

# EARTH SCIENCES

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## Program Information

The Geological Sciences deal with the history of the Earth and its life, especially that which is recorded in rocks. Different component parts of the Earth system, the *lithosphere, biosphere, atmosphere and hydrosphere*, operate at different length and time scales. During interactions between the spheres there is feedback between the component parts as energy and mass are exchanged, transferred and redistributed. In a geological context, the feedback can occur on a global scale, or on very small scales such as that which we see in minerals. More recently humans have become a major force in this Earth system because we have intervened in many of these exchanges.

Considering the Earth's past, geoscientists typically work with long time scales (in the order of millions to billions of years). We also use Hutton's original philosophy of *uniformitarianism*, stated as the *present is the key to the past*, to solve geological problems. However, as we see changes at the Earth's surface (our environment) occurring on very short time scales we need to learn to extract the signal of human activity from the Earth's pre-human past. Once we understand and quantify the nature and extent of the Earth's natural evolution as well as our more recent environmental impact, geological sciences can help predict future changes to the Earth.

Geology and Geophysics are the sciences that provide the quantitative data on the physical and chemical behaviour and characteristics of Earth materials - rocks, minerals, fluids and gases. These data are needed to model the behaviour of minerals in natural as well as many industrial systems. The theoretical and instrumental expertise needed to tackle many resource extraction, mineral processing and environmental

problems is resident in geological science departments. From a broad Earth, environmental and resource perspective our collective future will depend on sustainable use of our Earth's resources and care of the environment.

The three-year General program (comprising of 90 credit hours) in Geological Sciences is designed to give students a basic understanding of the discipline in combination with a concentration of courses in a second subject area. The General Program is not intended for those students who seek a career in the geosciences. Rather, it is a useful consideration for students planning to enter the Bachelor of Education program (see the Faculty of Education (<https://catalog.umanitoba.ca/undergraduate-studies/education/>) in this calendar) or other programs that require an undergraduate degree for admission. Students intending to pursue a career in the geosciences or graduate study should hold an Honours or Major degree (comprising at least 120 credit hours) in Geology or Geophysics.

## Professional Registration

The professional practice of geoscience in Canada is governed by provincial/territorial law and is regulated by professional geoscience associations. In Manitoba, Engineers Geoscientists Manitoba (EGM) regulates professional practice. The requirements for professional registration are acceptable academic preparation and a subsequent period of acceptable geoscience experience. Students considering professional registration should take the B.Sc. Geological Sciences Honours or Major degree and make appropriate course selections, particularly in the basic sciences. Graduates who do not meet the academic requirements may be required by the professional association to take additional courses or examinations. Current registration information for EGM is available in the department or from the association's web site: [www.enggeomb.ca](http://www.enggeomb.ca) (<http://www.enggeomb.ca>)

## Geological Sciences Prerequisite Information

To fulfil prerequisite requirements, a grade of 'C' must be achieved in any course stipulated as a prerequisite to a further course in Geological Sciences unless otherwise stated. Please note that some GEOL courses require a minimum grade of 'C+' in the prerequisite course.

## Programs

Degree/Diploma	Years to Completion	Total Credit Hours	Has Co-op Option
Geological Sciences, B.Sc. General ( <a href="https://catalog.umanitoba.ca/undergraduate-studies/environment-earth-resources/earth-sciences/geological-sciences-bsc-general/">https://catalog.umanitoba.ca/undergraduate-studies/environment-earth-resources/earth-sciences/geological-sciences-bsc-general/</a> )	3	90	
Geological Sciences Minor ( <a href="https://catalog.umanitoba.ca/undergraduate-studies/environment-earth-resources/earth-sciences/geological-sciences-minor/">https://catalog.umanitoba.ca/undergraduate-studies/environment-earth-resources/earth-sciences/geological-sciences-minor/</a> )		18	
Geology, B.Sc.G.Sc. Honours ( <a href="https://catalog.umanitoba.ca/undergraduate-studies/environment-earth-resources/earth-sciences/geology-bscgs-honours/">https://catalog.umanitoba.ca/undergraduate-studies/environment-earth-resources/earth-sciences/geology-bscgs-honours/</a> )	4	120	

Geology, B.Sc.G.Sc. Major ( <a href="https://catalog.umanitoba.ca/undergraduate-studies/environment-earth-resources/earth-sciences/geology-bscgsc-major/">https://catalog.umanitoba.ca/undergraduate-studies/environment-earth-resources/earth-sciences/geology-bscgsc-major/</a> )	4	120
Geophysics, B.Sc.G.Sc. Honours ( <a href="https://catalog.umanitoba.ca/undergraduate-studies/environment-earth-resources/earth-sciences/geophysics-bscgsc-honours/">https://catalog.umanitoba.ca/undergraduate-studies/environment-earth-resources/earth-sciences/geophysics-bscgsc-honours/</a> )	4	120
Geophysics, B.Sc.G.Sc. Major ( <a href="https://catalog.umanitoba.ca/undergraduate-studies/environment-earth-resources/earth-sciences/geophysics-bscgsc-major/">https://catalog.umanitoba.ca/undergraduate-studies/environment-earth-resources/earth-sciences/geophysics-bscgsc-major/</a> )	4	120