



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

SCIENCE

Welcome to Geophysics



The Faculty of Science is

ranked no.

8



in Oceania*

Welcome to Geophysics!

The field of Geophysics explores the laws of physics to learn about what happens underneath our feet inside the earth and oceans, or above us in the atmosphere. Seminal questions about the future of climate, energy, geohazards, and drinking water require a workforce that is well-versed in the different aspects of geophysics.

Geophysics is by definition an interdisciplinary study, and our core courses are shared between the Department of Physics and the School of Environment. If you think you may be interested in Geophysics, make sure you come and see one of the geophysicists in either department.

ASSOCIATE PROFESSOR KASPER VAN WIJK
Geophysics Undergraduate Coordinator

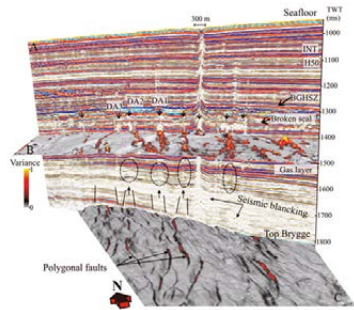


Bachelor of Science in Geophysics

Geophysics is the study of the earth and environment using physics and mathematics. It spans from the deep interior of the earth to its surface, oceans and atmosphere. It investigates and aims to explain the physical phenomena we observe today, to discover their past history, and to model their future behaviour.

Geophysicists research global processes such as plate tectonics, earthquakes, volcanoes, the oceans and atmosphere, and climate. They explore for natural resources such as oil, minerals and groundwater, and help solve environmental problems such as natural hazards, climate change, pollution monitoring and civil engineering.

For more information, go to www.science.auckland.ac.nz/geophysics



3

The average number of years it takes to complete a Bachelor of Science degree



You can choose either a single or double major



Preparation for school leavers

If you have a good science background, and geology, oceanography or meteorology appeals to you, taking a Geophysics degree will open new doors. If you want to apply your physics outdoors but also like data analysis and mathematical modelling, choosing geophysics can equip you with much sought-after practical and computational skills.

It is strongly recommended that students have NCEA Level 3 Maths and Physics. Students will be selected on the basis of their rank score.

For course planning and enrolment, go to www.science.auckland.ac.nz/student-centre

Thinking about postgraduate study options? Go to www.science.auckland.ac.nz/geophysics

Complementary majors

If you like physics and mathematics and are also interested in the natural world then Geophysics is for you. Students looking to broaden their knowledge and expand their career options after they graduate should consider partnering Geophysics with another field of study – either as a conjoint, or a double major in a science degree. Below is a list of subjects you can opt to take complementary to Geophysics as a double major.

GEOPHYSICS +

Earth Sciences

Environmental Science

Geography

Mathematics

Physics

www.science.auckland.ac.nz/doublemajors

Planning your major

BSc

Year 1

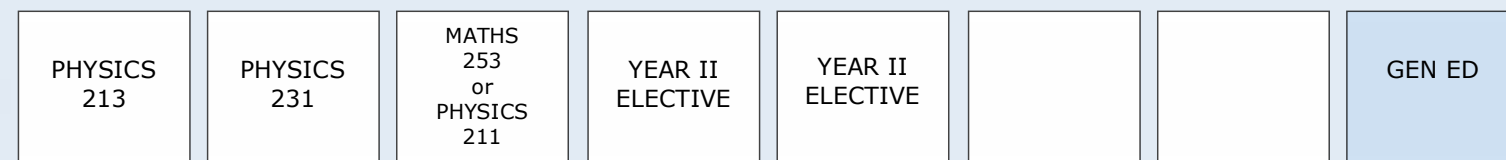


With appropriate prerequisites can also be filled by Stage II or III.

Highly recommended Year 1 courses:

PHYSICS 108, 120, 150; MATHS 108 or 150 and MATHS 253; CHEM 110, 120; COMPSCI 101

Year 2



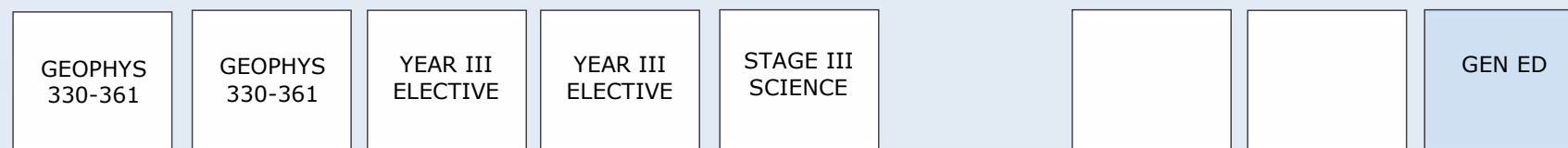
Year II Elective: 30 points from EARTHSCI 201, 204, MATHS 260, PHYSICS 240, 261

Any Stage Science

Other recommended courses:

EARTHSCI 202, 203, 204, PHYSICS 240, COMPSCI 210, 230, EARTHSCI 305, PHYSICS 326, 340, 390, COMPSCI 313, MATHS 361

Year 3



30 points from GEOPHYS 330-361

Year III Elective: EARTHSCI 301-307, 372 GEOPHYS 330-339, MATHS 302-389, PHYSICS 315-391

Stage II or III Science

1. Courses in a minimum of three subjects listed in the BSc Schedule.
2. At least 180 points (12 courses) must be above Stage 1.
3. Up to 30 points (2 courses) may be taken from outside the Faculty.
4. 30 points (2 courses) must be taken from the appropriate General Education Schedules for BSc students.
5. At least 75 points must be at Stage III, of which 60 points must be in the majoring subject.

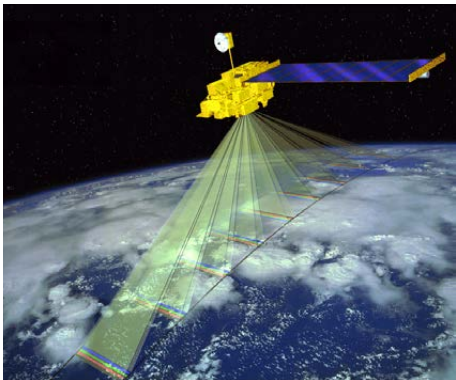
To view regulations for majors, and course descriptions, see www.calendar.auckland.ac.nz
BSc degree requires: 360 points (24 x 15 point courses). Each box represents one 15 point course.
It is recommended that students enrol in 8 courses each year.

Undergraduate Geophysics Courses

Stage I

EARTHSCI 103: Dynamic Earth

Examination of geologic processes that have shaped Earth and life through time, and their impact on modern society. Topics include: earthquakes, plate tectonics, volcanic eruptions, tsunamis, landslides, meteorites and planets, mass extinctions and evolution of life. A practical introduction to rocks, minerals and fossils provides insights into Earth's past and important modern resources.



Stage II

PHYSICS 213: The Geophysical Environment

An introduction to the atmosphere, oceans and solid earth in terms of its physical principles. Driven by recent developments in research, the course displays the connections between these three environments. Topics include the structure of the solid earth, ocean currents and tides, as well as fundamental aspects of weather and climate.

PHYSICS 231: Classical Physics

Classical mechanics including rotating reference frames. The properties of materials including elasticity and fluids. Forced and coupled oscillations. Travelling and standing waves on a string. An introduction to the laws of thermodynamics and their application to the properties of materials.

Stage III

GEOPHYS 330: Physics of the Earth

Covers the physics of the earth from the surface to the core. Specifically, this includes the gravitational field (with the rotation and figure of the earth), seismology and the seismic boundaries in the subsurface, the earth's internal heat budget, and the geomagnetic field.

GEOPHYS 331: Physics of the Atmosphere and Ocean

The application of fluid dynamics to the motion of the atmosphere and oceans. Marine topics include: ocean structure, oceanic circulation, underwater acoustics, tides and waves. Atmospheric topics include: boundary layer meteorology and the microphysics of clouds and precipitation. A weekend field trip is a component of the course.

GEOPHYS 361: Fundamentals and Applications of Geophysical Exploration

The fundamentals of geophysical exploration methods and their application. The course will provide a comprehensive overview of seismic techniques, geophysical borehole methods, and an introduction to gravity, electric, magnetic, electromagnetic, and radar techniques. Applications of these will be considered including hydrocarbon, mineral and geothermal exploration. Geophysical data will be acquired and analysed through field and laboratory work.

Careers in Geophysics

Geophysicists are trained in a variety of disciplines during their studies such as mathematical modelling, statistics, physics, and computer science.

Careers that can lead from a Geophysics major are:

Atmospheric Scientist

Energy industry (hydrocarbon, geothermal)

Geohazard research (EQC, insurance industry)

Ground water exploration/monitoring environmental/
geotechnical companies, consultancies

Meteorological service

Mineral exploration

Oceanographer

Research at crown institutes (such as GNS, NIWA)



“Physics, mathematics and geology are fun to learn on their own but it is when you combine the knowledge and techniques from these fields that things become really interesting.”

“The process of decoding physical field measurements in order to understand the physical properties, structure and dynamic behaviour of the earth can be challenging and rewarding. This interdisciplinary process is what drew me to studying geophysics in the first place. I would encourage anyone with the love of earth science to consider geophysics as this has enriched my understanding of the earth and its environment.”

Cheng Yii Sim studied a Bachelor of Science in Geophysics and Geology and is currently finishing her Masters in Science (Geophysics) at the University of Auckland.

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.

Helpful information

Academic dates	www.auckland.ac.nz/dates
Academic Integrity Course	www.auckland.ac.nz/academic-integrity
Accommodation	www.accomodation.auckland.ac.nz
Buy coursebooks	www.science.auckland.ac.nz/resource-centre
Career Development and Employment Services	www.auckland.ac.nz/careers
Course advice and degree planning in Science	www.science.auckland.ac.nz/student-centre
General education	www.auckland.ac.nz/generaleducation
How to apply	www.apply.auckland.ac.nz
How to enrol	www.auckland.ac.nz/enrolment
International students	www.international.auckland.ac.nz
Māori and Pacific students	www.science.auckland.ac.nz/tuakana
Need help?	www.askauckland.ac.nz
Rainbow Science Network for LGBTI students	www.science.auckland.ac.nz/rainbowsience
Scholarships and awards	www.scholarships.auckland.ac.nz
Support for students	www.science.auckland.ac.nz/support



Applications close on December 8.

Questions about Geophysics?

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Web: www.science.auckland.ac.nz/geophysics



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