



Geology (GEOL) 313

Our Physical Resources (Revision 5)

Status:

Replaced with new revision, see the [course listing](#) for the current revision

Delivery mode:

Individualized study online

Credits:

3

Area of study:

Science

Prerequisite:

None

Precluded:

None

Challenge:

GEOL 313 has a challenge for credit option.

Faculty:

[Faculty of Science and Technology](#)

Overview

GEOL 313 explores the nature and uses of numerous physical resources of the world, emphasizing on the resources of Canada, and Alberta in particular. The course covers such topics as formation, distribution, extraction, and use of fossil fuels, and nuclear and other energy resources. GEOL 313 examines water, soil, metallic, and industrial resources as well as the political, economic, and social impacts of their development.

Outline

- Unit 1: Resources: An Introduction
- Unit 2: Plate Tectonics and the Origins of Resources
- Unit 3: Resource Exploitation and the Environment
- Unit 4: Energy from Fossil Fuels
- Unit 5: Nuclear Power and Other Energy Alternatives
- Unit 6: The Abundant Metals
- Unit 7: The Geochemically Scarce Metals
- Unit 8: Industrial Minerals
- Unit 9: Water and Soil Resources
- Unit 10: Resource Development and International Trade


Learning outcomes

Upon successful completion of this course, you will be able to

- explain the interrelated nature of resource use and describe the irregular distribution of world resources and the resulting trade in mineral commodities; differentiate between renewable resources and non-renewable resources.
- outline the role of geochemical cycles in the recycling of materials in the Earth's crust, as well as in the forming, concentrating, redistributing, and altering mineral resources.
- describe the structure of the Earth's interior and outline the driving mechanism behind plate tectonics and plate motion.

- explain the links between the extraction and use of resources and the associated environmental effects.
- describe and differentiate between the formation and composition of hydrocarbon energy resources, including coal, oil sands, and oil shales, and describe the recovery techniques that apply to each.
- discuss the methods of energy generation needed for alternative energy sources and their the advantages and disadvantages, including nuclear, solar, wind, hydro, tidal, geothermal, biomass and hydrogen.
- describe the processes by which major ore deposits of geochemically abundant and geochemically scarce metals are formed, and indicate their occurrences and applications.
- describe the formation, occurrence, extraction and applications of industrial minerals and dimension stones.
- describe the hydrologic cycle and the various uses of water, and discuss the causes and possible solutions for the major water problems.
- describe soil formation processes and the role of soil type on land use; explain erosion and basic techniques used in soil conservation.

Evaluation

To **receive credit**  for GEOL 313, you must complete all the five assignments, a course project, and two examinations. The passing grade for GEOL 313 is sixty percent (60 percent). You must average sixty percent on the assignments and receive a grade of at least sixty per cent to pass each examination. The table below lists the components that contribute to your grade, and their weight.

Activity	Weight
5 Assignments (8% each)	40%
Midterm Exam	20%
Course Project	15%

Activity	Weight
Final Exam	25%
Total	100%


The **midterm and final examinations** for this course must be requested in advance and written under the supervision of an AU-approved exam invigilator. Invigilators include either ProctorU or an approved in-person invigilation centre that can accommodate online exams. Students are responsible for payment of any invigilation fees. Information on exam request deadlines, invigilators, and other exam-related questions, can be found at the **Exams and grades** [↗](#) section of the Calendar.


To learn more about assignments and examinations, please refer to Athabasca University's **online Calendar** [↗](#).

Materials

Craig, James R., David J. Vaughan, and Brian J. Skinner. *Earth Resources and the Environment*, 4th ed. Upper Saddle River, NJ: Prentice Hall, 2010.

 (Print)

The Canadian Centre for Energy Information. *Our Petroleum Challenge: Sustainability into the 21st Century*, 7th ed. Calgary, AB: Canadian Centre for Energy Information, 2004.  (Print)

Bott, R. *Canada's Oil Sands*, 3rd Ed. Calgary, AB: Canadian Centre for Energy Information, 2010.  (Print)

Coal Kit (Modules 1-4). Calgary, AB: The COAL Association of Canada, 2003.


Coal: Economics

Coal: Environment


Coal: Evolution

Coal: Technology  (Print)

Industry Canada. *Canadian Hydrogen and Fuel Cell Sector Profile 2005*.

Ottawa, ON: Public Works and Government Services Canada, 2006. 
(Print)

McKenzie-Brown, P. *Canada's Natural Gas Resources*. Calgary, AB:
Petroleum Communication Foundation, 2000.  (Print)

*The Mineral and Metals Policy of the Government of Canada: Partnerships
for Sustainable Development*. Ottawa, ON: Minister of Public Works
and Government Services Canada, 1996.  (Print)

Other Materials

The course materials include a study guide, student manual, assignment manual, and a reading file.



Challenge for credit

Overview

The challenge for credit process allows you to demonstrate that you have acquired a command of the general subject matter, knowledge, intellectual and/or other skills that would normally be found in a university-level course.

Full information about [challenge for credit](#)  can be found in the Undergraduate Calendar.

Evaluation





To **receive credit**  for the GEOL 313 challenge registration, you must achieve a grade of at least **C- (60 percent)**  on the examination.

Activity	Weight
Examination	100%
Total	100%



[Challenge for credit course registration form](#)

Important links

- › [Academic advising](#) 
- › [Program planning](#) 
- › [Request assistance](#) 
- › [Support services](#) 

Athabasca University reserves the right to amend course outlines occasionally and without notice. Courses offered by other delivery methods may vary from their individualized study counterparts.

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