

Geology 51-322 Mineral Deposits: Fall 2017
Section: A09C

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Office Hours: T 8:30–10:00am, W 4:00–5:30pm, or by appointment

Class Schedule: Lectures MW 1:50–2:50pm, Harrington 217, Lab F 1:50–4:00pm (*5pm)

About this course

Mineral Deposits is a broad introduction to the geology of deposits of mineral ore, techniques and practice of exploration for economic mineral deposits, and the function of the mining industry in general. In this course we will put the occurrence of different types of mineral deposits into a tectonic context, discussing varied approaches to economic geology. Your study will draw on your past introductions to minerals, rocks, and the “inner workings” of the earth. You will use petrology, geochemistry, structural geology, mineralogy, and field geology to examine this diverse field, with strong, direct connections to industrial applications.

Grades: Your course grade will be based on a major quiz and two lecture exams (45%), homework, reading quizzes, lab projects and presentations (30%), field trip participation/report (15%), and in-class exercises and participation (10%)

In-Class exercises: These include written answers to questions and accompanying steps and sketches based on problems shown in class. You must bring a calculator, pencil, and paper to each lecture for calculations. Additionally, we will be using Microsoft excel, primarily later in the course, so you may be asked to bring a laptop to class and/or lab (if you own one).

Homework will be assigned periodically throughout the semester with a focus on critical thinking and applications. **Late work will not be accepted.**

Grade scale: 93% and up = A; 90–92 = A-; 87–89 = B+; 83–86 = B; 80–82 = B-; 77–79 = C+; 73–76 = C; 69–72 = C-; 66–68 = D+; 63–65 = D; 60–62 = D-; <60% = F

Exams: The exams will material from lectures and readings. The first (mid-term) exam will count for 22% of your grade (given in class), and the second (cumulative) exam (take-home) is worth 18%. The exams test your ability to grasp concepts and solve problems rather than memorize formulas or vocabulary. However, if you fail to take good notes, participate in class, or gain a reasonable grasp of the material you will struggle with the exams. The tentative exam schedule (subject to change) is:

- Super-quiz:
- Exam 1: Two parts given in lab on Nov. 3

- Exam 2: assigned December 11, due December 15 by 5pm (take home to be completed independently).

Attendance: The material on the exams will come from the lecture, homework, and in-class exercises so attendance is required if you wish to do well in the course. Please feel free to ask questions at any time, including during lecture; however, disruptive behavior, including talking during lecture or text messaging, is not acceptable and will result in a lower course grade.

Special Accommodations: Reasonable accommodations will be made for students with disabilities. Please contact Disability Services (424-3100 (voice) or 424-1319 (TTY)) or visit their web site at <http://www.uwosh.edu/dean/disabilities.htm> for the University's accommodation request form and documentation requirements. Information related to an individual's accommodation request will be kept confidential.

Academic Integrity: The Wisconsin Administrative Code states: "Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others academic endeavors." (§ UWS 14.01) Plagiarism and other forms of academic misconduct are serious offenses with severe penalties. See the University of Wisconsin Oshkosh Student Discipline Code for definitions of academic misconduct and details about procedures, sanctions, and other relevant information. Specific questions about the provisions in the Student Discipline Code should be directed to the Dean of Students Office. If you do not understand this statement, please see me as soon as possible.

Course Objectives: By the end of the course, as a student you will be expected to...

- Discuss the basic principles of ore formation in the context of different deposit-forming systems.
- Contrast different types of geological ore formation processes, giving examples of each.
- Evaluate the economic geological considerations of important metals and non-metallic minerals.
- Critique the geology and mineralization history of important mineral districts worldwide.
- Log drill core and produce industry standard rock descriptions including trends.
- Propose, design, and plan a mineral exploration program in a new area of interest

Required Textbook: "Economic Geology" by Walter Pohl, published by Wiley-Blackwell, available in the bookstore or from the publisher. This textbook is written with a very broad view of the subject matter and we will "drill down" in to some more detailed nuances of different mineral deposit and exploration topics. This book has a fantastic perspective and often seeks to summarize why we ask the questions we ask, an important concept in any subject.

In addition to the textbook, we will read some of the primary literature (scholarly journal articles) relating to mineral deposits and exploration. Additional reading assignments will be announced in class.

Tentative Course Schedule:

Week beginning	Topic	Reading (Additional TBA)	Lab/Notes
Sep. 4	Introduction and context – thinking about mineral exploitation and society	NRC Report on Sustainability (D2L) Pohl Intro p. 1-4	No lab this week (lecture Friday)
Part 1: Metalliferous Ore Deposits and Ore Formation			
Sep. 11	Metallogenesis – Igneous Systems: Rock Crystallization	Pohl 1–1.1.5 (p. 5–35)	Lab: Mineral Review
Sep. 18	Magmatic Ore Systems: Secondary enrichment: Hydrothermal, Porphyry, Skarn	Pohl 1.1.6–1.1.10 (p. 35–68)	Lab: Ore Minerals and Rock review
Sep. 25	Volcanogenic, Supergene, Epithermal ore formation	Pohl 1.1.11–1.2 (p. 68–91)	Lab: Geologic Maps
Oct. 2	Autochthonous Sedimentary/Diagenetic ore formation, Part I Quiz Oct. 4	Pohl 1.3–1.6 (p. 92–132)	No Lab (field trip)
FIELD TRIP to Michigan, 10/6–10/8 (Depart Harrington Hall 6:30 am Friday)			
Oct. 9	No Lec 10/9; Tectonic Context of Ore Deposits, Field Trip report due Oct. 13	Pohl 1.7–1.9 (p. 132–147)	Lab: Logging Core
Part 2: Economic Geology of important minerals and materials			
Oct. 16	Economic Geology of Iron and Steel Metals Base Metals	Pohl 2.1–2.2.3 (p. 149–207)	Lab: Ore Petrography
Oct. 23	Economic Geology of Precious Metals and Light Metals	Pohl 2.3–2.4 (p. 207–239); skim 2.5–2.5.5 (p. 239–253)	Lab: Intro to District Project
Oct. 30	Economic Geology of Special Metals; Exam 1 in lab Nov. 3	Pohl 2.5.6–2.6 (p. 254–284); Review Pohl Part I	Exam 1 in lab
Nov. 6	Non-metallic Minerals	skim Pohl 3–3.28 (p. 287–367)	Lab: Geochemical data
Part 3: Exploration and Development of Mineral Resources			
Nov. 13	Mineral Industry: Mine Cycle and Exploration Strategies	Pohl 5.1–5.2 (p. 413–437)	District Project due in lab; presentations in lab
Nov. 20	Developing a Mine and Evaluating Reserves	Pohl 5.3–5.33 (p. 437–448)	Lab: Deposit Evaluation
Nov. 27	Mining and Environmental Concerns	Pohl 5.4–5.6 (p. 448–463)	Lab: Intro to Exploration Project
Dec. 4	Coal: Geology and Mining	Pohl 6.1–6.1.1 (p. 467–474), 6.2 (487–499), 6.4–6.5 505–518)	Exploration Project peer review, final due 12/14
Dec. 11	Exam 2 (assigned Dec. 11, due Dec. 15 by 5pm)	–	No Lab this week

Field Trip: A single 3-day field trip is planned for Friday Oct.6–Sunday Oct 8. We will travel to northern Wisconsin and the Upper Peninsula of Michigan to the mineral districts of Marquette–Ishpeming–and the Keweenaw Peninsula. Details will be announced in class. I will do all I can to keep costs associated with this trip at a minimum.