

School of Chemical and Physical Sciences

CHEMISTRY

UNDERGRADUATE COURSES

» 2026



Contact

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CHEMISTRY

Chemistry is everywhere. It is fundamental to all living beings, physical processes, materials and the environment. Chemistry underlies all the functions of the human body, our food, the consumer goods we use, the buildings we live and work in, the energy we generate and consume and the air we breathe. Understanding chemistry is the basis for understanding the function and structure of all of these, and also for developing new materials, pharmaceuticals, consumer products, technologies and processes to enhance our lives.

MAJOR REQUIREMENTS FOR CHEMISTRY

- chem121, chem122; 15 points from (ENGR121, MATH100-199, PHYS101, 142-145, QUAN111), 15 points from (BIOL111, BMSC117, BTEC101, ESCI111, 112, GEOG114)
- chem201, chem202, chem203; one of (chem205, chem206)
- 60 points from (chem301, chem302, chem303, chem305, chem306)

ENTRY TO 100-LEVEL CHEMISTRY COURSES

Advanced entry

If you have achieved 16 credits in Chemistry at NCEA Level 3 (which includes at least an achieved grade in two external achievement standards), you may enter chem121 in Trimester 1 or 2, or chem122 in Trimester 2, but we recommend that you take CHEM113 or SCIE105 in Trimester 1.

Intermediate entry

If you have fewer than 16 credits in Chemistry at NCEA Level 3 you will start with chem113 in Trimester 1. Successful completion of this course will allow you entry into chem121 and 122.

Novice entry

If you have not studied Chemistry to at least NCEA Level 2 you are strongly advised to take chem191 in trimester three (the summer trimester) (see page 4).

WHO TO CONTACT

All enquiries about undergraduate chemistry courses should be directed to A/Prof Mattie Timmer (Mattie.Timmer@vuw.ac.nz).

100-LEVEL COURSES

CHEM 191	CRN 7193 CRN 23006	Introductory Chemistry	15 PTS	3 3
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Prerequisites: none

Restrictions: chem113, 114, 121, 122

This summer bridging course provides basic chemical concepts and laboratory skills as a preparation for the study of chemistry at university level. It is designed for those with little or no background in chemistry or to be a refresher course for those who have studied chemistry in the past. In this course you will study the big ideas of science and chemistry, explore the fundamental building blocks of matter, and the connections between energy and reactions. You will also investigate these concepts whilst building your practical skills over a three day block in the laboratory.

CHEM 113	CRN 17147 CRN 33468	Concepts of Chemistry	15 PTS	1 3
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Prerequisites: none

Restrictions: chem114, 115, 121, 122

chem113 investigates electronic structures and properties of atoms, bonding and periodic trends. This knowledge will be applied to chemical processes including equilibria, redox reactions, transformations of acids and bases and organic reactions leading to an understanding why reactions occur. You will study the properties of organic compounds including nomenclature, isomerism, and the identification and reactivity of organic functional groups.

SCIE 105	CRN 35091	The Molecular Science of Life	15 PTS	1
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Prerequisites: none

Restrictions: SCIE 103 in 2022

Explore the molecular basis of human health and everyday life. You will learn about atomic and molecular structure and how this relates to the function of blood. Topics include electrolytes and osmolarity, blood group determinants, gas transport, blood pH, the molecules and chemistry of blood tests, and metabolic imbalances that lead to diseases that are commonly screened for using blood. This course is designed to support students from a range of backgrounds, including the health sciences. No previous chemistry experience needed. This course can be taken fully online, although in-person workshop sessions will be provided to assist with student learning.

SCIE 107	CRN 36125	The Molecular Brain	15 PTS	1
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Prerequisites: none

Restrictions: none

In this course you will explore the molecular basis of the brain. You will learn about atomic, molecular, and cellular structures, and how all three components are critical to understanding how the human brain “thinks”. You will learn about how the body makes molecules, and how drugs and neurotransmitters interact with receptors to affect neurological processes. Brain imaging and the molecular basis of diseases of the brain will also be discussed. This course is designed to support students from a range of backgrounds. No previous experience in chemistry or biology is needed.

CHEM 122	CRN 35060	Chemistry of Matter, Energy and the Environment	15 PTS	2
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Prerequisites: chem113 or 16 NCEA Level 3 Achievement Standard credits in Chemistry including two external standards, or equivalent background; MATH132, or B+ or better in (STAT193 or QUAN102) or 12 NCEA Level 3 Achievement Standard credits in Mathematics including one of 91575, 91577, 91578 or 91579

Restrictions: none

chem122 considers the chemical structure and properties of matter and uses this knowledge to explore the energetics of chemical processes and how this relates to the modern energy landscape. You will then apply this knowledge to investigate the chemistry of environmental systems. A central theme that is embedded within all topics is how chemical technologies can be used for our sustainable future.

200-LEVEL COURSES

CHEM 207	CRN 36108	Experimental Chemistry and Spectroscopy	20 PTS	2
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Prerequisites: 15 points from chem121, 122 (or 114, 115);

Restrictions: chem205 or 206

Chemistry is a science embedded within the physical world. In this practical, laboratory-based course, you will gain hands-on experience in modern chemical experimental approaches. You will develop skills in safe chemical handling, using and analysing instrumental data, and will link macroscopic observation with the microscopic world of chemicals. Additionally, workshops and computer simulations will supplement your learning in how to interpret complex data patterns to identify molecules and their behaviours at the atomic scale.

CHEM 208	CRN 36109	Chemistry of Life: Organic, Biomolecular and Medicinal Chemistry	20 PTS	1
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Prerequisites: chem121 (or 114);

Restrictions: chem201

Explore the structure and reactivity of organic and biomolecular compounds pertinent to metabolic processes and medicines. You will learn about molecular structure, reaction mechanisms, and spectroscopy, and the application of these concepts to the chemistry of alkene, carbonyl, alkyl, and aromatic compounds. The relevance of this chemistry to drug development and understanding the molecular foundations of living systems will be exemplified.

CHEM 210	CRN 36111	Chemistry: Matter and Reactivity	20 PTS	2
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Prerequisites: chem122 (or 114); 15 pts from (ENGR121, MATH100-199, PHYS101, 142-145, QUAN111);

Restrictions: chem202 or 203

Explore key topics for understanding chemical systems, from molecules to materials, including their reactions, changes, and transformations. Gain a fundamental framework for understanding how and why molecules/materials exist in the forms they do. Explore the roles of energy and light in chemical systems and chemical reactivity. Understand the reactions molecules/materials undergo, and the reasons, dynamics, and “why” behind chemical change. Real-world examples will be used to illustrate chemical applications.

300-LEVEL COURSES

CHEM 307	CRN 36112	Advanced Experimental Techniques	20 PTS	1
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Prerequisites: chem207 (or one of chem205, 206); (chem208 or 210);

Restrictions: chem305 or 306

Refine and expand your experimental and computational skills, exploring practical aspects of chemistry. Choose to build techniques across the breadth of chemistry or focus on medicinal chemistry related areas (depending on your individual interests and background). You will develop synthetic, computational and instrumental analysis skills, and investigate principles of measurement. You will also develop communication skills through the presentation of technical information and data in written, digital and oral formats.

CHEM 309	CRN 36114	Chemical Biology and Medicinal Chemistry	20 PTS	2
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Prerequisites: chem208 (or 201)

Restrictions: none

Explore the use of chemical tools for the study of biochemical pathways and the development of pharmaceutical drugs. Topics will include the design and synthesis of chemical probes, principles of medicinal chemistry, chemical biology, biosynthesis and an introduction to synthetic strategy.

CHEM 310	CRN 36115	Reactivity, Molecules and Materials	20 PTS	1
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Prerequisites: chem210 or (chem202 and chem203);

Restrictions: any of chem302, 303 or chem311, 312 in 2024

Explore the structure and reactivity of molecules and materials. You will learn about molecular structures, material structures, and their reactivities, properties and applications. The course discusses structure-property relationships as a foundation towards molecular reactivities, and materials applications in advanced technologies.