

Mātai Matū

Undergraduate Chemistry

Chemistry is the science of atoms and molecules. If you want to understand the structure and properties of the world around you, then Chemistry is the science for you. It's a central science, and underpins fields as diverse as biology, geology, environmental science, medicine and engineering.

What you will learn

The University of Auckland is New Zealand's leading University¹, and studying Chemistry with us means you'll have access to award-winning laboratory facilities, and academics who are leaders in their field.

Chemistry deals with molecular structure and synthesis, chemical reactions and theoretical models that explain molecular behaviour. The study of Chemistry leads to new substances, better processing reactions and greater understanding of materials, biological processing and the environment.

If you'd like to study Chemistry with us, it would be beneficial to have studied chemistry at high school. Mathematics and physics also provide helpful numerical knowledge, but they're not essential.

Choosing a subject

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

Complementary majors include:

Anthropological Science

Biological Sciences

Earth Sciences

Environmental Science

Geography

Mathematics



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**Conjoint a
BSc to study**
2
degrees at once

Career opportunities

A career with wide-ranging opportunities

Chemistry is an extraordinarily multi-disciplinary science. The interaction with other sciences has an enormous influence on our modern lifestyle and standard of living.

Studying Chemistry leads to new substances, better processing reactions and greater understanding of materials, biological processing and the environment.

Future opportunities for Chemistry graduates are many and varied. You may offer future employers an ability to think logically, analyse complex systems and communicate clearly.

You may end up working in the fields of food, paper, brewing, paint and plastics, ceramics, metals and agricultural products. You could also work in a Crown Research Institute, medical and diagnostic or Government laboratories, and police forensic units.

Our Chemistry graduates have been employed in the following jobs:

- Food lab scientist, Ministry of Agriculture, Forestry and Food (Food Division)
- Teacher, Aorere College
- Technician, Westland Milk Products
- Laboratory assistant, AsureQuality
- Analyst, Agility CIS
- Technician, Watercare Services Ltd
- Project engineer, Woodside Energy
- Teacher, Macleans College

What you can study:

Chemistry of the living and material worlds

Spectroscopy

Properties of matter

Nano-materials

Organic chemistry

Molecular synthesis

Modelling chemical processes

Green chemistry

Biomolecular chemistry

Materials chemistry

Find out more

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

www.science.auckland.ac.nz/ug-chemistry



“What I love about studying Chemistry is the strong connection of both the scientific practice, inquiry, and learning, as well as discovering the art of the field both in and out of the theoretical and practical learning environments. As a lover of challenges and puzzles, Chemistry and Psychology enables me to be as creative as possible to formulate ideas in an attainable way guided by awesome academic staff, postgraduate students, and peers. There is always something to keep you on your toes.”

“Coming from Christchurch, the University of Auckland Top Achiever Scholarship for 2019 has enabled me to form important and cherished friendships and memories at the University Halls of Residence.”

Eugene In

BSc in Chemistry and Psychology



Read Eugene's full story at: science.auckland.ac.nz/eugene-in

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Mātai Taiao Ahupūngao

Undergraduate Environmental Physics

Environmental Physics is the study of the Earth and environment using physics and mathematics. It spans from the deep interior of the Earth to its surface, oceans and atmosphere. Environmental physicists aim to explain the physical phenomena we observe today to discover their past and model their future behaviour.

What you will learn

As an environmental physics student, you'll study the physical processes of the Earth, including the hazards posed by earthquakes and volcanoes, the currents in oceans and atmosphere, weather, and climate.

Environmental physics is a combination of the geophysics and atmospheric physics, brought together to provide a deep understanding of all the physical processes that are at work on our planet.

Studying environmental physics at the University of Auckland means you'll learn in an environment that is ranked first in New Zealand for earth and marine sciences, which includes environmental physics.**

Prerequisites

If you're interested in studying Environmental Physics with us, you will need to have taken physics and mathematics at high school. Geography, chemistry and statistics provide helpful background knowledge, but they're not essential.

Choosing a subject

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

Complementary majors include:

Computer Science

Earth Sciences

Environment Science

Geography

Mathematics

Physics



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Career opportunities

A workforce addressing the future

Important questions about the future of climate, energy, geohazards, and drinking water require a workforce that is well-versed in the different aspects of Environmental Physics.

As an Environmental Physics graduate you are trained in a variety of disciplines during your studies. These include mathematical modelling, statistics, physics and computer science, and can lead to a variety of career paths.

Our graduates can be found researching the geophysical processes involved with climate, plate tectonics, earthquakes, volcanoes, the oceans and our atmosphere.

You can also become explorers for natural resources, looking for oil, minerals and groundwater, and help to monitor and manage

environmental problems including natural hazards such as earthquakes, climate change and pollution.

Jobs for our Environmental Physics graduates include:

- Atmospheric scientist
- Energy industry consultant
- Geohazard researcher
- Ground and geothermal water exploration consultant
- Environmental and geotechnical specialist
- Mineral industry advisor
- Oceanographer

What you can study:

Climate

Structure and dynamics of the Earth

Natural hazards and resources

Oceans and atmosphere

Find out more

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

science.auckland.ac.nz/ug-Environmental-Physics

“Physics provided me with a solid foundation for learning about the earth, atmosphere, and oceans. I also like that the broad nature of what I study doesn’t restrict me to one industry or job—I feel like I have gained a lot of transferable skills during my study (which aren’t industry specific).”

Mahima Seth

Bachelor of Science, majoring in Environmental Physics and Physics.



Read Mahima’s full story at:
science.auckland.ac.nz/mahima-seth



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Mātai Pūtaiao Kai me Taioranga Kai

Undergraduate Food Science and Nutrition

We all need to eat, and there is a wealth of science behind the food we eat, how it's made, and how it affects our health. This science is part of a fascinating subject that is highly relevant to the lives of everyone: Food Science and Nutrition.

What you will learn

Food Science and Nutrition is the science behind the food we eat. From the effect food has on our behaviour and wellbeing, to new applications in food development, processing, compliance and food safety.

When studying this subject at the University of Auckland, you choose between two distinct pathways: Food Science or Nutrition.

If you choose the Food Science pathway, you'll study topics like food manufacturing, processing and production, food components and their properties, food safety, and product development.

If you choose the Nutrition pathway, you'll study topics like human nutrition, the health and wellbeing of individuals and populations, and the environmental, social, economic and cultural influences on eating behaviours.

Food Science and Nutrition includes courses from Biological Sciences, Chemistry, Medical Science and Population Health, to answer questions like:

- What constitutes a healthy diet?
- Is there a way to engineer food to improve its nutritional value?
- How does the human body break down food to provide us with the energy we need?

Food Science and Nutrition involves many scientific disciplines. You'll find it useful to have a broad science background, including high school chemistry and mathematics for the Food Science pathway. High school biology, physics and statistics are helpful but are not essential. Note that high school food technology is not required because it



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Career opportunities

Food Science

The food and beverage industry and food research institutes need well-trained Food Science graduates who can help to ensure safe, innovative and high-quality food production. Industry is constantly striving to meet consumer demands for foods that are not only safe but healthy, sustainable, natural, convenient and have good sensory properties to maintain wellbeing. Your day-to-day work could include research, food and ingredient manufacturing, food safety, product development and food analysis.

Nutrition

With an increasing awareness of the role of the foods we eat and their effect on health, our nutrition graduates are equipped to work in health promotion in the community, health policy in government, nutrition consulting as a registered nutritionist, nutrition information services, food industry, and the health and fitness industry. You could also choose to undertake specialised post graduate training in order to register as a dietitian.

Our Food Science and Nutrition graduates can be employed in many aspects of the Food, Nutrition, and Health industries. Some examples are:

- Danone, and Danone Nutricia Specialised Nutrition, Nestle, Bronson & Jacob and other large food multinationals;
- Heinz-Watties, Synlait, Westland Milk, Fonterra, Ceres and many classic NZ food companies;
- Retail health consultant, Auckland Clinical Studies;
- Ministry of Primary Industries, The Ministry of Health and other regulatory and policy government roles;
- Registered Nutritionist at companies such as Radix Nutrition, Zespri;
- Public health positions at The Heart Foundation, Healthy Auckland Together, Health Promotion Agency, and Healthy Families NZ;
- Plant and Food Research and other research organisations;
- Many laboratory and testing companies.

If you follow the Food Science pathway, your study will include:

A consolidation of chemistry, biology and mathematics subjects in first year

Taking foods apart to look at the individual food components, their functionalities and nutritional quality

Food microbiology, food processing, food preservation, emerging technologies and their benefits

Product development

If you follow the Nutrition pathway, you'll study topics such as:

Human anatomy and physiology

Biochemistry and metabolism

Population health

The many factors influencing eating behaviours

Find out more

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

science.auckland.ac.nz/ug-food-nutrition



“I have always had a passion for creating food; from reading cookbooks, being hands-on in the kitchen doing little experiments and watching how it’s made via video online. But really tying it all together by understanding all the processes that goes on behind bringing these products to life.”

“My ultimate dream was to see something that I created on a supermarket shelf and being enjoyed by consumers, and a part of that started off with doing this degree.”

Bonnie Lam

Bachelor of Science in Food Science and Nutrition (Food Science pathway).



Read Bonnie’s full story at: science.auckland.ac.nz/bonnie-lam

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Mātai Pūtaiao Matū Toitū

Undergraduate Green Chemical Science

Green Chemical Science involves the use of chemical principles, science and technology to advance society in ways that are sustainable and safe for the environment.

What you will learn

The approaches used in Green Chemical Science often involve interdisciplinary studies in catalysis, synthesis, toxicology, analytical methodology, materials science and biochemistry, in order to tackle global issues and problems that impact on sustainability.

As a Green Chemical Science student you'll have an interdisciplinary and highly practical learning experience. You'll study topics including pollution elimination, clean water production, production of materials from renewable feedstocks, mitigation of global warming, and the development of renewable energy technologies.

You can study Green Chemical Science as a specialisation in the Bachelor of Science (BSc) or a Bachelor of Advanced Science (Honours).

If you're interested in studying Green Chemical Science with us, it's a good idea to have taken chemistry at high school. High school biology is beneficial, but it's not essential. Mathematics, statistics or physics also provide helpful numerical knowledge.



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Career opportunities

A buoyant future in an interdisciplinary field

Businesses both here and overseas are fast realising that sustainability and reducing waste can lessen a company's environmental impact, increase their profit margins and improve consumer relationships.

What's good for the planet is good for business, and the demand for greener processes means there's an increasing number of jobs available in the sustainability science arena.

Green Chemical Science graduates may find themselves in multi-faceted spaces working alongside people with different skill sets to deliver the best products and processes.

As a graduate of this specialisation you'll be equipped with the necessary skills and knowledge to take advantage of these career opportunities, and to contribute to society in a meaningful and informed way.

Jobs for our Green Chemical Science graduates include:

- Biochemist
- Chemist
- Chemistry technician
- Environmental consultant
- Environmental scientist
- Research chemist
- Scientific adviser

What you can study:

Pollution elimination

Clean water production

Production of materials from renewable feedstocks

Mitigation of global warming

Development of renewable energy technologies

Find out more

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

science.auckland.ac.nz/ug-green-chem

“My area of research is centred around developing a novel and scalable technology, known as high-energy ball milling, to effectively destroy toxic chemicals at a molecular level.”

Kapish Gobindlal

PhD in Chemistry.



Read Kapish's full story at:
science.auckland.ac.nz/kapish-gobindlal



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Mātai Matū Rongoā

Undergraduate Medicinal Chemistry

Medicinal Chemistry is the study of the design, biochemical effects, regulatory and ethical aspects of drugs for the treatment of disease. It's one of the most rapidly developing areas within the discipline of chemistry, both globally and locally.

What you will learn

If you want to be at the forefront of designing and discovering new compounds that are suitable for use as new drugs, and learn about how a substance operates in the body and its suitability for use as a drug - Medicinal Chemistry is for you.

As a Medicinal Chemistry student you'll gain a strong foundation in biological and chemical techniques that are relevant to the pharmaceutical world. You'll study the synthesis, reactivity and analysis of organic compounds, and you'll gain valuable insight into the pharmacological, regulatory and ethical aspects of these bioactive compounds.

If you're interested in studying Medicinal Chemistry with us, it's a good idea to have taken chemistry at high school. High school biology is also beneficial because of the biological/medicinal focus of this specialisation, but it's not essential. Mathematics, statistics or physics also provide helpful numerical knowledge.



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Career opportunities

A foundation of multi-disciplinary skills

Medicinal Chemistry is one of the most rapidly developing areas within the discipline of chemistry, both globally and locally.

Studying Medicinal Chemistry is designed to equip you with the multi-disciplinary knowledge and skills relevant to a rapidly expanding pharmaceutical industry.

You will have a unique combination of skills: you will be trained in the synthesis, reactivity and analysis of organic compounds and gain valuable insight into the pharmacological, regulatory and ethical aspects of these bioactive compounds.

As a graduate you tend to find employment in a wide range of institutions such as hospitals, biomedical and pharmaceutical companies, private research institutions, local and national government authorities and agencies and Crown Research Institutes.

Our Medicinal Chemistry graduates have been employed in the following jobs:

- Quality assurance technician, Unitech Industries Inc
- Technology specialist, ARI Limited
- Logistics coordinator, Napier Port

Other positions and roles include:

- Developing guidelines and reviewing new drug applications
- Drug development, including drug formulation
- Testing potential new bio-active compounds

What you can study:

Biochemistry

Pharmacology of the brain and body

Spectroscopy

Properties and analysis of matter

Nano-materials and bio-macromolecules

Find out more

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

science.auckland.ac.nz/ug-med-chem

“Medicinal Chemistry is about designing, synthesising and discovering drugs by using fundamental knowledge from chemistry as well as other fields in science.”

Casey Park

Bachelor of Science in Medicinal Chemistry.



Read Casey's full story at:
science.auckland.ac.nz/casey-park



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Mātai Ahupūngao

Undergraduate Physics

Understanding physics means to understand the laws of nature, and the nature of matter. Physics is arguably the most fundamental of all sciences – study Physics if you want a sharp insight into the world around you, and you want to apply that knowledge to environmental, medical, communications, and other real-world applications.

What is physics? And what can I do with it?

Physics is the study of how matter, energy, and forces work at scales from the very smallest fundamental particles up to the grandest scale of the Universe itself, and importantly everything in between!

It's also about using our understanding of physics to do useful things. This means we frequently work beyond physics in both inter- and trans-disciplinary studies. For example, to create new medical imaging or communication technologies.

At the University of Auckland we have physicists studying the our planet's atmosphere and deep interior, and using the same understanding of how sound travels through the solid Earth to also make new medical imaging technology and ways of testing the ripeness of fruit.

We also have physicists who are studying quantum mechanics both experimentally and theoretically, and applying this knowledge to make cutting edge communication devices or making the nanomaterials of tomorrow. We are also involved with large international projects in particle physics and astrophysics.

The scope of what we do at Auckland is so wide because there is no "typical physicist" job. What you will learn is the skill of solving different problems using many different tools.

What you will learn

All of modern science and technology is underpinned by physics. As a Physics student you'll gain an understanding of matter as well as training in experimental methods and the mathematical analysis of physical processes, such as energy and force.

The University of Auckland is ranked first in New Zealand for physics and astronomy¹, and studying with us means you'll have access to state-of-the-art teaching facilities and lecturers who are leaders in their fields.

Prerequisites

If you're interested in studying Physics with us it's a good idea to have taken mathematics at high school, but it's not essential. High school mathematics modules in differentiation and/or integration provide useful background knowledge, which you'll find useful for developing your mathematical analysis and reasoning skills. If you've also taken high

school physics with some mechanics and waves modules, you'll find this background knowledge useful too.

It will be important to start your physics degree in the correct place. We have three main courses in our first year and which one you take depends on how much physics and maths you have done at high school. You will always end up in the same place, but it is key to start in a class that is the right level for you.

Choosing a subject

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

Complementary majors include:

- Chemistry
- Computer Science
- Earth Sciences
- Environmental Science
- Environmental Physics
- Mathematics



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Career opportunities

A door to a range of opportunities

A Physics degree provides students with the skills they need to succeed and our graduates are found in a host of interesting jobs in New Zealand and around the world.

From patent consulting to weather forecasting, many diverse avenues open up to graduates with training in Physics. Industry, in particular, takes many of our graduates. You could end up in research, business, finance, IT, teaching, or the environmental or engineering sector.

With a Physics degree you can plot a professional pathway that will take you places you've never been before.

Our Physics graduates have been employed in the following jobs:

- R&D for Fisher & Paykel Healthcare
- R&D for MacDiarmid Institute and Dodd-Walls CoRE spinout companies
- Software developer at Rocket Lab
- Teacher, Western Springs College
- Tester, Planit Software Testing - New Zealand
- Technical writer, Integrated Control Technology (ICT)
- Policy analyst, New Zealand Treasury
- Programmer, Catalyst IT

Other positions and roles include:

- Materials development
- Patent consulting
- Weather forecasting

What you can study:

BSc, BSc(Hons), BAdvSci(Hons) in Physics

Acoustics

Astronomy and Astrophysics

Nano and Materials Physics

Climate, atmospheric and ocean physics

Lasers and optics

Nuclear Physics

Quantum Physics

BAdvSci(Hons) in Applied Physics

Computational Science

Medical Physics and Imaging Technology

Nano and Materials Physics

Photonics

Space systems

Find out more

about how your degree will be structured and what courses you need to take at science.auckland.ac.nz/ug-physics

“The fundamental laws that govern our universe have interested me since I was young. I enjoy seeing how we can take a small number of essential principles and use them to understand a multitude of diverse phenomena.”

Caleb Todd

BSc in Physics and Mathematics, BSc (Hons) in Physics



Read Caleb's full story at:
science.auckland.ac.nz/caleb-todd



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