

APPLIED SCIENCE AND MANAGEMENT DIVISION
Ore Deposits
3 Credit Course
Fall, 2014

ORE DEPOSITS

INSTRUCTOR: Dr. Joel Cubley

OFFICE HOURS: Instructor available
upon request.

OFFICE LOCATION: T1090

CLASSROOM: T1090

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TIME: Tuesdays (1-4pm)

TELEPHONE: 867-456-8605

DATES: September 9 – December 19, 2014

COURSE DESCRIPTION

Geology 201 provides introduction to the classification, distribution, and characteristics of metalliferous ore deposits, as well as diamonds. A focus is put on the classification of ores based on their petrologic association and current models for ore deposit genesis. The tectonic settings of ore deposits are considered within the context of the plate tectonic paradigm and global metallogenic events throughout Earth's history. Laboratory classes will examine sample sets from across Canada, with an emphasis on northern deposits. Students will receive an introduction to reflected light optical microscopy techniques, and blend hand sample and thin section petrography to best characterize mineralized samples.

PREREQUISITES:

GEOL110 (Mineralogy/Petrology) OR by permission from the instructor.

EQUIVALENCY OR TRANSFERABILITY

In Progress

LEARNING OUTCOMES

Upon successful completion of the course, students will have demonstrated the ability to

- Recognize and describe different styles of mineralization and associated alteration in rock specimens and thin sections
- Describe the characteristic mineralogical, structural and host-rock features of a range of important ore deposit types
- Explain the current hypotheses for the genesis of a range of ore deposit types
- Combine scientific data to form a hypothesis that can be used in mineral exploration for a range of ore deposit types
- Identify common ore minerals in both hand and diamond drill core samples, and define the chemical components of those minerals.

DELIVERY METHODS

This course consists of three 60-minute lectures and one lab period per week. The schedule included in this course outline details the major topics covered and when those topics will be presented throughout the course. Laboratory exercises will be conducted in both classroom and field settings. Most laboratory exercises will be conducted at the Yukon Geological Survey in order to utilize the MINFILE and diamond drill core collections housed at the H.S. Bostock Core Library.

ASSESSMENTS

Attendance and Participation

Students are strongly encouraged to attend all lectures and laboratory exercises. Lab exercises can be completed only during lab periods and materials may not be available outside these hours. Off-campus field exercises must be completed during the allocated time with the instructor present.

Assignments

GEOL 201 (Ore Deposits) is a hands-on course with lectures built around the laboratory exercises. The majority of the learning is experiential and occurs in the lab. Characteristics of each major ore deposit type are examined through the study of representative suites. The weekly labs are due at the start of the next week's lab period. In addition to the lab exercises, students will complete 4-5

lecture assignments over the course of the semester to help reinforce critical concepts.

Tests/Exam

There will be a midterm exam and a lab final exam as well as a lecture final exam.

Students must pass the lecture final examination to achieve an overall pass grade.

EVALUATION

<i>Tests and Assignments</i>	<i>Weight</i>	<i>Dates</i>
Weekly Lab Assignments	40% (4% each)	Due at the start of each subsequent lab section.
Lecture Midterm Exam	10%	During lecture class time (see schedule).
Lab Final Exam	20%	During scheduled lab time in the final week of classes.
Lecture Final Exam	20%	During exam period, as scheduled by registrar.
Lecture Assignments	10% (2.5% each)	During lecture class time (see schedule).
Total	100%	

The letter-grading scheme used in this course is the standard Yukon College scheme. Final grades will be rounded up to the nearest decimal place and assigned a letter grade based on this scheme.

REQUIRED TEXTBOOKS/MATERIALS

Robb, L. 2004. *Introduction to Ore-Forming Processes*. Wiley-Blackwell: Oxford. 384 pp.

PLAGIARISM

Plagiarism is a serious academic offence. Plagiarism occurs when students present the words of someone else as their own. Plagiarism can be the deliberate use of a whole piece of another person's writing, but more frequently it occurs when students fail to acknowledge and document sources from which they have taken material. Whenever the words, research or ideas of others are directly quoted or paraphrased, they must be documented according to an accepted manuscript style (e.g., APA, CSE, MLA, etc.). Resubmitting a paper which has previously received credit is also considered plagiarism. Students who plagiarize material for assignments will receive a mark of zero (F) on the assignment and may fail the course. Plagiarism may also result in dismissal from a program of study or the College.

ACADEMIC ACCOMMODATION

Reasonable accommodations are available for students requiring an academic accommodation to fully participate in this class. These accommodations are available for students with a documented disability, chronic condition or any other grounds specified in section 8.0 of the Yukon College Academic Regulations (available on the Yukon College website). It is the student's responsibility to seek these accommodations. If a student requires an academic accommodation, he/she should contact the Learning Assistance Centre (LAC) at (867) 668-8785 or lassist@yukoncollege.yk.ca.

TOPIC OUTLINE

Week	Topics
1	Definition of ore and the economic factors affecting the exploitation of ore; resources versus resources; ores as concentrations and first-order concentration mechanisms.
2	Eh-pH/ f_{O_2} diagrams; metal-carrying complexes in solutions; controls on metal-carrying capacity of fluids.
3	Controls on fluid movement (P_{lith} vs. P_{hyd}); types of ore fluids; modern ore fluids.
4	Preliminary classification of ores.
5	Stratiform Cr-PGE complexes; Fe-Ti-V ores (stratiform and anorthositic).
6	Fe-Ni-S ores; sulphide melt generation and segregation.
7	Granitoid genesis and importance to felsic intrusion-associated ores; Cu-porphyry ores and alteration types; Mo-porphyry and Climax molybdenum ores.
8	Skarn ores and petrogenesis.
9	Vein ores and ore zoning; epithermal Au-Ag ores; Carlin-type disseminated Au-Ag ores; Archean lode gold ores.
10	Volcanogenic massive sulphide ores; sedimentary exhalative clastic sediment-hosted ores.
11	Banded iron formations; sedimentary Mn-ores (deep sea nodules); placer Au and U ores.
12	Kimberlite pipes and diamonds; unconformity uranium ores.
13	Effect of weathering and metamorphism on ore deposits; metallogenic provinces and epochs.