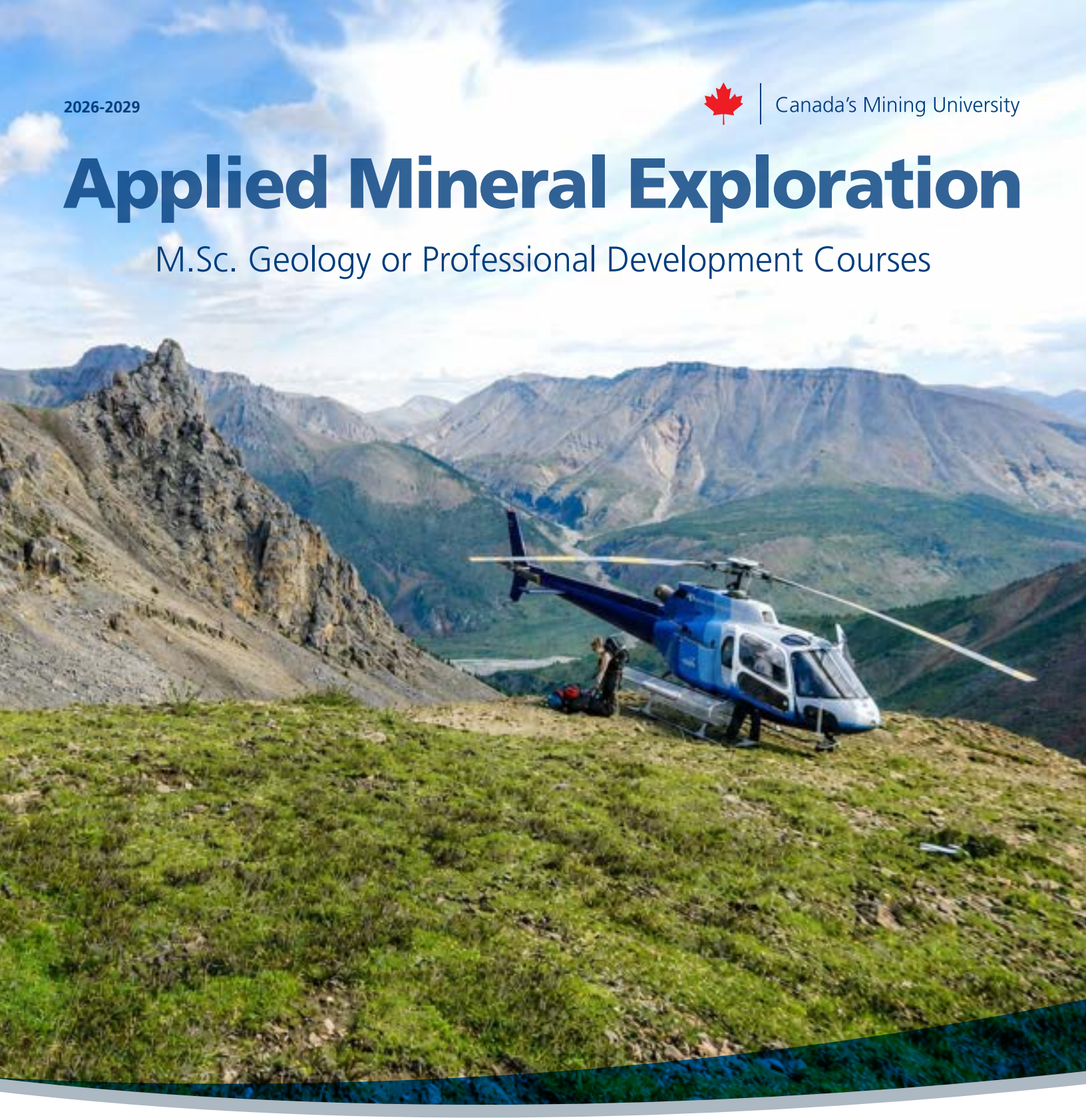
2026-2029

Canada's Mining University

Applied Mineral Exploration

M.Sc. Geology or Professional Development Courses



Earn a course-based M.Sc. in Geology or participate as a professional in courses that enhance your exploration skillset.

LaurentianUniversity
UniversitéLaurentienne

HARQUAIL School of Earth Sciences
École des sciences de la Terre

OUR **UNIQUE** LOCATION IN SUDBURY, ONTARIO

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 meteorite impact sites, and on rocks of the Canadian Shield.

The wide range of geological environments, including the Archean Superior Province, Proterozoic Southern and Grenville Provinces, and Paleozoic-Quaternary cover sequences offer unparalleled opportunities for graduate education and research in ore deposits, structural geology, mineralogy, geochemistry, igneous and metamorphic petrology, sedimentology, and geophysics.

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

Laurentian University / Université Laurentienne
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MERC
Mineral Exploration Research Centre at the HARQUAIL School of Earth Sciences

The Best Place on Earth to Study Geology!

STUDY OPPORTUNITIES

Degree Pathway

M.Sc. Geology - Applied Mineral Exploration

Flexible program allowing students and professionals to complete their degree on a customized timeframe, perfect for:

- Industry geologists who wish to upgrade their skills while maintaining full-time employment.
- Students who wish to quickly upgrade their skills by taking an intensive degree in as little as one year.

Modular Courses for Professional Development

Industry Professionals

Professional Geoscientists seeking advanced knowledge in the discipline can attend modular courses to satisfy continuing education requirements for maintaining professional accreditation across Canada and internationally. Professionals can register for the whole course or selected days.

M.Sc. GEOLOGY DEGREE

in Applied Mineral Exploration

Course-based Degree Pathway

Complete term or modular courses on a customized timeframe. At least one course from each of the Field Skills, Data Analysis, Ore Deposits, and Mine Cycle options must be included. An Applied Research Project is optional, often chosen to support a sponsoring employer's objectives.

Course options to develop essential skill sets

FIELD SKILLS

- Mineral Exploration in Volcanic Terrains
- Structure, Tectonics, and Mineral Exploration
- Field Geology of Precambrian Ore Systems

DATA ANALYSIS

- Exploration Geophysics
- Exploration Geochemistry
- 3D Modeling & Exploration Targeting

ORE DEPOSITS

- Exploration for Magmatic Ore Deposits
- Exploration for Hydrothermal Deposits

MINE CYCLE

- The Business of Exploration
- Field Program Leadership

PLAN YOUR PATH TO SUCCESS

Modular Courses for industry professionals or degree credit

August 2026, 2028	• Mineral Exploration in Volcanic Terrains
September, Annually	• Field Geology of Precambrian Ore Systems
August 2027, 2029	• Structure, Tectonics & Mineral Exploration
October 2026, 2028	• 3D Modeling & Exploration Targeting
December 2026, 2028	• Exploration Geochemistry
December 2027, 2029	• Exploration Geophysics
April 2027, 2029	• Exploration for Hydrothermal Ore Deposits
April 2028	• Exploration for Magmatic Ore Deposits
February 2027, 2029	• Field Program Leadership
May, Annually	• The Business of Exploration

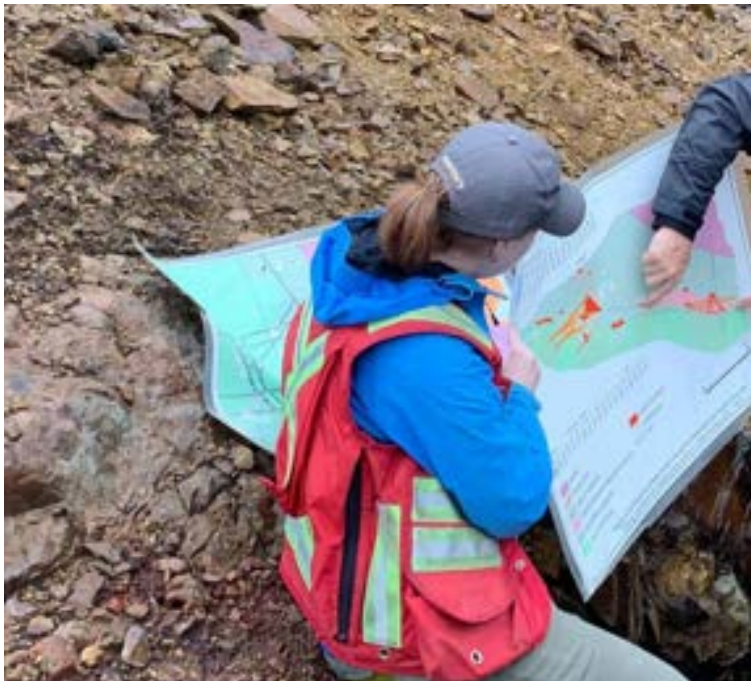
Term Courses

- Ore-Forming Processes
- Structural Control on Ore Deposits
- Polyphase Metamorphism and Deformation
- Carbonate Sedimentology
- Precambrian Geology
- Advanced Mineralogy
- Exploration Geophysics
- Electrical and Electromagnetic Methods
- Potential-Field & Gamma-Ray Spectrometry
- Hydrogeology
- Pleistocene & Glacial Geology
- Directed Studies in Geology
- Geology Non-Equivalent

Applied Research Project
[GEOL 5055]

In this course, eligible students pursue a research topic relevant to mineral exploration.

Enrolment in this course requires consultation with a faculty advisor and approval of the program coordinator.



MODULAR COURSES

Intensive Graduate-level Training for Professional Development or Degree Credit

Our modular courses focus on the specific multidisciplinary skills and in-depth deposit knowledge required to excel in today's field-, office-, and lab-based jobs in the exploration industry.

Expert guest lecturers highlight the latest developments in their fields and showcase real-world case studies.

Field-based mapping courses are offered in late summer. Lecture- and lab-based courses are offered throughout the year and many are available remotely as synchronous remote video conference.

Delivery methods and dates in this booklet are subject to change.

Visit our website at
hes.laurentian.ca/modular-courses
for the latest information regarding registration, dates, fees, and discounts.

Mineral Exploration in Volcanic Terrains
August 2026 and 2028 - [GEOL 5326]

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.

Field Geology of Precambrian Ore Systems
September, annually - [GEOL-5026]

This field course focuses on key aspects of mineral systems: sources, pathways and traps, at the regional to deposit scales. This course shows how Precambrian mineral exploration questions can be answered by integrating detailed mapping with petrographic and whole rock geochemical analysis. The 9-day field component begins the first week of the fall session, and is followed by 3 days in the lab. All field costs are borne by the student.

3D Modeling and Exploration Targeting
October 2026 and 2028 - [GEOL-5146]

This 11-day course will train students to create integrated models and use them for exploration targeting. Students will analyze and integrate multi-disciplinary data in 3D models created using both explicit and implicit approaches. They will define target minimums and use traditional approaches, prospectivity mapping and become familiar with AI-assisted data analytics to select exploration targets.

Exploration Geochemistry
December 2026 and 2028 - [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.

Field Program Leadership
February 2027 and 2029 - [GEOL-5156]

This 12-day field course prepares students for leadership positions with responsibility for exploration field programs. By the end of this course, students will be able to apply principles of project management, design effective exploration surveys with appropriately selected parameters, and will be able to outline the legal requirements and best practices for safety, environment, community and Indigenous consultation.

Exploration for Hydrothermal Ore Deposits
April 2027 and 2029 - [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
August 2027 and 2029 - [GEOL 5307]

This 12-day field 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 2027 and 2029 - [GEOL 5956]

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

Exploration for Magmatic Ore Deposits
April 2028 - [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.

The Business of Exploration
May, annually - [GEOL-5136]

This 11-day course provides the financial tools necessary to effectively operate in the modern mineral exploration business. It includes methods to evaluate mineral projects at various stages of advancement and examines exploration strategies and decision-making for majors and juniors through commodity and project cycles. Featuring guest lecturer Dr. Michael Doggett.

Field Course

In-person

Remote (synchronous)

Canada's Mining University

Enrol today!

For more information on how to apply for the M.Sc. Geology in Applied Mineral Exploration, visit: **laurentian.ca/msc-applied-mineral-exploration**.

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 will be provided.

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