

Intensive Earth Sciences Modular Courses

2024-2027

Keep Current on
Mineral Exploration Practices



Laurentian University
Université **Laurentienne**

HARQUAIL School of Earth Sciences
École des sciences de la Terre

hes.laurentian.ca

MERC

Mineral Exploration Research Centre
at the HARQUAIL School of Earth Sciences

merc.laurentian.ca



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The Harquail School of Earth Sciences at Laurentian University offers some of the most comprehensive field- and laboratory-based education and research programs in the world.

Our intensive industry-driven Modular Courses meet or exceed requirements for graduate students and practicing professionals.

Delivered in the field, in-class, or via webcast, our location in the world's largest mineral exploration and mining-service cluster allows us to offer a level of instruction that is unmatched. Our award-winning faculty offer unparalleled expertise in the field.

Modular Courses in Mineral Exploration

Designed to accommodate both graduate students and geoscientists employed full-time in the mineral exploration industry, the Harquail School of Earth Sciences' modular graduate courses cover advances in exploration concepts, data analytics and modelling, and geochemical and geophysical techniques applicable to the mineral exploration industry.

Our 10-day intensive modules include lectures and labs, problem sets, and in some cases, field-based mapping projects. Modules run from 9 am to 5 pm on consecutive days for maximum convenience of participants. Offered cyclically, several of our modules are available via videoconference through our Executive Learning Centre.



Upcoming Courses

Exploration for Magmatic Ore Deposits
April 2024 and 2026 - [GEOL 5606]

**Mineral Exploration in Volcanic Terrains
(Field Course)**
August 2024 and 2026 - [GEOL 5326]

Exploration Geochemistry
December 2024 and 2026 - [GEOL 5806]

Geochemistry of Hydrothermal Ore Deposits
December 2024 - [GEOL 5306]

Exploration for Hydrothermal Ore Deposits
April 2025 and 2027 - [GEOL 5607]

**Structure, Tectonics, and Mineral Exploration
(Field Course)**
September 2025 and 2027 - [GEOL 5307]

Exploration Geophysics
December 2025 and 2027 - [GEOL 5956]

*All course offerings are part of our
Applied MSc in Mineral Exploration.*

Courses are offered **in person and/or online** via live webcast unless they are a Field Course, which are taught on site only. Delivery methods and dates in this booklet are subject to change.

Check the website or contact us to confirm details of upcoming courses.

All courses are 3-credits for university-enrolled students, except for GEOL 5055 (6-credits).

Exploration for Magmatic Ore Deposits

April 2024 and 2026 - [GEOL 5606]

This 10-day course focuses on the geology and petrogenesis of magmatic ore deposits. Deposit types include Ni-Cu-PGE sulfide, chromite, magnetite and ilmenite deposits. Emphasis is placed on the processes responsible for their formation and the features pertinent to exploration. Laboratory exercises utilize extensive sample sets from classic localities worldwide.

Mineral Exploration in Volcanic Terrains

August 2024 and 2026 - [GEOL 5326]

Field Course

This 10-day field course focuses on recognizing, describing, and mapping volcanic lithofacies, alteration types, mineralization, and deformation in a well-exposed Precambrian volcanic succession hosting base and precious metal deposits. The course is delivered as a mapping project with evening lectures and discussion following a one-day introductory field trip. An introduction to graphic core logging is provided. Mapping is conducted in teams, and grades are based on the map, structural cross-sections, and a final report, which includes a description and interpretation of the geology and structure and an assessment of exploration potential with recommendations. All field costs are borne by the student.

Exploration Geochemistry

December 2024 and 2026 - [GEOL 5806]

This 10-day (plus optional 1-day introduction to ioGAS) course addresses the principles and methods of geochemical exploration, including planning, sampling, geochemical analysis, data handling and interpretation. It includes case histories of stratiform PGE deposits in layered intrusions, magmatic Fe-Ni-Cu-(PGE) sulfide deposits in ultramafic lavas, porphyry Cu deposits, volcanic-associated Cu-Zn-(Pb) deposits, Archean lode gold deposits, sedimentary-exhalative Pb-Zn-Cu deposits, and diamond exploration.

Geochemistry of Hydrothermal Ore Deposits

December 2024 - [GEOL 5306]

Register through University of Ottawa

This 8-day graduate course focuses on the fundamentals of mineral-chemical systems, ore element geochemistry, alteration mineral assemblages, and water-rock interactions in various ore deposit types. Students will learn critical concepts in understanding ore formation, review ore deposit case studies, and gain practical skills and knowledge applied to ore element behaviour, minerals and fluids in hydrothermal systems, and hydrothermal alteration processes and their application in mineral exploration.

Exploration for Hydrothermal Ore Deposits

April 2025 and 2027 - [GEOL 5607]

This 10-day course focuses on the geology, alteration, and origin of hydrothermal ore deposits. Deposit types include epithermal and mesothermal precious metal, porphyry Cu-Mo-Au, IOCG, sediment- and volcanic hosted base-metal deposits, and U and REE deposits. Emphasis is placed on the processes responsible for their formation, the recognition of alteration halos, and features pertinent to exploration.

Structure, Tectonics, and Mineral Exploration

September 2025 and 2027 - [GEOL 5307]

Field Course

This 12-day course addresses the tectonic and structural controls on the localization and genesis of mineral deposits. It examines regional tectonic settings, regional structural controls, and local structural controls, using orogenic Au deposits in Northern Ontario as a case study. The course is given as a field mapping course and includes evening lectures and field mapping exercises. All field costs are borne by the student.

Exploration Geophysics

December 2025 and 2027 - [GEOL 5956]

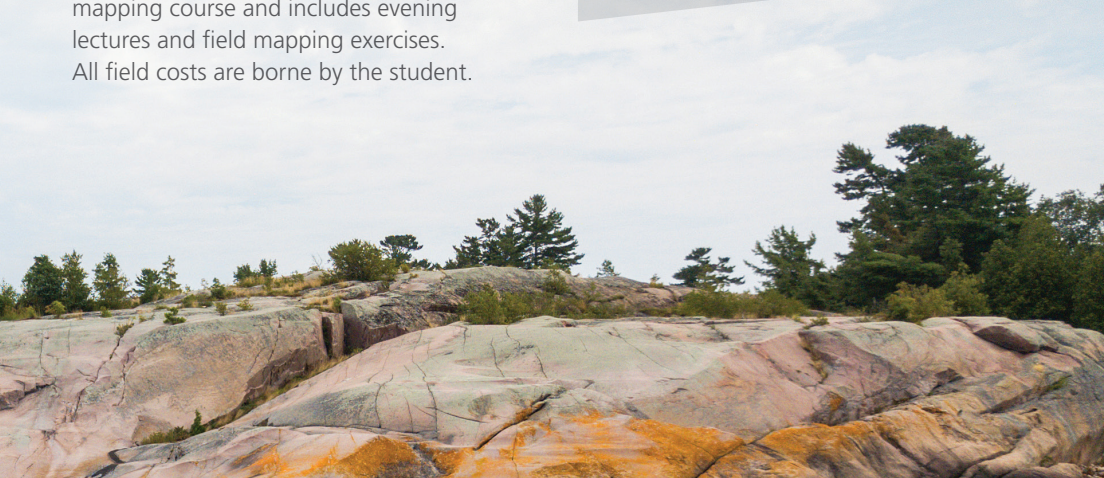
This 10-day course focuses on the application of gravity, magnetic, electrical, electromagnetic, seismic, well-logging and gamma-ray spectrometry techniques in mineral exploration. The course covers modelling techniques and an interpretation exercise.

Applied Research Project

This course is offered only to students in the MSc Geology - Applied Mineral Exploration program, and is optional for students in the Accelerated version of the program.

In this 6-credit course, eligible students pursue a research topic relevant to mineral exploration and submit the results of their research at the end of the MSc program. Enrolment in this course requires consultation with a faculty advisor and approval of the program coordinator.

[GEOL 5055]



Our Unique Location in Greater Sudbury

The wide range of geological environments, including Precambrian volcano-sedimentary belts, the Huronian Basin, the Grenville orogenic complex, and Paleozoic sequences, offers unparalleled opportunities for undergraduate and graduate research in ore deposits, structural geology, geophysics, mineralogy, igneous and metamorphic petrology, sedimentology, stratigraphy, and paleontology.

The Harquail School of Earth Sciences and the Mineral Exploration Research Centre (MERC), the lead organization on the \$104M Canada Research Excellence Fund-sponsored Metal Earth geoscience research program, are located in the Willet Green Miller Centre, in Sudbury, Ontario, Canada. Overlooking Ramsey Lake and the Lake Laurentian Conservation Area, we are situated in the world's largest mining cluster, on the rim of one of the world's oldest, largest, and best-exposed asteroid impact sites, and on rocks of the Canadian Shield.

We live, work, and teach geological science in a living laboratory and invite you to explore our School, labs, and facilities.



The Best Place on Earth to Study Geology!



Study Opportunities



Continuous development of skills and knowledge is a critical component of success in the field of exploration geology.

To meet workplace demands, busy exploration geologists find it difficult to take significant amounts of time off to update their knowledge and skills. Recognizing this, our 10-day Graduate/Modular Courses are designed to meet the needs of industry and students pursuing advanced degrees.

Modular Courses

Modular Course enrolment is open to geoscientists seeking to keep current in the discipline as well as graduate students enrolled in MSc or PhD programs at Canadian and international academic institutions. Modular course fees vary based on applicant type.

Modular courses satisfy continuing education requirements for maintaining PGO and other accreditation across Canada and internationally.

To learn more, visit:

hes.laurentian.ca/modular-courses

MSc Geology

Applied Mineral Exploration

- Part-time program designed for industry geologists who wish to upgrade their skills while maintaining full-time employment
- Includes an applied research project that may focus on a problem of interest to the candidate's employer, typically in an active exploration or mining area

Accelerated: One Year Option

- Designed for industry geologists who wish to upgrade their skills by taking an intensive, course-based degree program

Details:

hes.laurentian.ca/graduate-programs



Harquail School of Earth Sciences also offers fully-funded thesis-based MSc and PhD study options, as well as post-graduate research opportunities. For details, visit **hes.laurentian.ca/careers**.





LaurentianUniversity
Canada's Mining University



Enrol today!

For additional modular course information, registration information, course fees, and our updated schedule, visit **hes.laurentian.ca/modular-courses**.

Upon registration, the full program agenda, course requirements, and logistics for your stay will be provided.

For more information on how to apply for the Applied MSc in Mineral Exploration, visit: **hes.laurentian.ca/graduate-programs**.



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