

BACHELOR OF SCIENCE



Scientists are discoverers looking into the unknown, from the depths of the Antarctic Ocean to the workings of the human brain. A Bachelor of Science (BSc) will help you gain the essential skills needed to become a science innovator in the evolving job market of the future—you could be developing new technologies, treating diseases, protecting the environment, or addressing the many other problems that require expert scientific minds.

In this three-year undergraduate degree at the number-one ranked university in New Zealand for research quality, you'll absorb knowledge, observe phenomena, experiment with ideas, and maybe even be part of making new discoveries.

We encourage you to take advantage of the flexibility of a Science degree and choose from more than 20 specialist scientific programmes that Victoria University of Wellington offers, so you can combine your interests and your career aspirations.

At this university, you won't just learn about scientific theories, you'll also learn how to undertake research. Your BSc will position you ahead of other graduates in New Zealand, and the world, with skills in collecting, analysing and understanding data, thinking critically and creatively, and communicating your ideas effectively.

As a student, you'll find yourself surrounded by people passionate about science. Our staff are world leaders in their fields of research and you'll benefit from their expertise in lecture theatres and laboratory sessions. Much of their ground breaking research is carried out in the University's excellent facilities and out in the field, utilising Wellington's vibrant science community.

Home to many national organisations and the highest concentration of science organisations in New Zealand, our capital city location places Victoria University of Wellington at the heart of science discovery.

Relationships with Wellington's science community provide you with opportunities to gain valuable work experience and summer internships, and will position you among researchers who are key voices in significant debates, discussions, and discoveries.

In the latest Performance-Based Research Fund national assessment of research excellence, all disciplines in the Faculty of Science were rated either first or second for research quality in their subject areas. The 2019 QS World Ranking placed Development Studies, Earth Sciences, Geography, and Psychology in the top 100.


Join us in the heart of science discovery in New Zealand to change the world for the better.


FIND OUT MORE ABOUT THIS DEGREE


 www.victoria.ac.nz/bsc

FACULTY OF SCIENCE

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 www.victoria.ac.nz/science

POTENTIAL CAREERS

A BSc provides the ideal foundation for a career in any scientific area. Employers recognise that Victoria University of Wellington's Science graduates, with adaptable skills and the ability to think critically and creatively about challenging issues, are especially suited to the jobs of the twenty-first century.

You could become a clinical psychologist, conservation biologist, data scientist, marine scientist, meteorologist, or physicist—the possibilities are endless and, in our changing world, your future career may not exist yet.

i www.victoria.ac.nz/careers

POSTGRADUATE OPPORTUNITIES

A BSc may lead to further study at Honours, Master's, or PhD level. Postgraduate study is the ideal grounding for a career in any area of science, from biotechnology to theoretical physics, and is a requirement for some careers in science.

i www.victoria.ac.nz/science/postgraduate

RECOMMENDED SCHOOL SUBJECTS

It is useful to have studied Science and Mathematics at NCEA Level 3. Some Science courses have specific NCEA Level 3 entry requirements, and others have no specified criteria. You'll find entry requirements on the subjects and courses pages (from page 125).

Even if you haven't studied much Science at secondary school, if you are passionate about science and prepared to put in the effort, there are many options to support your study at tertiary level. It may be possible to take preparatory courses in Trimester 3 in the summer before your first year if you require additional study or do not meet NCEA requirements.



MAJORS

Major	Code
Actuarial Science	ACTS
Applied Physics	APHS
Biology	BIOL
Biotechnology	BTEC
Cell and Molecular Bioscience	CBIO
Chemistry	CHEM
Computer Graphics	CGRA
Computer Science	COMP
Data Science	DATA
Development Studies	DEVE
Ecology and Biodiversity	EBIO
Electronic and Computer Systems	ELCO
Environmental Science	ENSC
Environmental Studies	ENVI
Geography	GEOG
Geology	ESCI
Geophysics	GPHS
Marine Biology	BMAR
Mathematics	MATH
Physical Geography	PHYG
Physics	PHYS
Psychology	PSYC
Renewable Energy Systems	RESY
Science Communication	SCOM
Statistics	STAT

OTHER SUBJECTS

Science in Society (SCIS) is a minor offered in a range of disciplines and is designed to develop scientific literacy and communication of scientific ideas.

A minor in Forensic Science is available if you are majoring in Biomedical Science, Cell and Molecular Bioscience, or Chemistry during a semester of exchange study at the National University of Singapore.

DEGREE REQUIREMENTS

Three years of full-time study (or longer part time).

A total of 360 points is required:

- at least 270 points must be from courses listed in the BSc Schedule
- at least 210 points from 200- and 300-level courses
- of the 210 points, at least 150 points from courses listed in the BSc Schedule
- at least 75 points from 300-level courses listed in the BSc Schedule
- courses listed for other degrees may be counted as being BSc courses, including:
 - maximum of 30 points if taken to satisfy a BSc major
 - maximum of 30 points if taken to satisfy a second

(Continued on next page)

major from another first degree offered at this university

- maximum of 60 points across both these categories
- one course in ENGR 121–123, ENGR 142, MATH, PHYS, QUAN, STAT (or approved equivalent) at any level
- one approved course that demonstrates competency in oral and written communication
- the requirements for at least one major subject (see below) must be satisfied.
- 300-level courses may only be counted towards one major (or minor).

Other important information

You may also select up to two minors in undergraduate subject areas for the Bachelor of Arts, Bachelor of Architectural Studies, Bachelor of Commerce, Bachelor of Design Innovation, and the Bachelor of Science.

A minor comprises at least 60 points from the relevant subject area at 200 level or above, of which at least 15 points must be at 300 level and not counted towards a major or another minor.

Many courses have specific prerequisites, so you will normally need to start studying subjects you wish to minor in during your first year. Go to www.victoria.ac.nz/courses for details.

MAJOR REQUIREMENTS

You must complete major requirements in at least one major subject as listed below. The requirements listed are the normal requirements for a major, including prerequisite courses; statutory requirements are listed in the University's *Calendar*. Many courses have specific prerequisites—check the subjects and courses pages (from page 125).

In most cases, but not all, the courses listed in (a) of the major requirements below are what you need to take in your first year. To find out details of what a particular course is about and when it is taught, refer to the subjects and courses pages (from page 125).

Actuarial Science (ACTS)

- a. Complete six courses at 100 level: ACCY 130, ECON 130, ECON 141, MATH 142, MATH 151 (or at least a B+ in QUAN 111), MATH 177.
- b. Complete four courses at 200 level: ACTS 201, ECON 201, FINA 201 or FINA 202, MATH 277.
- c. Complete four courses at 300 level:
 - ACTS 301, either FINA 303 or 306, STAT 335; (and one further course from ACTS 336, FINA 303, 306, MATH 377).

Applied Physics (APHS)

- a. Complete four courses at 100 level: MATH 142, MATH 151, PHYS 114, PHYS 115.
- b. Complete four courses at 200 level:
 - two courses from PHYS 201–299
 - two further courses from ECEN 201–204, MATH 243, MATH 244, PHYS 201–299.
- c. Complete four courses at 300 level:
 - PHYS 343
 - either ECEN 301 or ECEN 303

- one further course from PHYS 301–399
- one course from PHYS 301–399 (or a related subject).

Biology (BIOL)

- a. Complete four courses at 100 level: BIOL 111, BIOL 113, BIOL 114, and STAT 193 or equivalent.
- b. Complete three courses from BIOL, BMSC, or BTEC 201–299.
- c. Complete courses worth 60 points from BIOL, BMSC, or BTEC 301–399.

The Biology major is not recommended if you wish to progress into the Bachelor of Science with Honours (BSc(Hons)) or Master of Science (MSc) in Biological Sciences. If you're interested in doing this, you should enrol in one of the other Biological Sciences majors (Biotechnology, Cell and Molecular Bioscience, Ecology and Biodiversity, or Marine Biology).

Biotechnology (BTEC)

- a. Complete five courses at 100 level: BIOL 111, BTEC 101, CHEM 114, CHEM 115, and either PHIL 106 or PHIL 361 or SCIS 211.
- b. Complete four courses at 200 level:
 - BIOL 241, BTEC 201
 - two courses from BIOL 236, BIOL 244, BIOL 252, CHEM 201, CHEM 205.
- c. Complete three courses at 300 level:
 - BTEC 301, SCIE 310
 - one course from BIOL 340, BMSC 301, BMSC 334, BMSC 339, CHEM 301, CHEM 305.

Cell and Molecular Bioscience (CBIO)

- a. Complete four courses at 100 level: BIOL 111, BIOL 113, BIOL 114, CHEM 114.
- b. Complete four courses at 200 level: BIOL 241, BIOL 243, BIOL 244, BIOL 252.
- c. Complete three courses at 300 level:
 - BIOL 340, BMSC 339
 - one course from BMSC 334, BMSC 335, BMSC 343, BMSC 354, BTEC 301.

Chemistry (CHEM)

- a. Complete four courses at 100 level:
 - CHEM 114, CHEM 115
 - one course in MATH or PHYS
 - one course from BIOL 111, BMSC 117, BTEC 101, ESCI 111, ESCI 112, GEOG 114.
- b. Complete five courses at 200 level: CHEM 201, CHEM 202, CHEM 203, CHEM 205*, CHEM 206.
- c. Complete four courses at 300 level from CHEM 301, CHEM 302, CHEM 303, CHEM 305, CHEM 306.

*The requirement for CHEM 205 will be waived for students completing majors in both CHEM and PHYS.

Computer Graphics (CGRA)

- a. Complete six courses at 100 level: CGRA 151, (COMP 102 or COMP 112), COMP 103, ANFX 101, either ENGR 121 and ENGR 123, or MATH 151 and MATH 161
- b. Complete five courses at (mostly) 200 level:
 - CGRA 251, COMP 261, (ANFX 201 or MATH 245), NWEN 241

- one course from ENGR 122, MATH 141, MATH 142, MATH 251.
- c. Complete four courses at 300 level:
- two courses from CGRA 301–399
 - two courses from ANFX, CGRA, COMP, MATH, NWEN, SWEN 300–399.

Computer Science (COMP)

- a. Complete the following courses at 100 level:
- COMP 102 or COMP 112
 - COMP 103
 - either ENGR 121 and ENGR 123 or MATH 161 and one of MATH 177 or QUAN 102 or STAT 193.
- b. Complete four courses at 200 level: COMP 261, and three further courses from COMP, CYBR, NWEN, or SWEN 200–299.
- c. Complete four approved courses from CGRA 350, COMP, CYBR, NWEN, or SWEN 300–399,

Data Science (DATA)

- a. Complete three courses at 100 level:
- DATA 101
 - One course from COMP 102, COMP 112, COMP 132, or both (INFO 151, INFO 226)
 - One course from MATH 177, QUAN 102, STAT 193.
- b. Complete four courses at 200 level:
- DATA 201, DATA 202
 - One course from MATH 277, QUAN 203, STAT 292
 - One further course from COMP 261, GEOG 215, INFO 264, MATH 245, MATH 251, MATH 261, MATH 277, PHIL 269, QUAN 201, QUAN 203, STAT 292, STAT 293.
- c. Complete four courses at 300 level:
- DATA 301, DATA 303, COMP 309
 - One course from DATA 304–399, COMP 307, ECON 303, GEOG 315, INFO 377, MARK 317, MATH 353, MGMT 315, MGMT 316, STAT 392, STAT 394, SWEN 304.

Development Studies (DEVE)

- a. Complete three courses at 100 level: GEOG 112 and one approved regional-based course and one approved subject-based course.
- b. Complete three courses at 200 level: GEOG 212 and one approved regional-based course and one approved subject-based course.
- c. Complete three courses at 300 level: GEOG 312, GEOG 316, and one approved 300-level course.

Lists of approved regional- and subject-based courses are on page 145 and online. GEOG 324 and GEOG 325 are strongly recommended for anyone interested in development studies research practice. These courses are required for the GEOG and PHYG majors, so if you're taking Development Studies as a double major with one of these majors, you cannot count these courses as part of the Development Studies major.

This major requires careful planning. We recommend you look at the Geography, Environment and Earth Sciences website (www.victoria.ac.nz/development-studies) and talk to a student adviser.

Ecology and Biodiversity (EBIO)

- a. Complete four courses at 100 level: BIOL 111, BIOL 113, BIOL 114, STAT 193.
- b. Complete four courses at 200 level: BIOL 222, BIOL 227, BIOL 228, BIOL 241.
- c. Complete three courses at 300 level: BIOL 329 and two further courses from BIOL 325, BIOL 327, BIOL 328.

Electronic and Computer Systems (ELCO)

- a. Complete five courses at 100 level:
- either COMP 102 or COMP 112
 - either MATH 142 and MATH 151; or ENGR 121 and ENGR 122
 - either ENGR 141 and ENGR 142; or PHYS 114 and PHYS 115.
- b. Complete four courses at 200 level:
- three courses from ECEN 201–299
 - one 200-level course from COMP, ECEN 201–239, NWEN, SWEN, MATH.
- c. Complete four courses from ECEN 301–399.

Environmental Science (ENSC)

This must be studied as a second major alongside Applied Physics, Biology, Chemistry, Ecology and Biodiversity, Geography, Geology, Geophysics, Marine Biology, Mathematics, Physical Geography, Physics, or Statistics.

- a. Complete four courses from BIOL, CHEM, ESCI, GEOG, MATH, PHYS, STAT 100–199, including:
- STAT 193
 - one course in MATH.
- b. Complete GEOG 214 and courses worth 40 points from BIOL, CHEM, ESCI, GEOG, MATH, PHYS, STAT 200–299 (in addition to those required by the partner major).
- c. Complete courses worth 60 points at 300 level, including:
- ENSC 301
 - either ENSC 302 or ENSC 303
 - further approved 300-level course(s).

Environmental Studies (ENVI)#

- a. Complete four courses at 100 level: ESCI 111, GEOG 112, GEOG 114, STAT 193 or equivalent.
- b. Complete three courses at 200 level:
- GEOG 214
 - one theory- or policy-based course
 - one practice or applied course.
- c. Complete three courses at 300 level:
- GEOG 314
 - one theory- or policy-based course
 - one practice or applied course.

Go to www.victoria.ac.nz/bsc-requirements for a list of approved courses.

*This major is under review and any change is anticipated to apply from 2020.

Geography (GEOG)

- Complete four courses at 100 level: ESCI 111, GEOG 112, GEOG 114, STAT 193 or equivalent.
- Complete three courses at 200 level: GEOG 215, GEOG 217, and one course from GEOG 212, GEOG 214, GEOG 216, GEOG 222.
- Complete four courses at 300 level:
 - GEOG 324, GEOG 325
 - one course from GEOG 312–316 or GEOG 320
 - one further course from GEOG 300–399.

Geology (GEOL)

- Complete four courses at 100 level:
 - ESCI 111 and ESCI 112
 - one course in MATH, PHYS, QUAN, STAT
 - one further course from CHEM 113–115, MATH 141–177, PHYS 114, PHYS 115, STAT 193.
- Complete four courses at 200 level: ESCI 202, ESCI 203, ESCI 204, ESCI 241.
- Complete five courses at 300 level: ESCI 301, ESCI 302, ESCI 341, ESCI 342; and either ESCI 303 or ESCI 305.

Geophysics—Meteorology (GPHS)

- Complete six courses at 100 level:
 - either COMP 102 or COMP 112
 - either ESCI 111 or ESCI 112
 - MATH 142 and MATH 151
 - PHYS 114 and PHYS 115.
- Complete four courses at 200 level:
 - either MATH 243 or MATH 244
 - MATH 251, PHYS 209, PHYS 223.
- Complete four courses at 300 level: MATH 322, MATH 323; two further courses from MATH, OPRE, or PHYS 300–399.

Geophysics—Solid Earth (GPHS)

- Complete five courses at 100 level:
 - ESCI 111 or ESCI 112
 - MATH 142, MATH 151, PHYS 114, PHYS 115.
- Complete five courses at 200 level:
 - MATH 243 or MATH 244
 - ESCI 203, MATH 251, PHYS 209, PHYS 223.
- Complete four courses at 300 level: ESCI 305, ESCI 344, MATH 323, and one further course from MATH or PHYS 300–399.

Marine Biology (BMAR)

- Complete four courses at 100 level: BIOL 111, BIOL 113, BIOL 114, STAT 193.
- Complete four courses at 200 level: BIOL 227, BIOL 228, BIOL 271, STAT 292.
- Complete three courses at 300 level: BIOL 370, BIOL 371, BIOL 372.

Mathematics (MATH)

- Complete three courses at 100 level: MATH 142, MATH 151, MATH 161.
- Complete four courses from MATH 200–299.
- Complete four further courses from MATH 200–399.

Physical Geography (PHYG)

- Complete four courses at 100 level:
 - ESCI 111, GEOG 114
 - either ESCI 112 or GEOG 112
 - one course in MATH, PHYS, QUAN, STAT.
- Complete three courses at 200 level:
 - GEOG 222
 - two courses from GEOG 215, GEOG 220, GEOG 224.
- Complete four courses at 300 level:
 - GEOG 324, GEOG 325
 - two courses from GEOG 318, GEOG 319, GEOG 321.

Physics (PHYS)

- Complete four courses at 100 level: MATH 142, MATH 151, PHYS 114, PHYS 115.
- Complete five courses at 200 level:
 - MATH 243; PHYS 221, PHYS 222, PHYS 223
 - one further course from ECEN 201–204, PHYS 201–299*.
- Complete four courses at 300 level: PHYS 304, PHYS 305, PHYS 307, PHYS 309.

*The requirement for one further course will be waived for students completing majors in both PHYS and CHEM.

Psychology (PSYC)

- Complete three courses at 100 level: PSYC 121, PSYC 122, STAT 193.
- Complete four courses at 200 level: PSYC 232, either PSYC 231 or PSYC 233, and two further courses from PSYC 200–299.
- Complete four courses at 300 level: PSYC 325 and three further courses from PSYC 300–399.

Students are not able to do a double major in Psychology (PSYC) and Education and Psychology (EDPS).

Renewable Energy Systems (RESY)

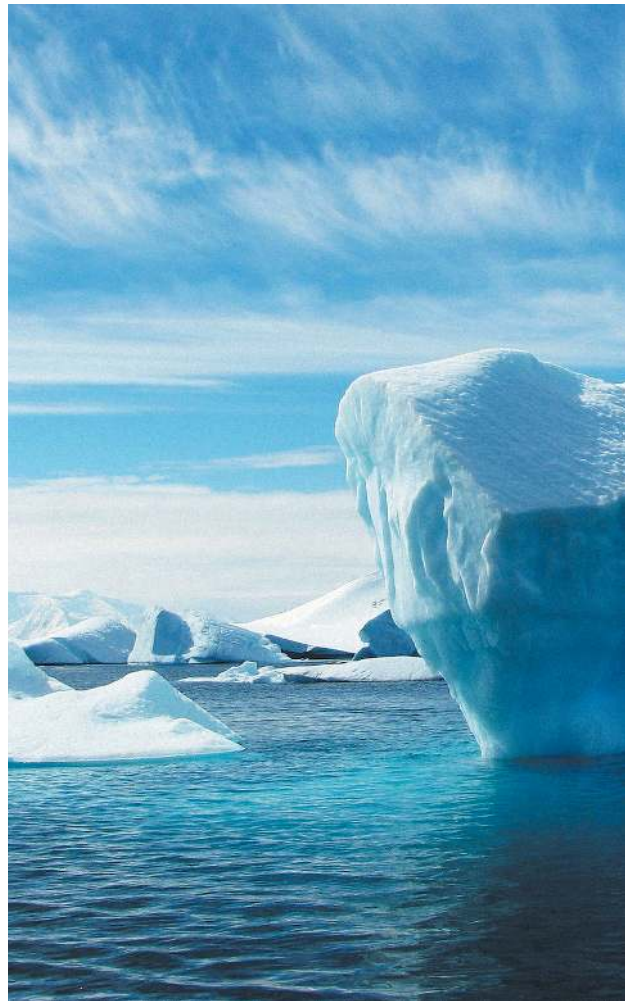
- Complete four courses at 100 level: ENGR 141 (or CHEM 114 and PHYS 114), ENGR 111, STAT 193 or QUAN 102, one further course from ENGR 121, MATH 141, MATH 142, MATH 151.
- Complete four courses at 200 level: RESE 211, RESE 212, two further courses from ECEN 202, ECEN 203, GEOG 214, GEOG 215, GEOG 217, GEOG 222.
- Complete four courses at 300 level: RESE 311, RESE 312, RESE 323, one further course from GEOG 314, GEOG 315, RESE 313.

Science Communication (SCOM)

- a. Complete two courses at 100 level: COMS 101, SCIS 101.
- b. Complete three courses at 200 level: COMS 201, SCIS 211, SCIS 213.
- c. Complete four courses at 300 level:
 - SCIS 311
 - one further course from CREW 352, SCIS 314
 - one further course from SCIS 300–399
 - one further course from COMS 300–399.

Statistics (STAT)

- a. Complete either MATH 177 or STAT 193 and one course from MATH 100–199 and STAT 100–199.
- b. Complete four courses at 200 level:
 - either STAT 292 and STAT 293 or MATH 243 and MATH 277
 - two further 200-level Science courses.
- c. Complete four courses at 300 level:
 - STAT 332 or STAT 393
 - one further course from STAT 300–399
 - two further courses at 300 level from MATH, OPRE, STAT.



DEGREE EXAMPLES

BSc majoring in Ecology and Biodiversity and Statistics

Year 1		Year 2		Year 3	
1/3	2/3	1/3	2/3	1/3	2/3
BIOL 113 15 points	BIOL 111 15 points	BIOL 222 20 points	BIOL 227 20 points	BIOL 327 20 points	BIOL 329 20 points
BIOL 114 15 points	STAT 193 15 points	BIOL 228 20 points	BIOL 241 20 points	STAT 391 15 points	STAT 393 15 points
MATH 141 15 points	MATH 177 15 points	STAT 292 15 points	BIOL 271 20 points	STAT 392 15 points	STAT 394 15 points
ESCI 111 15 points	ESCI 132 15 points		STAT 293 15 points	BIOL 325 20 points	
60 points	60 points	55 points	75 points	70 points	50 points
120 points		130 points		120 points	

Total points required: 360
Total points completed: 370

BSc majoring in Physics, with a minor in Mathematics

Year 1		Year 2		Year 3	
1/3	2/3	1/3	2/3	1/3	2/3
PHYS 114 15 points	PHYS 115 15 points	PHYS 222 15 points	PHYS 221 15 points	PHYS 305 15 points	PHYS 304 15 points
MATH 151 15 points	MATH 142 15 points	PHYS 223 15 points	PHYS 209 15 points	PHYS 307 15 points	PHYS 309 15 points
MATH 141 15 points	MATH 161 15 points	MATH 200 level 15 points	MATH 243 15 points	MATH 300 level 15 points	MATH 300 level 15 points
COMP 102 15 points	COMP 103 15 points	STAT 193 15 points	MATH 200 level 15 points	STAT 200 level 15 points	PHYS 300 level 15 points
60 points	60 points	60 points	60 points	60 points	60 points
120 points		120 points		120 points	

Total points required: 360
Total points completed: 360

Key

First major	Second major	Elective
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KAILEEN BUTTON

Student, Bachelor of Science in Cell and Molecular
Bioscience and Biotechnology

“The University offers students the opportunity to follow their passions and expand their knowledge with the best resources and lecturers. I have always been passionate about the cellular aspects of all organisms at a molecular genetics level. In my BIOL 252 Cell and Development Biology course, I was able to apply my knowledge of fundamental developmental cellular processes. In my laboratory sessions, I developed valuable cell-culturing skills and became the proud mother of sea urchin embryos.”

