

Earth Sciences

Postgraduate Handbook 2018



THE UNIVERSITY OF
AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

SCIENCE

SCHOOL OF ENVIRONMENT

Welcome to the School of Environment



Postgraduate study in Earth Sciences encompasses the disciplines of geology, geophysics and physical geography.

The Earth Sciences specialisation is offered by the School of Environment. We offer a diverse range of courses for postgraduate study. The school houses a vibrant community of more than 50 instructors and researchers. The mix of different interests creates a rich training and research environment.

New Zealand and the South Pacific region offer an exciting environmental laboratory to examine a wide-range of globally relevant research questions. Our location in Auckland provides the perfect gateway to access this unique natural laboratory.

Postgraduate study in Earth Sciences is an excellent step towards a number of careers, including professional geology and geoscience. It is also a strong foundation for postgraduate research.

We have an impressive array of field equipment and analytical facilities to support our research activities, alongside a talented group of postgraduate students from around the world who help to provide a stimulating and supportive environment for your studies.

I am confident that you will find studying Earth Sciences a satisfying and rewarding experience, and we look forward to working with you to meet your academic goals.

PROFESSOR PAUL KENCH
Head of School

Earth and Marine Sciences ranks in the

TOP 15 

universities worldwide

**QS World University Rankings by
Subject 2017**

Postgraduate studies in Earth Sciences

As the world's population increases, more energy, food, water and minerals are required from the earth. Earth scientists play a vital role in finding and developing, whilst protecting, these resources.

Earth scientists also play a critical role in protecting the communities we live in by predicting and monitoring hazards such as volcanic eruptions, earthquakes, landslides and floods. Earth Sciences is the study of a range of branches of science concerned with evaluating the interactions of the solid earth, with surface processes, climates and biota. Examination of the nature and consequences of natural and anthropogenic changes to the earth system also form important elements of modern Earth Sciences research.

Students will have the opportunity to extend their understanding of the Earth Sciences to establish careers in areas such as resource management, hydrology, hydrogeology, coastal management, catchment management, water resources, mineral exploration, petroleum exploration, environmental geochemistry, engineering geology, natural hazards research, meteorology and geothermal energy.

A postgraduate degree in Earth Sciences provides the required foundation for developing a successful and rewarding career. These programmes of study are required for students who want to undertake advanced research such as a Doctor of Philosophy (PhD).

www.science.auckland.ac.nz/phd



Scholarships and awards

The following awards are an example of the scholarships and prizes available that may be applicable to your thesis research:

- School of Environment Māori Masters Thesis Scholarships
- Brothers Memorial Award
- RJ Mowat Memorial Scholarship in Geology

www.auckland.ac.nz/scholarships

Earth Sciences qualifications pathway

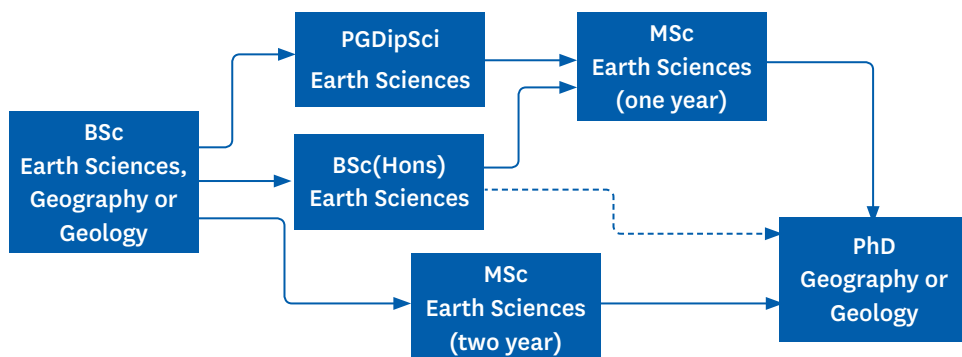
The Bachelor of Science (Honours) (BSc(Hons)) and Postgraduate Diploma in Science (PGDipSci) are one-year programmes that include advanced coursework. In addition, the BSc(Hons) programme provides some opportunity for independent research. Students who want to take one of these programmes need to have fulfilled the requirements for a BSc.

• BSc(Hons) in Earth Sciences:

A major in Earth Sciences, Geography, or Geology and at least 90 points at Stage III with at least 45 points at Stage III in Earth Sciences or Geology courses, or GEOG 330-331, 334, 351, 360 or equivalent. A grade average of at least a B is required in your Stage III courses.

The Earth Sciences specialisation provides students with comprehensive knowledge across the related disciplines of geology, geography and geophysics, and allows students to focus on aspects of the Earth Sciences that are of particular interest to them.

- **PGDipSci:** A major in Earth Sciences, Geography or Geology with at least 45 points at Stage III in Earth Sciences or Geology courses, or GEOG 330-331, 334, 351, 360, or equivalent.



- **The Master of Science (MSc)** is a research degree normally taken as a one-year (full-time) programme following a PGDipSci or BSc(Hons), with admission requiring an average grade equivalent to at least B- over 90 points. Alternatively, it may be taken as a two-year (full-time) programme with a first year of taught courses followed by a thesis research project in the second year. The two-year programme is recommended to international students or domestic students seeking to develop a more directed research component to their postgraduate studies. Both the PGDipSci and MSc programmes may be taken part-time as well as full-time.

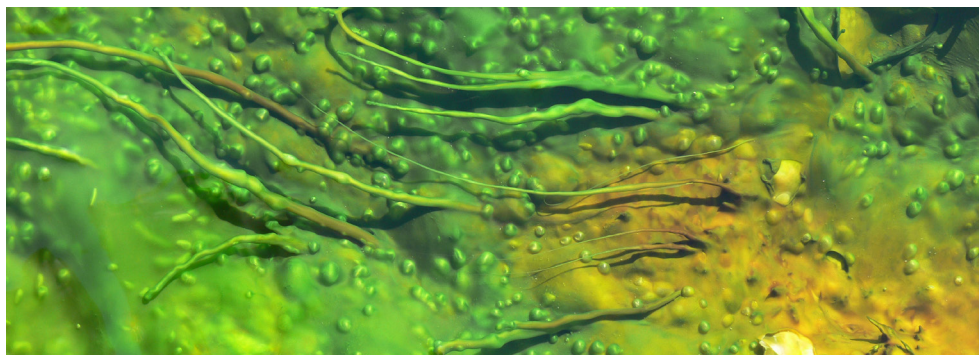
- **The degree of Doctor of Philosophy (PhD)** is a three to four year research degree that may be taken after an MSc, or in some cases following BSc(Hons).

Geophysics

The University of Auckland offers Geophysics programmes at both undergraduate and postgraduate level run jointly by the School of Environment and the Department of Physics.

The Bachelor of Science (Honours) and Postgraduate Diploma in Science are one-year programmes offering courses and, for the BSc(Hons) a research project, for students who wish to combine geology, physics, mathematics, and computer science for the study of the earth's processes, resources and environment.

Postgraduate students of Geophysics can choose from a broad range of courses and research projects spanning solid-earth geophysics, atmospheric geophysics, and physical oceanography.



The BSc(Hons), PGDipSci and first year of two-year MSc (Earth Sciences) programmes

Course code	Title	Semester
For BSc(Hons) at least four courses from the following (60 points) OR for PGDipSci and MSc at least six courses from the following (90 points)		
EARTHSCI 703	Hydrothermal Systems: Geothermal Energy and Ore Deposits	2
EARTHSCI 705	Geohazards	2
EARTHSCI 707	Special Topics in Earth Sciences	2
EARTHSCI 714	Earthquake Geology	1
EARTHSCI 720	Chemistry of our World	1
EARTHSCI 732	Reconstructing Environmental Change	1
EARTHSCI 752	Understanding Volcanic Systems	2
EARTHSCI 754	Pure and Applied Sedimentology	1
EARTHSCI 760	Seismic Data Analysis for Basin Exploration	1
EARTHSCI 770	Engineering Geological Mapping	Summer
EARTHSCI 763	Geophysical Applications to Explore the Subsurface	2
EARTHSCI 771	Advanced Engineering Geology	1
EARTHSCI 780	Advanced Field Earth Sciences	Summer
GEOG 730	Climate Change: Past, Present and Future	2
GEOG 745	Applied Fluvial Geomorphology	1
GEOG 746	Applied Coastal Geomorphology	1
GEOG 770	GIS Analysis and Spatial Data Handling	2
GEOG 771	Spatial Analysis and Geocomputation	2
GEOG 772	Advanced Raster Data Analysis	1
GEOPHYS 761	Subsurface Imaging with Seismic and Radar Waves	2
GEOPHYS 762	Subsurface Characterization with Potential Field Methods	2
For BSc(Hons) only (30 points)		
EARTHSCI 789	BSc(Hons) Dissertation in Earth Sciences	2
For BSc(Hons), PGDipSci and two-year MSc, up to two courses (30 points) from 700-level		

Postgraduate research in Earth Sciences

Postgraduate research is highly valued and forms an important part of the BSc(Hons), MSc and PhD programmes. The following research themes identify the expertise of Earth Sciences at the University of Auckland.

Hazards and Disasters

Researchers in this theme cover the breadth of hazards and disasters, from the underlying physical processes and methods of assessment, through to people's vulnerabilities and capacities, and risk assessment and management.

Climate and Society

Researchers in this theme deal with sensitivity of physical and human environments and climate. Themes are drawn from hydrology, agriculture, human health, ecosystems and energy, and others.

Coasts and Rivers

The Coasts and Rivers group investigate the natural processes operating on the landscape, across a range of temporal and spatial scales, from catchment to cobble, from Holocene to a few days.

Environmental Change

Researchers in this theme are involved in reconstructing and investigating long-term environmental change, using a range of proxies from tropical corals to Antarctic sediments.

Volcanology, Petrology and Geochemistry

The volcanology, petrology and geochemistry group investigates magmatic and volcanologic problems on Earth and in the solar system. Research focuses in magmatic-volcanologic studies range from planetary differentiation to magma genesis and evolution to volcanic hazards. In addition to magmatic and volcanologic studies, geochemical investigations include paleoclimate, paleoceanography, environmental geochemistry and geochemical forensics.

Natural Resources

Research in this theme incorporates many aspects of the Pacific region's diverse natural resources including hydrocarbons, geothermal energy, mineral deposits and aggregates. Projects integrate structural, sedimentological, geophysical and petrophysical studies and span the fundamental and applied earth sciences.

For more information:

www.env.auckland.ac.nz/research



Careers in Earth Sciences

The employment pathways for Earth Sciences graduates are varied and include:

- Environmental consultancies
- Energy industry (geothermal and petroleum)
- Engineering companies
- Local authorities
- Central government
- Science teaching
- Exploration geology

Earth scientists may be responsible for monitoring hazards, such as volcanic activity, earthquakes, landslip and subsidence, which affect us and the communities we live in. Furthermore, some graduates use their training in data analysis techniques to move into employment in information technology industries.

"I wanted to study Geology and Chemistry together because of my concern for the environment."

"I chose to study at University of Auckland because we are New Zealand's largest and leading Faculty of Science."*

"My thesis topic is on the bioremediation of Cu and Zn-rich soils using Medicago sativa and Helianthus annuus by Ethylenediaminetetraacetic Acid (EDTA) metal chelation. With this research I aim to focus on the rehabilitation of mine degraded lands because they are so prevalent, especially in my home country, the Philippines."

"I really liked doing laboratory analyses like acid digestions and instrument operations, basically analytical chemistry. I liked data interpretation as well because it gives meaning to the numbers that the machine, ICP-MS and AAS, is reading out for me."

"With my postgraduate qualifications I hope to contribute to the field of contaminant hydrogeology and environmental remediation."

Christine Jeiselle G Guarino graduated with a Master of Science specialising in Earth Sciences (2016) after completing a Postgraduate Diploma in Science specialising in Geology.

*See www.science.auckland.ac.nz/excellence



Helpful information

Academic dates

www.auckland.ac.nz/dates

Accommodation

www.accommodation.auckland.ac.nz

Apply for postgraduate study

www.auckland.ac.nz/applynow

Career Development and Employment Services

www.cdes.auckland.ac.nz

Childcare

www.auckland.ac.nz/childcare

Course advice and degree planning in Science

www.science.auckland.ac.nz/student-centre

Disability Services

www.disability.auckland.ac.nz

How to enrol

www.auckland.ac.nz/enrolment

Information for postgraduate students

www.postgraduate.ac.nz

International students

www.international.auckland.ac.nz

Libraries and Learning Services

www.library.auckland.ac.nz

Māori and Pacific students

www.science.auckland.ac.nz/tuakana

Need help?

www.askauckland.ac.nz

Postgraduate Students' Association

www.pgsa.org.nz

Rainbow Science Network for LGBTI students

www.science.auckland.ac.nz/rainbowsience

Scholarships and awards

www.scholarships.auckland.ac.nz

www.auckland.ac.nz/fees

www.auckland.ac.nz/studentloansandallowances

Support for students

www.science.auckland.ac.nz/support

Earth Science Adviser

Dr Melissa Bowen

m.bowen@auckland.ac.nz

+64 9 923 9037

Building 301, Room 529B,
23 Symonds Street, Auckland 1010

Geophysics Adviser

Dr Jennifer Eccles

j.eccles@auckland.ac.nz

+64 9 923 8092

Building 302, Room 735,
23 Symonds Street, Auckland 1010

**Questions about Earth Sciences?
environment@auckland.ac.nz**

Disclaimer

Although every reasonable effort is made to ensure accuracy, the information in this document is provided as a general guide only for students and is subject to alteration. All students enrolling at the University of Auckland must consult its official document, the University of Auckland Calendar, to ensure that they are aware of and comply with all regulations, requirements and policies.



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AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

Connect with us

Faculty of Science, The University of Auckland
Private Bag 92019, Auckland 1142, New Zealand

Phone: 0800 61 62 63 | Email: scifac@auckland.ac.nz

Web: www.env.auckland.ac.nz



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