

UNIVERSITY OF WATERLOO | FACULTY OF SCIENCE

EARTH SCIENCES

UNIVERSITY OF
WATERLOO



Students appreciate the view and geological landscapes atop the Willisville Lookout near Whitefish Falls, Ontario, during their EARTH 390 (Methods in Geological Mapping) field trip.

EARTH SCIENCES

uwaterloo.ca/future/programs/earth-sciences

3rd in Ontario for Earth and Marine Sciences

Work well under pressure.

Learn about the fascinating and complex world under your feet by exploring topics such as geology, geophysics, geochemistry, and hydrogeology.

In Earth Sciences you will learn how to combine knowledge from all science disciplines to investigate the make up of our planet, from rocks and soil to water and the effects of climate change. We depend upon resources that come from the earth, such as minerals, oil, organic materials, gases, and the water we drink.

Study in one of Canada's leading earth sciences programs, where a focus on experiential learning awaits you. With hands-on labs, adventurous field trips, research projects, and diverse co-op terms you'll graduate with the skills and knowledge required to immediately begin and accelerate in an exciting, fulfilling, and dynamic field.

EARTH SCIENCES GRADUATE STUDIES

Continue your studies with a Master's degree or a PhD in Earth and Environmental Sciences. Enhance your research in the areas of water sciences, sustainable mining, earth processes and geohazards.

SAMPLE CO-OP POSITIONS

- › Geophysical Data Processor
- › Geological Research Assistant
- › Land Resource Specialist
- › Groundwater Technician
- › Waste Water Project Assistant

SAMPLE CO-OP POSITIONS

- › University of Waterloo
- › Environment & Climate Change Canada
- › Natural Resources Canada
- › Ontario Ministry of Agriculture, Food and Rural Affairs
- › Atomic Energy of Canada Limited

POSSIBLE CAREER FIELDS/PATHS

- › Energy and natural resources
- › Field research
- › Environmental consulting
- › Geological exploration
- › Governmental agencies

uwaterloo.ca/science



4.03 BILLION YEARS

That's the age of our oldest rock – Acasta gneiss – located in the Peter Russell Rock Garden

SPECIALIZATIONS IN EARTH SCIENCES

(you'll select one of these specializations prior to starting first year)

GEOLOGY

The study of the Earth, its structure and composition, and the physical, chemical, and biological processes that affect it. Explore and learn how to locate our natural resources (minerals, oil, gas, water), the geological hazards that impact us, how to manage resources sustainably, and understand global climate change. For students looking for flexibility within their program, this specialization is for them.

HYDROGEOLOGY

Focus on this interdisciplinary specialty that studies the terrestrial, subsurface, and geochemical makeup of water, to help understand and better protect this most vital and precious of resources. With emphasis on water remediation, contamination detection, and management of water sources, students will learn how to become effective hydrogeologists that are involved in the current global water crisis.

GEOPHYSICS

How do you see what's below the surface of the earth without opening or digging up the earth? The answer is geophysics. Combining several disciplines, geophysicists use special instrumentation and analysis to determine what is happening under our feet without costly excavations. Geophysicists are also involved in evaluating earthquakes, volcanoes, geomagnetic occurrences (such as the Aurora Borealis), and the effects of nuclear hazards.

MAPPING IT ALL OUT

EARTH 390 METHODS IN GEOLOGICAL MAPPING

Don't just read about techniques in geological mapping – live it! This course features a 10-day field study in Sudbury and Whitefish Falls to help students fully submerge in nature to master the observation and interpretation skills of a professional geoscientist. Learn to interpret subtle clues hidden in rocks while mapping a world-class exposure of unique rocks. This exciting course is popular amongst students and creates lasting memories – along with solidifying the reasons why students love Earth Science!

“We look at minerals, rocks, and structures in the real world, practice mapping skills, solve real geological problems, and write investigation reports – which are extremely important and significant for my future career. We work as a team – exchange our ideas, discuss the observations, and solve problems together. During the field trip we became friends.”

- 4th year Earth Sciences (Geology major) student

SKILLS ATTAINED WITHIN THIS MAJOR

- › Critical thinking
- › Problem solving
- › Communication
- › Fieldwork capabilities, including rock sampling and geological mapping



EARTH SCIENCES
museum
UNIVERSITY OF WATERLOO

Containing extensive collections of rocks and mineral specimens, dinosaurs and ice age mammals, our replica silver mine tunnel, fossils, and so much more, our museum is an amazing experience for students.



Available in both the
**GO-OP AND
REGULAR**
streams of study



Apply directly to the
**PHYSICAL
SCIENCES**
entry program on
OUAC, selecting
EARTH SCIENCES
as the major



BECOMING A PROFESSIONAL GEOSCIENTIST

means you are qualified and licensed to sign proposals and designs into action. Students will qualify to become a P.Geo. upon graduation.

Join WATROX, the Earth and Environmental Sciences Undergraduate club – open to all science students!

More than just a place to hang out, students enjoy events such as rock climbing (of course!), camping, trivia nights, bowling, and much much more.

GEOLOGY SPECIALIZATION* COURSE OUTLINE

YEAR 1 (FALL)

CHEM 120/120L
General Chemistry 1/Lab

EARTH 121/121L
Introductory Earth
Sciences/Lab

EARTH 123
Introductory Hydrology

MATH 127 Calculus 1
for the Sciences

PHYS 111/111L
Physics 1/Lab
or **PHYS 121/121L**
Mechanics/Lab

YEAR 1 (WINTER)

CHEM 123/123L General Chemistry 2/Lab

EARTH 122/122L Introductory Environmental Sciences/Lab

ENGL/SPCOM 193 Communication in the Sciences

MATH 128 Calculus 2 for the Sciences

PHYS 112/112L Physics 2/Lab
or **PHYS 122/122L** Waves, Electricity and Magnetism/Lab

YEAR 2

EARTH 221 Geochemistry 1

EARTH 223 Field Methods in Hydrology

EARTH 231 Mineralogy

EARTH 232 Petrography

EARTH 235 Stratigraphic Approaches
to Understanding Earth's History

EARTH 260 Applied Geophysics 1

MATH 106 Applied Linear Algebra 1
or **MATH 114** Linear Algebra for Science

2 Program Electives

1 Elective

YEAR 3

EARTH 238 Introductory Structural Geology

EARTH 331 Volcanology and Igneous Petrology

EARTH 333 Introductory Sedimentology

EARTH 342 Applied Geomorphology

EARTH 358 Earth System Science

EARTH 390 Methods in Geological Mapping

STAT 202 Introductory Statistics for Scientists

2 Earth Electives (300-level or higher)

2 Electives

YEAR 4

EARTH 332 Metamorphic Petrology

EARTH 436A Thesis Proposal

EARTH 436B Honours Thesis
or 1 Earth Elective (300-level or higher)

EARTH 471 Mineral Deposits

4 Earth Electives (300-level or higher)

1 Elective

SAMPLE FIRST-TERM SCHEDULE

* Labs

| MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY |
|-------------------|-------------------------|---------------------|-----------------------|-------------------|
| Calculus 1 hr | | Calculus 1 hr | | Calculus 1 hr |
| Chemistry 1 hr | Chemistry 3 hrs * | Chemistry 1 hr | | Chemistry 1 hr |
| Physics 1 hr | | Physics 1 hr | Physics 3 hrs * | Physics 1 hr |
| Hydrology 1 hr | | Hydrology 1 hr | | |
| | Earth 1.5 hrs | Earth 3 hrs * | Earth 1.5 hrs | |

Course outline and schedule are subject to change at any time.

*Note that this course outline is for the Geology specialization. Please see the undergraduate calendar for the Hydrogeology and Geophysics specialization outlines. Course sequence may vary for students who choose the co-op system of study.

ugradcalendar.uwaterloo.ca/group/uwaterloo-faculty-of-science

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