2017
Undergraduate courses
Biological Sciences

School of Biological Sciences
Te Kura Mātauranga Koiora

Location: 5th Floor, Kirk Building, Kelburn Campus
Office Hours: Monday–Friday, 8.00am–5.00pm
Phone: 04-463 5339 or 04-463 5207 or 0800 22 77 55 (toll free)
Email: biosci@vuw.ac.nz
Website: www.victoria.ac.nz/sbs
Bachelor of Science Degree Requirements

- A total of 360 points
- 210 points above 100-level, of which 150 points must be Science
- 75 points at 300-level
- 90 points can be from outside science (some majors also permit an additional 30 outside points).
- At least one Major, and a second Major may be from science or from any other first degree with a maximum of 150 points permitted from outside science.

Science Major Requirements

- 60 points at 300-level
- 60–80 points at 200-level
- 45–60 points at 100-level.

Science Minor Requirements

- 60 points above 100-level specified in the major, of which
- 15 points must be at 300-level.

PLEASE NOTE

Cancellation of courses
The courses offered by the University and listed in this prospectus may be cancelled by the University as a result of insufficient resources or student demand, or if other unforeseen circumstances arise.

Timetable changes
Check the timetable online for confirmation of course times.
http://www.victoria.ac.nz/students/study/timetables

HOW TO USE THIS GUIDE

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<td>CRN 566</td>
<td>CELL BIOLOGY</td>
<td>15 PTS</td>
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DISSECTION WORK

If you are doing a major within the School of Biological Sciences you will be expected to carry out some dissection work. This is because first-hand experience of organismal anatomy is an integral part of being a successful biologist. The extent of this work will vary depending on your degree programme, but will not exceed 35 hours. All dissection work done within the School conforms to the high standards of the Victoria University of Wellington Animal Ethics Committee, which meets both New Zealand and international standards for animal welfare. All our staff members are committed to the welfare of animals, and every effort has been made to minimise the use of dissections in our courses. However, if you still have valid reasons why you are unable to participate in dissection work, these can be considered on a case-by-case basis.
YOUR PROGRAMME

Use this template to plan your programme. Start by adding in the core papers for your degree.

Year 1: 120 points

Year 2: 120 points

Year 3: 120 points

BIOLOGY

At Victoria’s School of Biological Sciences you can specialise in any of the latest fields of contemporary biology, from genetics to ecology. With the Biology major you can combine elements of the other majors for a more flexible and broader degree.  
Note: Students with a BIOL major who wish to progress into BSc(Hons) or MSc in Biological Science must ensure that they have the pre-requisite courses for entry into a 400-level programme.

MAJOR REQUIREMENTS

a. BIOL 111, 113, 114, STAT 193 (or equivalent)
b. 60 points from BIOL/BMSC/BTEC 201–299
c. 60 points from BIOL/BMSC/BTEC 301–399.

BIOTECHNOLOGY

Biotechnology is the application of science and technology to living organisms. While it has been used for decades—to provide insulin for diabetics, for example—its potential and its implications for society are still being realised.

A BSc major in Biotechnology at Victoria provides a grounding in biotechnology and its underlying biological and chemical sciences. It is helpful to have some elementary knowledge of biology, chemistry and statistics. Students can specialise in areas such as bioactives and biodiscovery, protein and nucleic acid biotechnology and bioprocessing and microbial biotechnology. As well as a sound scientific education, students consider cultural and ethical issues, and are introduced to aspects of the commercial law and technology transfer involved in bringing biotechnological developments to the marketplace.

MAJOR REQUIREMENTS

a. BIOL 111, BTEC 101, CHEM 114, 115; one course from PHIL 106, 228
b. BIOL 241, BTEC 201; two courses from (BIOL 236, 244, 252, CHEM 201, 205)
   BTEC 301, SCIE 310; one course from (BMSC 340, BMSC 334, 339, CHEM 301, 305)
CELL AND MOLECULAR BIOSCIENCE

Science is at the heart of a knowledge-based economy, and in the new century bioscience is leading the way in innovation, enterprise and expansion. Cell and Molecular Bioscience is one of the five majors offered by the School of Biological Sciences within the BSc.

The subject concentrates on four areas: biochemistry and molecular biology, the science of living organisms at the molecular level; cell biology, the structure and function of cells in animals, plants and bacteria; genetics, the structure, function and regulation of genetic material; physiology and pharmacology, the integrated function of human organ systems and the effect of drugs.

One of the most in-demand and exciting areas in modern science, Cell and Molecular Bioscience offers a range of employment opportunities in New Zealand.

MAJOR REQUIREMENTS

a. BIOL 111, 113, 114, CHEM 114
b. BIOL 241, 243, 244, 252
c. BIOL 340, BMSC 339; one course from (BMSC 334, 335, 343, 354, BTEC 301)

ECOLOGY AND BIODIVERSITY

At Victoria’s School of Biological Sciences, you’ll learn about the huge diversity of plants, animals and micro-organisms that inhabit the Earth. After a broad introduction, the major in Ecology and Biodiversity focuses on areas of plant, animal and ecosystem diversity and function. Topics include physical and biological processes in ecology, genetics and molecular biology, statistics, plant ecology and conservation, animal ecology and behaviour, and evolution. You’ll find it helpful to have some elementary knowledge of biology and statistics.

Wellington offers access to some unique centres of native biodiversity including the Otari Native Plant Museum, Kapiti Island Bird Sanctuary and the urban wildlife sanctuary Zealandia. Current research interests include tuatara evolution and conservation, insect invasions and sex in plants.

For a career that has anything to do with the understanding and management of living things and their interactions with people, a BSc major in Ecology and Biodiversity is ideal.

MAJOR REQUIREMENTS

a. BIOL 111, 113, 114, STAT 193
b. BIOL 222, 227, 228, 241
c. BIOL 329, 40 further points from (BIOL 325, 327, 328)
Marine Biology is the study of ocean organisms and how they interact with one another and their environment. New Zealand has one of the most extraordinary and unspoilt marine ecosystems in the world, and Victoria, which has the closest campus to the sea, is a leader in the field of marine biology. The University has its own marine field station, the Coastal Ecology Laboratory (VUCEL), and its own research vessels, the tri-hull *Raukawa Challenger* and three aluminium vessels, *Pipi*, *Tuatua* and *Tipa*.

In addition to links with a host of New Zealand and international universities, the Marine Biology group has ties with industry and all the major players in the public sector of the marine industry. These include Crown research institutes such as NIWA, the Ministry of Fisheries and the Department of Conservation, all of which are located in Wellington. These varied links mean that at Victoria you will learn both how the oceans work and how humans interact with the marine environment.

Victoria also benefits from its proximity to New Zealand's major fishing port, Nelson, and the nation's aquaculture centre, the Marlborough Sounds. No other university is better placed to study life in the sea.

**MAJOR REQUIREMENTS**

a. BIOL 111, 113, 114, STAT 193  
b. BIOL 227, 228, 271, STAT 292  
c. BIOL 370, 371, 372
**THE VICTORIA BACHELOR OF BIOMEDICAL SCIENCE**

Human health and clinical medicine are supported by researchers and professionals whose training and skills are in the biomedical sciences. Old diseases that resist treatment or control, new diseases, changing human lifestyles and environments, and new and improved drugs are all challenges that draw the attention of biomedical scientists.

**BBMEDSC MAJORS**
- Human Genetics
- Molecular Pathology
- Molecular Pharmacology and Medicinal Chemistry.

**MAJOR REQUIREMENTS FOR BIOMEDICAL SCIENCE**

**PART 1— all majors**

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<td>a. BIOL 111, 114, BMSC 117, CHEM 114, STAT 193</td>
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<td>b. BIOL 241, 243, 244</td>
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Note: If you have fewer than 18 NCEA level 3 chemistry credits (or an approved alternative), you must take CHEM 113 in trimester 1 before entering CHEM 114

**PART 2— students must complete one of the following majors in addition to Part 1:**

**HUMAN GENETICS**
- a. BMSC 116, COMP 102 or 112
- b. BIOL 252
- c. BMSC 339, BIOL 340. BMSC 343; plus at least 20 further points from 200 or 300 level BIOL, BMSC, BTEC courses, and an additional 20 points from 300-level BMSC courses

**MOLECULAR PATHOLOGY**
- a. BMSC 116, COMP 102 or 112 or PSYC 122
- b. BIOL 252
- c. BMSC 301, 323, 334, 335, 340

**MOLECULAR PHARMACOLOGY AND MEDICINAL CHEMISTRY**
- a. CHEM 115, PSYC 122
- b. CHEM 201, 205
- c. BMSC 335, 354, CHEM 301, 305.

The writing courses, WRIT 101 (Writing English) and WRIT 151 (Academic Writing in ESL) are recommended.
### 100-LEVEL COURSES

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<td>CELL BIOLOGY</td>
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<tr>
<td>BIOL 113</td>
<td>CRN 7037</td>
<td>BIOLOGY OF PLANTS</td>
<td>15 PTS</td>
<td>1/3</td>
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<tr>
<td>BIOL 114</td>
<td>CRN 7038</td>
<td>BIOLOGY OF ANIMALS</td>
<td>15 PTS</td>
<td>1/3</td>
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<tr>
<td>BIOL 132</td>
<td>CRN 568</td>
<td>BIODIVERSITY AND CONSERVATION</td>
<td>15 PTS</td>
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<tr>
<td>BMSC 116</td>
<td>CRN 8738</td>
<td>SEX AND EVOLUTION</td>
<td>15 PTS</td>
<td>1/3</td>
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<tr>
<td>BMSC 117</td>
<td>CRN 8739</td>
<td>THE BIOLOGY OF DISEASE</td>
<td>15 PTS</td>
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<tr>
<td>BTEC 101</td>
<td>CRN 11092</td>
<td>INTRODUCTION TO BIOTECHNOLOGY</td>
<td>15 PTS</td>
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</table>

Structure and function of pro- and eukaryotic cells, an introduction to biological chemistry, cell ultrastructure and metabolism, cell division and development. An extensive introduction to cell biology. Cellular structure and function are examined, using examples from bacteria, plants and animals. A knowledge of introductory chemistry is an advantage but not essential.

An exploration into the structure, function and biodiversity of plants and fungi, emphasising their adaptations to different environments, their interactions with other organisms, and their fundamental importance to humanity. It offers a solid foundation for students who wish to pursue a career in plant sciences, ecology, conservation biology or biotechnology and is a key element of the Ecology and Biodiversity major. Extensive previous knowledge of plant biology is not required, but secondary school biology is helpful.

An introduction to animal structure and function. This course is largely based on the biology of mammals with a strong emphasis on human biology but comparison is made throughout with other animals. The aim is to demonstrate the structural and functional unity of animals and their variety and diversity as expressed in evolutionary terms. It is not assumed that students have an extensive previous knowledge of the subject, and those who do will find differences in scope and emphasis from school studies.

An introduction to the diversity, management and conservation of microbial, plant and animal communities. Using key taxa or ecosystems as examples, students will gain an appreciation of the current issues facing the world’s biodiversity, and explore possible methods for conservation, including habitat restoration, translocation and predator control.

This course examines broad evolutionary themes in relation to mating patterns, gamete and early development. Examples will be taken from fungi, plants and a range of animals, both vertebrate and invertebrate. Human pregnancy and birth will also be examined. Tutorial workshops are an opportunity to discuss and explore selected topics in more depth. The course introduces basic aspects of human anatomy, physiology, genetics and psychology, and is thus a stepping-stone to advanced courses in these subjects.

The aims of this course are to provide a solid understanding of the pure and applied science underlying the biotechnology industry, and to provide insight into the cultural and ethical values, and economic and political issues, that this science must align with. Particular focus in lectures will be given to the techniques and applications of recombinant biotechnology in microbes, plants and animals; harnessing natural resources; health-related biotechnology; reproductive biotechnology; environmental biotechnology and regulation of biotechnology.

### CHEM 113 CSV 17147 CONCEPTS OF CHEMISTRY 15 PTS 1/3
Prerequisites: We strongly recommend students who have not completed level 2 NCEA Chemistry take CHEM 191 over the summer
Restrictions: CHEM 114, 115

This course covers the fundamental concepts of Chemistry—the electronic structure and properties of atoms, periodic trends, chemical bonding, the relationship between structure and reactivity, chemical equilibria and thermodynamics, acids and bases, redox reactions, organic nomenclature and isomerism, the identification and reactivity of a selection of organic functional groups.

### CHEM 114 CSV 17148 PRINCIPLES OF CHEMISTRY 15 PTS 1/3
### CRN 17170
Prerequisites: CHEM 113 or 18 AS credits at NCEA Level 3 Chemistry including: AS91390, AS91391 and AS91392 or equivalent background in Chemistry

Principles of atomic and molecular structure; thermodynamics and kinetics; an introduction to the systematic chemistry of the main group of elements and transition metals and applications; and to a mechanistic interpretation of organic chemistry.

### CHEM 115 CSV 17149 STRUCTURE AND SPECTROSCOPY 15 PTS 2/3
Prerequisites: CHEM 114 or A- or better in CHEM 113 and concurrent enrolment in CHEM 114
Restrictions: CHEM 204

This is a unifying chemistry course in which we use a skills-based approach to chemical structural elucidation using electromagnetic radiation (i.e. light). In particular electronic, vibrational and rotational excitations, electron spin alignment and complete ejection of an electron, i.e. UV-Vis, IR, Raman, Microwave, NMR spectroscopies and X-ray diffraction will be explored from fundamentals to practical. Mass spectrometry will also be introduced.

### STAT 193 CSV 17147 STATISTICS FOR THE NATURAL AND SOCIAL SCIENCES 15 PTS 1/3
### CRN 17170
### CRN 17171
Restrictions: MATH 277, QUAN 102
Streams: 1/3: Stream A (CRN 1791)
          Stream B (CRN 11333)
2/3: Stream A (CRN 4442)
     Stream B (CRN 6164)
3/3: CRN 17069

An applied statistics course for students who will be advancing in other disciplines as well as those majoring in Statistics. It is particularly suitable for students majoring in Biological Science subjects, Geography, Linguistics, Psychology, social sciences such as Education. This course assumes no previous knowledge of statistics, but mathematics to Year 12 is preferred. Topics covered include estimation, confidence intervals and hypothesis testing, comparison of means and proportions, simple regression and correlation, and analysis of variance.
200-LEVEL COURSES

BIOL 219 CRN 8036 NEW ZEALAND FLORA AND FAUNA 15 PTS 2/3
CRN 8828

Prerequisite: 60 points

A hands-on exploration of how New Zealand's natural history has evolved to be so different from that found on continental landmasses. Lecture-based material will cover the basic principles of evolution, island ecology and historical biogeography. Local field trips in the Wellington region will reinforce lecture-based material by exposing students to native plants and animals.

BIOL 222 CRN 15180 ECOLOGY AND ENVIRONMENT 20 PTS 1/3

Prerequisites: STAT 193, 30 points from (BIOL 111, 113, 114, 132, ENVI/GEOG 114, ESCI/GEOG 111, ESCI 112)

Restrictions: GEOG/ENVI 222

The course will focus on physical and biological processes in terrestrial environments and ecosystem functioning. The field trip will introduce techniques relevant to field-based enquiry in ecology, environmental and earth science.

Note: Students who enrol in field courses must be physically able and must have a good level of physical fitness.

BIOL 227 CRN 9214 PLANTS AND ALGAE FUNCTION AND DIVERSITY 20 PTS 2/3

Prerequisite: BIOL 113

Plant and algal physiology and structure with emphasis on adaptations of the whole organism; diversity and evolution of photosynthetic organisms (including blue-green bacteria, algae and plants) and fungi.

BIOL 228 CRN 9215 ANIMAL DIVERSITY 20 PTS 1/3

Prerequisite: BIOL 114

Diversity, form and function of animals; an overview of the taxonomic and morphological diversity of all animals; focused study of selected terrestrial and aquatic taxa, including sponges, cnidarians, annelids, molluscs, arthropods and vertebrates (including fish, amphibians, reptiles, birds and mammals).

BIOL 241 CRN 9055 GENETICS 20 PTS 2/3

Prerequisite: BIOL 111

Restriction: BMSC 241

An introduction to the structure, behaviour and regulation of chromosomes, genes and DNA; and to the processes of heredity and the mechanisms by which genetic information is transmitted and expressed in animals (including humans), plants and micro-organisms. Introduction to population genetics and DNA technologies.

BIOL 243 CRN 9057 PHYSIOLOGY AND PHARMACOLOGY 20 PTS 2/3

Prerequisites: BIOL 111, 114; CHEM 113 or CHEM 114

Restriction: BMSC 243

The functioning and roles of the central and peripheral nervous system and endocrine/ neuroendocrine systems in the control of activity of the cardiovascular, respiratory, gastrointestinal and reproductive systems, as well as the digestion, absorption and metabolic responses to different environmental and energy demands. The emphasis is on mammalian physiology with particular reference to human functions. Elements of pharmacology are introduced in the context of modulation of normal function by pharmaceuticals.
### BIOL 244 CRN 18337  INTRODUCTORY BIOCHEMISTRY  20 PTS  1/3

**Prerequisites:** BIOL 111; CHEM 113 or 114  
**Restrictions:** BIOL/BMSC 239, 240, BMSC 244

The mechanisms and roles of metabolic processes in the interconversion of molecules in animals, plants and microorganisms.

### BIOL 252 CRN 9056  CELL AND DEVELOPMENTAL BIOLOGY  20 PTS  1/3

**Prerequisites:** BIOL 111, 114  
**Restriction:** BMSC 252

This course expands on topics introduced in first-year cell biology, covering the structure and behaviour of cells in relation to the underlying molecular events and the role of cells in the physiology and development of the whole organism.

### BIOL 271 CRN 9216  INTRODUCTORY MARINE BIOLOGY  20 PTS  2/3

**Prerequisites:** 60 points, including BIOL 114

An introductory course focusing on marine biology and ecology. This course introduces students to the diversity and physiology of marine organisms, biological oceanography, the structure and function of marine ecosystems such as the deep sea, polar seas, rocky shores, mangrove forests and coral reefs and marine conservation issues.

### BTEC 201 CRN 11093  MOLECULAR BIOTECHNOLOGY  20 PTS  2/3

**Prerequisites:** BIOL 111, BTEC 101

The aims of this course are to introduce the biotechnology industry, through examples of biotechnological innovation, introduction to microbial, plant and animal biotechnology, harnessing natural resources, health-related biotechnology and placing these in the context of cultural and ethical values and political issues.

### CHEM 201 CRN 8607  ORGANIC CHEMISTRY  15 PTS  2/3

**Prerequisite:** CHEM 114, 115 or equivalent

This programme builds on CHEM 114 and CHEM 115 with a molecular orbital approach to the mechanisms of fundamental organic chemical reactions, leading to a survey of the chemistry of conjugated systems, aromatic compounds and carbonyl chemistry.

### CHEM 205 CRN 8610  CHEMICAL SYNTHESIS LABORATORY COURSE  15 PTS  2/3

**Prerequisite:** CHEM 114, 115 or equivalent

CHEM 205 provides the opportunity to develop practical skills, competence and confidence in the chemistry laboratory with particular reference to the synthesis and purification of molecules and compounds; functional group transformations; physical, chemical and spectroscopic characterisation; and multi-step chemical syntheses. The programme provides an introduction to the nature of research involving organic and inorganic bench chemistry.

### STAT 292 CRN 18331  APPLIED STATISTICS 2A  15 PTS  1/3

**Prerequisites:** STAT 193 or a comparable background in Statistics  
**Restrictions:** STAT 291

This course is central to the Applied Statistics stream. Topics are statistical methods and their application in the biological, environmental, health and social sciences, including design of experiments, one-way and multi-way ANOVA and t-tests for difference of means, regression, analysis of covariance, binomial and Poisson distributions, contingency tables, models for binary response variables, and log-linear models for contingency tables. Examples are used for illustration throughout the course, using a statistical computer package.
### 300-LEVEL COURSES

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<td>BIOL 314</td>
<td>CRN 27126</td>
<td>ISLAND BIOLOGY – INTERNATIONAL FIELD COURSE</td>
<td>15 PTS</td>
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**Prerequisite:** BIOL/GEOG 222 and 15 200-level BIOL, ENVI or STAT pts; or permission of Head of School

This course explores the biology of isolated landmasses. The primary focus of the course is a field trip to Lord Howe Island, a small sub-tropical island off the coast of New Zealand. First, students will learn the ecological principles that shape the evolution of island biotas in readings and pre-recorded lectures prior to the field trip. Next, students will travel to Lord Howe Island for a week to conduct a range of field exercises that reinforce concepts that were covered previously readings and lectures. Students will also explore the specific conservation issues facing Lord Howe Island and how they relate to the challenges that will likely face New Zealand in the future.

| Course Code | CRN 19701 | GLOBAL CHANGE BIOLOGY | 20 PTS | 2/3 |

**Prerequisites:** BIOL 227, 228

An introduction to the eco-physiological responses of plants and animals to environmental and anthropogenic stress, with an emphasis on the effects of changes in global climate and land use. The course focuses on biological functions as they are affected by interactions with their physical, chemical and biotic environments.

| Course Code | CRN 9218 | POPULATION AND COMMUNITY ECOLOGY | 20 PTS | 1/3 |

**Prerequisites:** BIOL/GEOG 222, 15 200-level BIOL, ENVI or STAT points

**Assessment:** In-term 60%, final examination (3 hours) 40%

This course will cover practical and conceptual approaches to the study of plant and animal ecology; covering population dynamics, community structure and ecosystem ecology.

| Course Code | CRN 9219 | BEHAVIOUR AND CONSERVATION ECOLOGY | 20 PTS | 1/3 |

**Prerequisite:** BIOL 222, 15 200-level BIOL, ENVI or STAT points

This course will cover the behaviour and conservation ecology of animals and plants. The course will include ethology and sociobiology, and ecological, genetic and biogeographic principles relevant to reservation, restoration and reconciliation ecology. Topics will incorporate animal, population and meta-population management, pest control and biosecurity, and human dimensions of environmental management. Case studies and issues of topical interest will be debated.

| Course Code | CRN 9220 | EVOLUTION | 20 PTS | 2/3 |

**Prerequisite:** BIOL/BMSC 241

Origin and development of concepts about biological history including the establishment of modern experimental methods for understanding pattern and process in the origin of new species.

| Course Code | CRN 9598 | GENES AND GENOMES | 20 PTS | 1/3 |

**Prerequisites:** BIOL/BMSC 241, 244

**Restrictions:** BMSC 340

Recombinant DNA technology, biotechnology, gene organisation, expression, chemical genetics and evolution in higher organisms, bioinformatics and comparative genomics.
This seven-day field course includes 2 nights/3 days at a remote field site (dates TBC). The first meeting is at VUCHEL (Victoria University Coastal Ecology Lab, 396 The Esplanade, Island Bay), 8.30am sharp. Purchase and read the course manual prior to the start of class for more details.

An introduction to selected marine communities, marine ecology fieldwork, and the scientific process. Complementary modules on the field-based course introduce students to hard and soft shore intertidal ecosystems, sampling techniques, experimental design, statistical analysis and data interpretation. Students design, undertake, and present independent research projects at a remote field site.

This course focuses on quantitative ecology of marine systems. Lectures and laboratories encourage students to think critically and investigate ecological processes and how they shape population dynamics and community structure across a range of marine settings (e.g. soft shores, rocky reefs, and coral reefs). Course modules and assessments will emphasise quantitative methods including the design, statistical analysis, and interpretation of ecological field experiments and observational studies.

This course focuses on applied aspects of marine biology. In the first half of the course students will gain an understanding of New Zealand and world fisheries and aquaculture. The second half of the course focuses on conservation and marine management and topics covered include invasive species ecology, pollution, application of molecular techniques to marine management and marine protected area ecology.

This course charts the development of the microbiology field up to the present day. The course features an in-depth investigation of microorganisms at the genetic and phenotypic levels and examines their role in infectious diseases. Students will acquire practical experience in the characterization and identification of microbes using both classical and modern techniques. This course includes six 4-hour laboratory classes. Students are advised to check the laboratory class times before course enrolment.

The pathogenesis, morphology and complications of common benign and malignant diseases.

The cellular and molecular basis of the immune system, its organisation, reactions and controls in health and disease. Topics covered include the activation, differentiation and control of specific cell functions and immunological methods in research.
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<tr>
<td>BMSC 335</td>
<td>CRN 15263</td>
<td>ADVANCED PHYSIOLOGY</td>
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<tr>
<td>Prerequisite:</td>
<td>BIOL/BMSC 243</td>
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<td>Restriction:</td>
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Cellular, organismal and integrative physiology of the mammalian neural, cardiovascular, respiratory, renal, and endocrine systems. Advanced topics include neuroendocrine and pharmacological control of renal excretion and the circulation. Other topics covered include functional brain anatomy, motor control, cognition, and speech, muscle physiology, exercise physiology, control of coronary blood flow, hormone release, control of target cell function and reproductive physiology.

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<th>Course Code</th>
<th>CRN 15265</th>
<th>CELLULAR REGULATION</th>
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<tr>
<td>Restriction:</td>
<td>BIOL 339</td>
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Consideration of molecular processes which affect normal cell structure and function and their regulation. Abnormalities, including cancer, are also described.

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<th>ADVANCED GENETICS</th>
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<td>Restrictions:</td>
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A survey of experimental approaches in genetics, from classical screens to genomewide analyses, examining a variety of genetic model organisms and their specific applications, cytogenetics, chromosomal abnormalities and associated genetic counselling issues in humans. Fundamentals are applied to searches for complex disease genes, and understanding genetic variation in human populations.

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<th>PHARMACOLOGY</th>
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<tr>
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Review of the principles of pharmacology; transport across the blood brain barrier and placental membrane; drug biotransformations and application to prodrugs; assay techniques; quantification of drug absorption, distribution and elimination kinetics; drug targets; drug design; illustrative case studies.

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<th>Course Code</th>
<th>CRN 11094</th>
<th>BIOTECHNOLOGICAL TECHNIQUES AND PROCESSES</th>
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<tr>
<td>Prerequisite:</td>
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Theoretical and practical aspects of biotechnological techniques and processes, including the following subject areas: gene therapy, cancer therapeutics, antibody technologies, vaccine design, stem cells, aptamers (nucleic acids as structural tools), biosensors, intellectual property, bacterial genetics, fermentation technology, and chemical genetics. Lectures are presented by practicing specialists in each research field.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>CRN 9058</th>
<th>ORGANIC CHEMISTRY</th>
<th>15</th>
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<tr>
<td>Prerequisite:</td>
<td>CHEM 201</td>
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Advanced topics in organic chemistry such as biosynthesis of biologically important molecules, chemistry of reactive intermediates, pericyclic reactions, organometallic reactions in synthesis, retrosynthetic analysis and carbohydrate chemistry.

<table>
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<th>Course Code</th>
<th>CRN 9059</th>
<th>CHEMISTRY SYNTHESIS LABORATORY</th>
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This course involves the synthesis, isolation and purification of organic compounds. The programme provides for the development of advanced laboratory skills and the use of sophisticated techniques, including working under inert atmospheres and the application of advanced 2D NMR spectroscopy.
Research principles and methodology are illustrated with an emphasis on problem solving in organic chemistry.

<table>
<thead>
<tr>
<th>SCIE 310</th>
<th>CRN 26078</th>
<th>INNOVATION AND ENTREPRENEURSHIP 20 PTS</th>
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<tr>
<td>Prerequisite:</td>
<td>60 points of science above 100-level</td>
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The course covers the generic processes in the development of a technology or technological products with selected aspects such as economic analysis, entrepreneurship, project management, marketing and an introduction to tools for business planning.
WHO TO CONTACT

STUDENT AND ACADEMIC SERVICES—FACULTY OF SCIENCE

Te Wāhanga Pūtaiao
Address: Level 1, Cotton Building
Phone: 04-463 5101
Email: science-faculty@vuw.ac.nz
Website: www.victoria.ac.nz/science
Hours: 8.30am–5.00pm Monday, Wednesday, Thursday, Friday
9.30am–5.00pm Tuesday

At the Faculty of Science Student Administration Office, student advisers can help with admission requirements, degree planning, changing courses and transfer of credit from other tertiary institutions. They also deal with other aspects of student administration such as enrolment, exams organisation and the maintenance of student records.

Student Advisor Email Contact
Nique Nacu  nique.nacu@vuw.ac.nz  04-463 5101
Jessica Cameron  Jessica.cameron@vuw.ac.nz  04-463 5983
Annemarie Thorby  annemarie.thorby@vuw.ac.nz  04-463 7473
Cristina Sebold  cristina.sebold@vuw.ac.nz  04-463 5981

Johan Barnard  Manager, Student and Academic Services  04-463 5980
Shona de Sain  Associate Dean (Students)  04-463 5092

STAFF CONTACTS

<table>
<thead>
<tr>
<th>STAFF</th>
<th>ROOM</th>
<th>CONTACT</th>
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<tbody>
<tr>
<td>Head of School</td>
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<tr>
<td>Prof Simon Davy</td>
<td>KK505</td>
<td>463 5573</td>
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<tr>
<td>Deputy Head of School</td>
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<tr>
<td>A/Prof Kevin Burns</td>
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<td>Undergraduate Programme Directors</td>
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<td>Biomedical Science</td>
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<tr>
<td>Dr Lifeng Peng</td>
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<tr>
<td>Biotechnology</td>
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<tr>
<td>A/Prof David Ackerley</td>
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<tr>
<td>Cell and Molecular Bioscience</td>
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<td>A/Prof Paul Teesdale-Spittle</td>
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<td>Marine Biology</td>
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<tr>
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<td>KK722</td>
<td>463 8104</td>
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<td>ACADEMIC STAFF</td>
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<td>Enzyme engineering, biochemistry, microbiology</td>
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<td>Prof Simon Davy</td>
<td>Marine symbiosis and coral reef biology</td>
<td>KK705</td>
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<td>Dr Darren Day</td>
<td>Biochemistry, molecular biology</td>
<td>KK802</td>
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<tr>
<td>Prof Elaine Dennison</td>
<td>Clinical research</td>
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<td>Dr Julie Deslippe</td>
<td>Plant-microbial interactions</td>
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<td>Prof Jonathan Gardner</td>
<td>Marine biology, population and seascape genetics, marine reserves</td>
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<tr>
<td>Prof Kevin Gould</td>
<td>Plant ecophysiology</td>
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<tr>
<td>Dr Stephen Hartley</td>
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<td>Prof Anne La Flamme</td>
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<td>Insect ecology</td>
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<tr>
<td>A/Prof Wayne Linklater</td>
<td>Wildlife biology, human dimensions ecology</td>
<td>KK617</td>
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<tr>
<td>Dr Joanna MacKichan</td>
<td>Bacterial pathogenesis</td>
<td>KK804</td>
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<tr>
<td>Dr Melanie McConnell</td>
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<tr>
<td>Prof John Miller</td>
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<tr>
<td>Dr Andrew Munkacsi</td>
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<td>A/Prof Nicola Nelson</td>
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<td>Dr Diane Ormsby</td>
<td>Reproductive and developmental biology</td>
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<td>Proteomics</td>
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<tr>
<td>Dr Peter Pfeffer</td>
<td>Developmental and reproductive biology</td>
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<td>Dr Janet Pitman</td>
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<tr>
<td>Dr Peter Ritchie</td>
<td>Evolutionary genetics</td>
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<td>Prof Jeff Shima</td>
<td>Marine ecology and fish biology</td>
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<td>Biochemistry and pharmacology</td>
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<tr>
<td>Dr Heiko Wittmer</td>
<td>Conservation and restoration ecology</td>
<td>KK618</td>
</tr>
<tr>
<td>A/Prof Joe Zuccarello</td>
<td>Molecular biology and phycology</td>
<td>KK619</td>
</tr>
</tbody>
</table>
Adjunct Staff at the Malaghan Institute of Medical Research

Prof Graham Le Gros, Director  
*Asthma and parasitic diseases*  
499 6914 ext 822

Prof Mike Berridge  
*Cancer cell and molecular biology*  
499 6914 ext 825

Dr Elizabeth Forbes-Blom  
*Gut Inflammation*  
499 6914 ext 881

Prof Franca Ronchese  
*Immune cell biology*  
499 6914 ext 828

Emeritus Professors

Prof Phil Garnock-Jones  
*Plant taxonomy, phylogeny and evolution*  
KK419 463 6085

Prof John Wells  
*Taxonomy of copepoda*  
KK514 463 5324

Prof Ken McNatty  
*Reproductive Biology*  
KK611 463 6029

Prof Charles Daugherty  
*Conservation Biology*  
TBC

Administrative Staff

Lesley Thompson  
School Manager  
KK506 463 5332

Charlotte Ansell  
Administrator  
KK507 463 5207

Paul Marsden  
Administrator – Operations  
KK516 463 5555

Mary Murray  
Administrator  
KK507 463 5339

Sandra Taylor  
Administrator  
KK516 463 5747

Mark Stephen  
Administrator (Graduate Programmes)  
KK516 463 5581

Technical Staff

Stephen Meyer  
Manager Technical Services  
KK503 463 5579

Sushila Pillai  
Teaching Technician Coordinator  
KK420 463 5580

Neville Higgison  
Equipment officer  
KK415 463 5154

Dan Crosset  
Technical Officer – VUCEL  
CEL101 470 9257

Craig Doney  
Equipment Officer  
KK404 463 5154

Angela Fleming  
Technical Officer  
KK704 463 5233

Shaun Graham  
Equipment Officer  
KK404 463 5154

Derek Heath  
Technical Officer  
KK420 463 5580

Sue Keall  
Senior Technical Officer  
KK514 463 5324

Danyl McLauchlan  
Computational Biologist  
AM301 463 5735

Daniel McNaughtan  
Technical Officer – VUCEL  
CEL101 470 9257

Dr Lesley Milicich  
Technical Officer  
KK510 463 5233

Adrian Pike  
Technical Officer  
KK420 463 5580

Sushila Pillai  
Technical Officer  
KK420 463 5580

Pisana Rawson  
Technical Officer  
KK420 463 5580

Chris Thorn  
Technical Officer  
KK704 463 5233

John van der Sman  
Technical Officer – VUCEL  
CEL101 470 9250

Jennifer Howe  
Technical Officer  
KK704 463 5233 Ext 8240