



# Chemistry Mātauranga Matū

“It is really amazing how chemistry can open up so many doors and you can end up doing something completely unrelated to your actual degree, but you never would've got there without it”.

Adelaide Johnston, Bachelor of Science (Chemistry), Laboratory Analyst, Zenith Technology

## Making, measuring, understanding

Chemistry is so much a part of our lives, sometimes we don't even notice it. It's at the heart of cooking and eating, breathing and seeing, the clothes we wear and the materials we use to construct our environment.

While studying Chemistry at Otago, you'll look at how chemicals interact with each other, with light, and with the environment; how to synthesise novel materials and measure trace amounts of pollutants. Research interests in the Department of Chemistry include nanotechnology and marine chemistry, the development of smart polymers and anti-cancer drugs. Chemistry enables change in our world – in medicine, technology, and the environment. Study Chemistry at Otago, and be part of it!

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## Why study Chemistry?

Chemistry is the science of matter; it's so fundamental it's been called the central science. Studying Chemistry will help you develop an understanding of how the universe works. You'll learn how to synthesise new chemicals that could have a profound effect on people's lives. You could assist with the discovery of new drugs, agrochemicals, catalysts and sources of energy, and gain a highly transportable and internationally recognised qualification in Chemistry. Studying Chemistry at Otago means you'll acquire problem-solving skills within a chemical framework.

## Background required

To enter Otago's Chemistry programme, you should ideally have studied chemistry to Year 13. Mathematics and physics at Year 12 or 13 would also be helpful. If you haven't studied chemistry to the appropriate level, or you think your grades are not good enough, we offer two further options:

**CHEM 150 Concepts in Chemistry:** A six-week paper taught as part of the University's Summer School. The first four weeks are distance-taught and the last two are on campus in Dunedin. This course is designed for students with less than 14 chemistry credits at Level 2.

**Introductory Chemistry:** A distance-taught programme for those with little or no chemistry background. This can be studied at any time throughout the year and students can take as long as they need to complete it.

## Careers

Careers involving chemistry are hugely varied and there's been a shortage of chemistry graduates in New Zealand in recent years.

Qualified chemists work in industries involving chemicals, plastics, pharmaceuticals, food, textiles and timber. These positions include areas in research and development, quality control, marketing, sales and management. Chemists also play leading roles in agriculture, horticulture, fisheries, water quality control, and in chemical, biochemical or medical

research units. They are 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. Recent changes in environmental and occupational health and safety legislation have also resulted in jobs for chemistry graduates, both in the public sector and industry. Chemistry graduates are in continual demand for commerce-related positions – employers recognise that people with a background in chemistry have been well-trained to handle information and deal with complex concepts. These are qualities relevant throughout the workforce in areas as diverse as finance, law, politics and sales. And remember, there is ongoing demand for secondary science and chemistry teachers throughout New Zealand.

## What will I study?

At 100-level – at least one of the following:

**CHEM 111 Chemistry: Molecular Architecture**  
This course focuses on atoms and molecules – the way they are put together and the way they interact with each other. You'll learn about modern methods of determining molecular structure and shape, and explore the relationship between molecular interactions and the properties of materials. As well as the theory, you will conduct practical experiments during laboratory sessions.

### CHEM 191 The Chemical Basis for Biology and Human Health

An introduction to the concepts of chemistry – underlying important processes in biology and human health, including energetics, kinetics, redox, equilibria and solubility, acids/base chemistry, stereochemistry and the organic chemistry of carbohydrates, amino acids and DNA.

At 200-level – you will expand your knowledge in areas including physical, organic, inorganic, biological and analytical Chemistry.

At 300-level, you'll hone your expertise even further, learning modern techniques of chemical synthesis and analysis, and be involved in basic research in an area of particular interest.

By the end of your Chemistry degree, you will have a sound understanding of a wide variety

of chemical processes and extensive research, analysis and practical skills.

## What other subjects go with Chemistry?

The short answer is "just about anything!" Because the scope of chemistry is so broad, it can be combined with a wide range of subjects and each combination opens up its own possibilities.

**Science:** Pair Chemistry with Computer Science, Geology, Physics, Mathematics and Statistics, Microbiology, Zoology or Biochemistry. Increasing numbers of students combine Chemistry with Food Science and Human Nutrition, or Physiology, Pharmacy and Pharmacology.

**Commerce:** Undertaking a double degree in Science and Commerce means students are well-placed to work in industry and business. Team Chemistry with Finance, Marketing, Information Science or Economics and see how far you can go!

**Law:** Patent law is an expanding area that demands graduates who have both a qualification in law and a strong background in science, particularly chemistry.

Other options may include combining Chemistry with Physical Education, Design, Clothing and Textile Sciences, Botany, Ecology, Marine Science, Genetics, Anatomy or Teaching – the list goes on! If there is any combination that grabs your attention, we can help you work it out. Just ask.

For questions about  
Chemistry  
[otago.ac.nz/chemistry](http://otago.ac.nz/chemistry)



## PROFILE

### Kavindra (Kavi) Wijenayake

Doctor of Philosophy (Chemistry), Service Development Manager, Oritain

Moving to a foreign country to study was always going to be a challenge, but the University of Otago was like love at first sight. Its scenic location, a long history unlike any other, the mix of countryside and city-life atmosphere, and a world-class reputation in research are just some of its special features.

My dream job was to become a detective, or be part of an investigative team solving forensic mysteries – to reach this goal, I would need to learn more science. After completing my undergraduate degree – majoring in Chemistry – I wanted to do a PhD to further specialise in the areas of chemistry used in forensic applications. I can undoubtedly say that it was the best experience in my entire study career, and the knowledge and wisdom that I gained during my PhD is something I truly treasure. It gave me the luxury to become an expert in the forensic field that involves 'chemical fingerprinting'; this method can be used to trace fraudulent activity, such as crimes related to provenance and authenticity that take

place in global supply chains.

Since completing my PhD, I am working for Oritain Global Limited in Dunedin. The science that Oritain uses is the exact science that I studied during my PhD. Moreover, Professor Russell Frew, one of the founders of Oritain, was my PhD supervisor. These factors really helped me to prepare for my roles in the company, however, if I wasn't so passionate, with a strong desire to partake in what Oritain does for the world, I wouldn't have succeeded and reached where I am now. My main aspiration for my future career is to help people who are suffering.

Anyone who gets the opportunity to study at Otago should be proud of themselves – simply because of what awaits you and is on offer to you throughout your uni-life and beyond. It's not just a degree, life at Otago is an adventure, and it will make you want to come back again and again if given the chance. If you want to live your best life, come to Otago!

