in lectures and tutorials into practice. Our small class sizes mean that once you’re in these labs, you will have more one-on-one time with our teaching staff.

Our undergraduate students also have the opportunity to use complex research equipment and techniques, such as nuclear magnetic resonance (NMR) spectroscopy and DNA sequencing.

Field trips
In some papers you will be able to take part in field trips to local beaches, forests and lakes to conduct sampling and learn first-hand about the environments you are studying.

Student support
The Faculty of Science & Engineering has a team of mentors who are available to assist new students with study choices, career paths and anything else you may have questions about.

The Faculty also has a Māori Student Support Officer whose role is to provide ongoing support for students. There is also a team of kaitaki (mentors) available to help you with subject-specific areas, and wānanga (workshops) are offered.

Employer contacts
As a science student you will be exposed to potential employers at every stage of your degree, including guest speakers in your lectures, site visits during field trips and during work placements, Summer Research Scholarships and internships.

Extracurricular opportunities
Many subject areas have social groups that hold quiz nights and other social events, including the Waikato Biological Society.
If you’re intrigued by the natural world around you, or enjoy understanding how things work, Waikato’s Bachelor of Science (BSc) is what you’re looking for.

A BSc from Waikato will open doors to some of the world’s fastest growing industries and most exciting research areas, including climate change and the sustainable management of environmental resources. You’ll graduate with the theory, technical ability and leadership skills to succeed in the science industry.

A lot of our scientific research involves collaboration with businesses, other research institutes and local authorities, and it impacts development all over New Zealand and around the world. Part of our success comes from our investment in world-class research equipment and facilities, most of which is available to students during their studies.

The first year of the BSc will enable you to explore a range of scientific disciplines, laying a solid foundation for you to build on, even if you haven’t studied science before.

The BSc enables you to choose from a range of specific skill sets depending on how you wish to use your degree. Options include:

- Project-based learning that will prepare you for management careers in the science field.
- Research experience where you can practice the skills needed to succeed in postgraduate study and research-oriented careers.
- Entrepreneurial courses where mentors will help you develop your own ideas and teach you how to assess commercial viability.

Our science minors will give you a taste of a complimentary discipline to broaden your knowledge and demonstrate the breadth of your scientific skills. Alternatively, select a minor from a supporting non-science discipline to show employers you can apply yourself in a range of fields.

### Practical experience

Putting into practice what you learn in your lectures is a major part of our BSc. You’ll gain hands-on experience with some of the most high-tech laboratory equipment available, such as our mass spectrometers for investigating molecular structure. We also organise field trips to local beaches, forests and lakes for you to directly apply what you’re learning.

### Entry requirements

To enrol in the BSc, you need University Entrance or equivalent. Some first-year papers may have specific prerequisites, so check the paper catalogue carefully. If you do not meet the prerequisites, contact recruitment@waikato.ac.nz as there may be other pathways that you can take. The catalogue of papers can be found at papers.waikato.ac.nz

### Major subjects

- Chemistry
- Computer Science
- Earth Sciences
- Ecology and Biodiversity
- Environmental Sciences
- Molecular and Cellular Biology
- Psychology
- Materials Science*

### Minor subjects

You can either select a minor from the science subjects listed below, or undertake a minor in any other subject within the University.

- Animal Behaviour
- Applied Physics
- Biochemistry
- Chemistry
- Coastal Processes
- Computer Science
- Ecology and Biodiversity
- Environmental Sciences
- Geology
- Hydrology
- Materials Science*
- Mathematics
- Molecular and Cellular Biology
- Soil Science
- Statistics

*Subject to approval

### Career options

Here are some of the careers you could pursue:

- Conservation biologist
- Conservation ranger
- Environmental scientist
- Forensic technician
- Geologist
- Geotechnical officer
- Laboratory technician
- Marine ecologist

And there are many more. Chat to a Future Student Adviser if you’d like to know more about where this degree could lead. Email recruitment@waikato.ac.nz
Waikato’s Bachelor of Science (Technology) (BSc(Tech)) was the first degree of its kind in New Zealand, and offers a unique, job-oriented approach to scientific study.

The BSc(Tech) is a flexible degree, designed to provide students with the necessary practical experience to stand out among other science graduates.

It’s an internationally recognised degree, meaning you can find work anywhere in the world. A high percentage of graduates actively seeking employment find it within six months of graduating.

This degree includes 10 weeks of relevant work experience. The Cooperative Education Unit assists in matching students with placement opportunities, and offering reflective learning and skill development after the placements are completed. Students are regularly offered permanent roles following their placements.

Heading into the workplace with a BSc(Tech) from Waikato means you’ll have spent the summer between your second and third years gaining work experience and, in most cases, being paid for your efforts.

To prepare you for the workplace and gain an understanding of how the business world works, the BSc(Tech) includes a work preparation paper in addition to a wide variety of science papers.

The first year of the degree is similar to the BSc, enabling you to explore a range of scientific disciplines, broaden your opportunities and lay a foundation for you to build on, even if you haven’t studied science before.

From second year, your major will form the core of your degree and give you a much deeper understanding of a particular discipline. Minor subjects enable you to design a tailored programme that helps you differentiate yourself and ensure you have a unique skill set.

Our science minors will give you a taste of a complimentary discipline to broaden your knowledge and demonstrate the breadth of your scientific skills. Alternatively, select a minor from a supporting non-science discipline to show employers you can apply yourself in a range of fields.

Entry requirements
To enrol in the BSc(Tech), you need University Entrance or equivalent. Some first-year papers may have specific prerequisites, so check the paper catalogue carefully. If you do not meet the prerequisites, contact recruitment@waikato.ac.nz as there may be other pathways that you can take. The catalogue of papers can be found at papers.waikato.ac.nz

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• Environmental Sciences
• Geology
• Hydrology
• Materials Science*
• Mathematics
• Molecular and Cellular Biology
• Soil Science
• Statistics

*Subject to approval
Major in Chemistry

Chemistry is the science of substances – their structures, how they are bonded, how they react with each other, where they occur and in what amounts, and what they can be used for.

Chemistry is a central science, with connections to all other sciences and many areas of engineering. It forms a major growth area in modern science for both research and employment.

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

Developing hands-on skills and confidence in using modern instrumentation is a strong focus of our chemistry major. We pride ourselves on the quality and extent of practical experience our students receive while studying.

The Waikato region is often recognised as the agricultural heartland of New Zealand. This is underpinned by analytical chemistry, with a number of important commercial organisations in the region. We have strong relationships with these companies, both through our work placements, collaborative research and contract work, and they often employ our students and graduates.

Career options

- Biochemist
- Biosecurity officer
- Chemical technologist
- Environmental scientist
- Food technologist
- Forensic scientist
- Marine scientist
- Material scientist
- Microbiologist

Potential employers

- Agricultural industry
- Crown research institutes
- Education sector
- Food and dairy industry
- Forestry industry
- Medical research
- Pharmaceutical companies
- Horticulture and polymer industry

ALICE WANG
BSc(Tech), MSc, Chemistry
Technical Sales Specialist Asia-Pacific Region, Magritek

Waikato Masters graduate Alice Wang spends a lot of her work life travelling throughout the world.

Alice now works at Magritek, a scientific instrument company specialising in compact benchtop Nuclear Magnetic Resonance technologies. Based in Wellington, Alice looks after sales activities in the company’s Asia-Pacific markets.

“My responsibilities including selling our products, managing a network of channel partners, and attending conferences and exhibitions. This role combines my technical knowledge and people skills to connect with customers around the world.”

Alice was fortunate enough to spend a year in London at Tata Global Beverages for her final work placement of her degree – a real stand out from her time at Waikato.

“The industrial work experience I gained during my final placement was a definite highlight during my study. I learnt a lot of things working with talented people, and gained extra skills that can’t be taught in a classroom.”

Major in Computer Science

The use of computing technologies in entertainment, industry, business, education and government is growing, meaning there is a greater need for qualified professionals.

Computer Science is the body of knowledge that answers the fundamental question: What can be efficiently automated?

Computer scientists look at ways to systematically describe and transform information. Some focus on theory, some on implementing computations, others on programming languages and others on ways to improve human-computer interaction.

As a computer science student, you’ll learn about software systems and how people and computers interact. You’ll learn how to create new software, how to ensure it works well and does what it is supposed to, and how to make it easy for people to use.

Within the subject of Computer Science, there are several focus areas:

- Artificial intelligence
- Computer technology
- Data mining
- Games and multimedia
- Information systems
- Interaction design
- Internet applications
- Networks
- Software development

Facilities and equipment

The computer science facilities and equipment available to our students are among some of the best in New Zealand, ranging from mobile phone app development for phones and tablets, to cluster computers to massive parallel processing. Because our degrees are highly practical you’ll be working with these facilities and equipment right from your first semester.

Further study

- Master of Cyber Security
- Master of Information Technology
- Master of Science
- Master of Science (Research)

Career options

- Web architect
- Network engineer
- Programmer
- Software developer
- Systems analyst
- Usability engineer

Potential employers

- Consulting firms
- Hardware manufacturers
- Major private companies
- Software companies
- Telecommunications firms
- Web development firms

CLAUDIA WU
BSc with First Class Honours, Computer Science
Avondale College, Auckland
Senior Portfolio Analyst; ANZ

Claudia Wu spends her days making sense of numbers, to ensure ANZ is lending responsibly.

“Our team manages ANZ's policies and strategies for retail and business banking. In a typical day, I look after an analytical ‘data mart’ and make sure the data that comes in is accurate for analytical purposes.”

Claudia monitored job ads online and found that analyst positions appeared frequently and were advertised for longer periods than others, indicating a shortage in the industry.

She structured her degree accordingly, studying Computer Science, with supporting papers in Statistics and Mathematics. Her hard work paid off when she secured the position with ANZ.
Major in Earth Sciences

Earth Sciences is essential to facilitate the sustainable management of Earth’s energy, water, mineral, soil and marine resources.

The demand for experts in earth sciences continues to grow as the need for predicting and mitigating natural hazards such as floods, droughts, earthquakes, landslides, tsunamis and volcanic eruptions increases.

The Faculty of Science & Engineering is a leader in the teaching and research related to the environment. Earth Sciences cover volcanology, coastal and marine sciences, environmental sciences, soil science, hydrology, sedimentary geology and physical geography.

The Earth Sciences major consists of 4 main sub-disciplines: geology, soil science, hydrology and coastal processes. The first two years concentrate on fundamental knowledge and skills across all sub-disciplines. In your final year, you’ll have the option to specialise in a specific area.

The University of Waikato Hamilton campus is located close to both the west and east coasts of the North Island, a short drive from the active Taupo Volcanic Zone, at the heart of the most productive horticultural and agricultural region, and has New Zealand’s longest river at the doorstep. This provides an easily accessible real world “laboratory” for the teaching of Earth Sciences.

Most of the papers available within the Earth Sciences major involve field trips to examine and investigate physical environments. This includes undertaking the Tongariro Crossing to examine the active volcanic landscape and processes that operate on it, and measuring water properties within Tauranga Harbour. All papers include practical laboratory exercises to learn the skills necessary to characterise earth materials and develop the ability to solve problems.

The knowledge and skills provided by the major in Earth Sciences are taught in the context of the local environment, but due to the diverse features of that environment, they are transferable to other regions worldwide.

Career options

- Coastal engineer
- Environmental consultant/scientist
- Earth scientist
- Engineering/exploration geologist
- Groundwater scientist
- Hazard manager
- Hydrologist
- Oceanographer
- Petroleum geologist
- Soil scientist
- Technician
- Volcanologist
- Water resource manager

Potential employers

- Crown research institutes
- Education sector
- Energy companies
- Environmental agencies
- Environmental consulting companies
- National government, local bodies, regional and district councils

LAURA HINES
BSc, MSc(Research), Earth Sciences and Biological Sciences
Chemistry and Microbiology Laboratory Technician, Tatua Cooperative Dairy Company

Laura completed her Bachelor of Science and Master of Science (Research) with a double major in both degrees, and gained first-class honours in her Masters.

The connections Laura made with both students and lecturers were the highlight of her time at the University of Waikato. She is now working alongside some of the people she studied with and is sure that her networking during her study helped her to secure her current role.

Laura is working at Tatua Cooperative Dairy Company as a Chemistry and Microbiology Laboratory Technician. She enjoys the variety her role offers—one day she will be elbow deep in chemistry and the next in microbiology. Laura tests milk powders and food products to make sure they are within specification and are the highest quality before being released to the customer.

Tatua have given Laura the opportunity to carry out a work based project to determine if improvements can be made on current processes and procedures for thermophile and aerobic plate count tests.

Laura believes that “life is all about your attitude”. To succeed, she believes that students need to work hard, study hard, have goals and never be afraid to ask questions.
Major in Ecology and Biodiversity

Ecology and Biodiversity focuses on the distribution, abundance, and biology of organisms and their role in New Zealand’s most important ecosystems.

If you are interested in gaining an understanding of the management of living things and their interactions with people, a major in Ecology and Biodiversity is ideal. You will learn about the diversity of life on Earth and how this diversity emerged, as plants and animals become adapted to the environment and to each other.

The University of Waikato has a particularly strong reputation for our research program in lake and river ecology and restoration, taking advantage of our close proximity to the Rotorua Lakes District, the Waikato River, peat lakes and wetlands within the Waikato Region. Microbial researchers access geothermal areas in the Rotorua and Taupo Districts.

Our location provides quick access to coastal marine research, and the University maintains a coastal marine field station in nearby Tauranga. It also gives ready access to a broad range of terrestrial environments, including pastoral agriculture and lowland to montane forests.

This major includes field trips, surveying and organism biology across a broad range of ecosystems, from coastal marine and estuarine environments, to pastoral agriculture, freshwater lakes and rivers, natural forests and urban restoration sites. In laboratories students will be introduced to a broad range of organisms, learn skills in their identification and handling, and gain experience in research methods for studying organism biology and functioning.

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 New Zealand ecosystems.

Facilities
We have extensive laboratory facilities, including:

- Microbial, molecular genetics, physiology and ecology laboratories
- Microscope facilities, including confocal laser scanning microscopy, scanning and transmission electron microscopes
- Waikato Stable Isotope Unit
- Waikato DNA Sequencing Facility
- Environmental Research Institute
- Thermophile Research Unit
- International Centre for Terrestrial Antarctic Research
- University of Waikato Herbarium, a controlled environment glasshouse facility
- Field centres for freshwater and coastal marine science.

Career options
- Biodiversity advisor
- Biodiversity surveyor
- Biosecurity and customs officer
- Conservation ranger
- Laboratory technician
- Pest management advisor
- Field researcher
- Ecological consultant
- Ecologist
- Environmental scientist
- Agricultural scientist
- Museum curator
- Taxonomist
- Land management officer
- Zoo keeper

Potential employers
- Agricultural and fisheries sectors
- Biotechnology industry
- Conservation sector
- Crown research industries
- Medical and animal health
- Diagnostic laboratories
- National government, local bodies, regional and district councils
- Non-governmental organisations
- Zoos

ANTHONY COVENTRY
BSc(Tech), Earth Sciences and Biological Sciences
Zoo Keeper, Hamilton Zoo

Hanging out with rhinos is just a standard day in the office for Bachelor of Science (Technology) graduate Anthony Coventry. Anthony, a previous Otorohanga College Student, completed his BSc(Tech) in Biology and Earth Sciences at Waikato and now works as a Zoo Keeper at Hamilton Zoo.

“I work in the Ungulates Team, working mostly with rhinos but also with other animals such as giraffes, chimps and siamangs among others. I really enjoy building relationships and trust with the animals and exciting people about animals - inspiring them to look into what they can do to help both local and international conservation groups” says Anthony.

Anthony’s study enabled him to meet a number of people in a range of different industries through his work placements – which ultimately lead to getting his dream job at Hamilton Zoo.

“I really liked how the BSc(Tech) degree allowed me to have real work experience and connected me with people in the working world from a variety of industries”.

Study Science 9

Major in Ecology and Biodiversity
Environmental Sciences is the interdisciplinary scientific study of the relationship between humans and the environment.

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

The major in Environmental Sciences 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.

Waikato is a great region 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, a wide range of Lakes, from the relatively pristine Lake Taupo so some lakes with poor water quality such as Hamilton Lake within Hamilton City.

World heritage listed Whangamarino wetland, leading international examples of predator pest control at Maungatautere, and many native forest ecological restoration sites are all within easy reach of the University of Waikato.

Career options
- Agricultural adviser
- Biosecurity officer
- Coastal resource manager
- Consent planner
- Environmental analyst
- Environmental scientist
- Hydrologist
- Oceanographer
- Water resource manager

Potential employers
- Crown research institutes
- Education providers
- Energy companies
- Environmental consultancies
- National government, local bodies, regional and district councils
- Non-governmental organisations

SARAH BOWLER
BSc, Environmental Sciences
Rangitikei College

When Sarah visited Waikato University as a school student she fell in love with the serene campus and was impressed by the approachable staff. Now she is in her final semester of a BSc and the university has lived up to her high expectations.

“At Waikato Uni I don’t just get swallowed up by the crowds of people. I get the chance to be an individual and stand out and that comes from being on a first-name basis with lecturers and tutors.

The relatively smaller class sizes and the close student-teacher relationships have been so valuable for me in my studies so far.”

In addition to study, Sarah is working part-time at DairyNZ, an organisation dedicated to dairy industry success through ongoing sustainability, profitability and innovation.
Major in Molecular and Cellular Biology

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 subject explores how unicellular and multicellular organisms function and how it can provide researchers with crucial insights into the basis of human and animal diseases.

By studying a major in Molecular and Cellular Biology at the University of Waikato, you will:

- Gain a detailed knowledge of the molecules of life and the relationship between the structure and function of biomolecules;
- Understand the subcellular and cellular organisation of eukaryotic cells and the key catabolic, anabolic and metabolic cellular processes that occur;
- Learn how to distinguish between the genetic organisation and gene expression of viruses, prokaryotes, and eukaryotes, and describe the mechanisms of inheritance and evolution;
- Be able to describe the anatomy and physiology of mammals and other organisms, and the mechanisms behind certain 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.

Career options

- Agricultural researcher
- Plant and food researcher
- Biochemist
- Biotechnologist
- Quarantine officer
- Chemical analyst
- Laboratory technician

Potential employers

- Crown research institute
- Education providers
- Energy companies
- Environmental agencies
- Environmental consulting companies
- National government, local bodies, regional and district councils

Ella Grierson
BSc, MSc, Biological Sciences
Mercury Bay Area School, Whitianga
Research Associate, Plant and Food Research

Undergraduate and postgraduate study in biology has led to an exciting role in plant genetics for graduate Ella Grierson.

Ella works in the plant pigments team at Plant and Food Research in Palmerston North.

“I’m assisting with research focussed on understanding the genes responsible for certain valuable traits, to enable us to develop new plant cultivars faster. We use a wide range of techniques, and I’m currently working on projects involving molecular biology as well as tissue culture.”

Ella says that no two days are the same and she’s enjoying working with like-minded people who share her enthusiasm for plant biology. “Being part of such a friendly team and to be contributing to our understanding of plant genetics is really exciting.”
Major in Materials Science*

Materials Science is based on the relationship between the structure and behaviour of materials and how structures can be modified by processes.

Efficiently converting New Zealand’s raw materials and commodity goods into products is important to the national economy. To do this, we need to understand the properties of materials as diverse as food, wood, metals, plastics and fuel.

Materials Science involves knowing how to prepare raw materials, how to make reactions occur, and how to separate and purify the products.

It also involves understanding how to limit and treat wastes, minimise energy use, and consider sustainable processes. Ultimately, value is added to raw materials to manufacture useful products that can be as varied as dietary formulae, foods, ceramics that can withstand high temperatures, new metal alloys, pharmaceuticals, laminated boards, functional proteins, and composites.

The major in Materials Science allows you to gain expertise in engineering process time and temperature to enable control of material structure. It also allows you to understand the predictive capability for the influence of environment on long term material properties.

Materials Science skills are used in industrial and other activities where materials are undergoing chemical, biochemical or physical change.

Career options
- Materials scientist
- Energy efficiency engineer
- Environmental engineer
- Materials engineer (plastics, composites, metallurgy)
- Process design
- Products/process development engineer

Potential employers
- Crown research institutes
- Environmental industries
- Food and dairy industries
- Iron and steel manufacturing
- Oil and gas industries
- Petrochemical and plastics industry
- Pulp, paper and wood industries

Biodegradable plastic from animal protein waste

University of Waikato researchers have invented a novel manufacturing process to turn low-value animal protein into high-value biodegradable plastic. In New Zealand, bloodmeal is produced as a co-product from the meat industry and is available in large quantities, typically used as animal feed or fertiliser.

The new product, called Novatein™, uses bloodmeal and standard plastic processing equipment to produce bioplastic with a wide range of applications including seedling trays, plant pots, pegs, and vine clips.

Its unusual ingredient – bloodmeal – offers a cost competitive, sustainable alternative to petroleum-based plastic resins. Its bloodmeal colour can also be modified, giving it a translucent, honey-coloured appearance.

“For me, the most gratifying thing is being able to use low-value sustainable materials to create a high-value product that breaks down without polluting the environment,” says University of Waikato chemical and biological engineer, Dr Johan Verbeek.

*Subject to approval
Animal Behaviour

Animal behaviour focuses on the behaviour of animals in their natural habitats and ecosystems. This subject examines what can influence animals’ patterns of behaviour, their interactions with one another (including humans), and how they live within their environments.

Completing this minor will provide students with an understanding of how developmental processes can influence animals’ behaviour, mechanisms that trigger or control behaviours, what functions certain behaviours might serve for an animal, and how behaviours might have evolved over time.

Applied Physics

Applied Physics is the application of physics concepts to selected topics in science, and is designed to strengthen and broaden a subject major in Earth Sciences, Biology or Chemistry. It is designed to show how an understanding of fundamental physics principles can strengthen and enrich subject competence, by design, has a distinctively interdisciplinary nature that will enhance the learning experience of both science and non-science students.

The Physics content is motivated by practical examples drawn from geophysical exploration, nuclear chemistry and biomedical systems, and is supported by laboratory and field work.

Biochemistry

Biochemistry is the explanation of life in molecular terms. Life can be considered to be a range of complex interactions between molecules. Biochemistry is the study of proteins, lipids, carbohydrates and nucleic acids which are the fundamental molecules of life.

Biochemistry combines biological and chemical technologies to investigate cellular processes such as how cells communicate with each other during normal and disease states.

Coastal Processes

Coastal Processes engages in identifying and evaluating processes and factors that contribute to the formation and evolution of coastal landforms, which allows for the prediction of future coastal responses to changing climate and human activities.

A key element of this subject is the identification of the effects of human activities and evaluation of approaches that can be used to avoid or mitigate adverse impacts. Due to the complexity of coastal processes, and the competing demands made by society it is often not possible to identify a single solution to coastal issues. The Coastal Processes minor equips students with the skills to assess a range of potential responses and identify a best practicable approach.

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 equipment. 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

Hydrology is the study of water distribution, movement and quality in the environment. In New Zealand, weather events (floods, droughts, landslides, etc.) and accidental contamination frequently disrupts water supplies. The Hydrology minor provides the basic knowledge and skills required to understand the processes that control the spatial distribution of water on the Earth, assess the factors that impact on water quality and supply, and evaluate approaches to maximise water availability while minimising the impacts on the environment.

Mathematics

A strong mathematical background is a valued trait in today’s workforce. A minor in Mathematics will give you the knowledge and understanding of the subject itself, and valuable analytical and problem-solving skills. It is a subject of vital importance which underpins the study of biology, chemistry, computer science, earth sciences, cryptography, economics, engineering, finance, modeling (including environmental modeling), operations research, physics, and statistics.

Soil Science

The growing global population is very dependent on increasing production of food and fibre from soils around the world. Due to historical pressures and mismanagement, degradation and depletion of productive soils (and associated reduction in water quality) is a widespread problem.

The Soil Science minor provides the basic knowledge and skills required to understand the distribution of different soil types on the Earth, evaluate their characteristics, and develop methods to maximise the utilisation of soils while minimising the impacts on the environment.

Statistics

Statistics is the science of collecting and interpreting data. Almost every facet of modern life relies on some application of statistics.

Statistical analysis is used to make informed decisions in areas such as agriculture, industry, law, medicine, psychology, insurance and commerce. Without statistics we would have to resort to hunches or guesses.