GEOLOGY (GEOL)

GEOL 6400 International Field Camp
3 credit hours
This course is offered on an irregular basis in the form of a Geology field trip abroad, allowing the students to be exposed to geological features that cannot be found in Canada. In practical terms, this course will acquaint the student with modern methods of structural, stratigraphic, petrologic and/or geophysical analysis. After mastering these skills, students will undertake an independent geological report project. Students may be required to travel at their own expense.

GEOL 6414 Tectonics
3 credit hours
This course describes the major features of the Earth and its place in the solar system. The evidence for plate tectonics, the analysis of plate movements, and the characteristic rock associations formed in different tectonic environments are presented. Aspects of global change will be considered, including the evolution of tectonic processes through geologic time, changes in the atmosphere and oceans, and the importance of meteorite impacts.

GEOL 6441 Mineral Resources
3 credit hours
A study of Earth's mineral resources, their classification, genesis and distribution in time and space. Important examples from Canada and abroad will be discussed. Topics will also include mineral exploration techniques, mining methods, metallurgical recovery, net smelter return, and ore reserve estimation/classification. Laboratories will examine a variety of base and precious metal ore deposit types. Mining/exploration practice and resource exploitation are also examined in terms of their environmental impacts.

GEOL 6450 Advanced Igneous and Metamorphic Petrology
3 credit hours
The topics covered in this course include magmatic petrogenesis; magma types; petrographic provinces and their relations to their tectonic setting; differentiation indices; variation diagrams; distribution trends of major and trace elements; equilibrium and fractional crystallization in selected synthetic systems; phase equilibria in metamorphic systems; reaction balancing methods; porphyroblast-matrix relations; quantification of pressure-temperature-time trajectories. Laboratory work is centered on the acquisition and manipulation of microprobe data.

GEOL 6465 Advanced Sedimentology
3 credit hours
This course examines current research on sedimentary rocks and basins and the methods used to understand them. The course is taught as a series of modules by multiple instructors who introduce the students to selected areas of research. Among the topics to be covered are modern carbonate and evaporite environments, exotic chemical sedimentary rocks and diagenetic cements, volcanogenic sedimentary rocks, sequence stratigraphy in carbonate and siliciclastic successions, applications of ichnology (trace fossils), the use of stable isotopes in the study of terrestrial carbonates, and the use of detrital minerals to interpret basin evolution.

GEOL 6654 Applied Geochemistry
3 credit hours
The application of graphical and numerical tools for classifying Earth materials according to their chemical composition is studied through field-based and computer-based laboratories. This course examines geochemical sampling, instrumental analysis, statistical evaluation of real geochemical data, and the methods of proper reporting and quality control. The students are introduced to novel methods (fluid inclusion microanalysis, alteration mapping in ore deposits, reaction path modeling) and their application in characterizing geochemical processes on Earth.

GEOL 6666 Petroleum Geology
3 credit hours
The origin, migration and accumulation of oil and natural gas. Types of oil bearing structures and basic principles in oil exploration.

GEOL 6690 - 6699 Directed Studies in Geology
3 credit hours
Intended to supplement or provide an alternative to the regular geology courses in order to meet the special needs and interests of students. The course provides an opportunity to study a particular subject in detail and requires from the student some measure of independence and initiative.

GEOL 6800 – 6825 Special Topics in Geology
6 credit hours
Course content varies from year to year.

GEOL 6826 – 6849 Special Topics in Geology
3 credit hours
Course content varies from year to year.