

University of Arkansas
Department of Geosciences

GEOS 4083 / 5283 – Economic Geology
Spring 2023 Tentative Syllabus
TuTh 3:00 pm-4:15 pm Gearhart Hall 0017

Professor: Adriana Potra
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Office hours: Tu/Th 11:00 am – 1:00 pm
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Required textbooks: Ore Deposit Geology (2013), John Ridley (textbook I)
Introduction to Ore-Forming Processes (2005), Lawrence Robb (textbook II)
Geology of Mineral Resources (2015), M. Jebrak and E. Marcoux (textbook III)

Additional texts: The Geology of Ore Deposits (2007), J.M. Guilbert and C.F. Park

Welcome to Economic Geology! The objective of this course is to introduce you to the important types of economic mineral deposits and to some of the most important examples of each type. The course will cover:

- The basics of the geology and geochemistry that accompany metallic and non-metallic mineral deposit formation
- Basic principles of mining and exploration economics
- Environmental concerns associated with the extraction of earth resources.

Mineralogy and Chemistry are a MUST for this course, and Petrology and Geochemistry are very USEFUL!

EVALUATION

There are **three exams**, with dates marked in the syllabus. The format for the exams will be a mix of multiple choice, fill in the blank, short essays, and problem solving. The exams are not cumulative. There is also **homework** and, for the graduate students, a **term paper** that make up part of your grade. More details about the term paper will be available by January 31st.

Exams cannot be made up and homework cannot be turned in after the due date unless prior instructor approval has been granted.

Grading: GEOS 4083

Exams	3X 25%	=	75% of grade
Homework		=	25% of grade

Grading: GEOS 5283

Exams	3X 25%	=	75% of grade
Homework		=	10% of grade
Term paper (written part due May 12)		=	15% of grade

A = 10-9, **B** = 8.9-7.9, **C** = 7.8-6.5, **D** = 6.4-5.5, **F** = fewer than 5.5 points.

Class date	Lecture topic	
Mar 7	Short group discussion – Box 3.6 Volcanic-hosted massive sulfide (VHMS) deposits	I (178-183)
Mar 9 – 14	High-sulfidation epithermal Au-Ag deposits Low-sulfidation epithermal deposits	
Mar 16	Short group discussion – Box 3.7 Orogenic Au deposits Carlin-type Au deposits	I (213-216)
	<i>Summary of hydrothermal deposits in magmatic and orogenic environments</i>	II (125-126)
Mar 20 – 24	Spring Break	

Section 3B: Hydrothermal ore deposits formed in sedimentary environments

Mar 28	Short group discussion – Box 4.1 Base-metal deposits in sedimentary basins I <ul style="list-style-type: none"> Mississippi Valley-type (MVT) Pb-Zn deposits 	I (257-261)
Mar 30	Base-metal deposits in sedimentary basins II <ul style="list-style-type: none"> Sedimentary exhalative Pb-Zn-Ag deposits (SEDEX) Stratiform sediment-hosted Cu deposits 	
April 4	Exam two (not cumulative)	
April 6	Uranium deposits in sedimentary basins <i>Summary of hydrothermal deposits in sedimentary environments</i>	II (214-215)
April 11	Article review (TBA)	

Part 4: Sedimentary processes and associated ore deposits

April 13	Short group discussion – Box 5.1 Sedimentary ore-forming processes Chemical precipitation from sea/lake waters <ul style="list-style-type: none"> Banded iron formations Phosphorus deposits Evaporites 	I (304-307)
April 18	Short group discussion – Box 5.2 Mechanical concentration of heavy minerals <ul style="list-style-type: none"> Alluvial deposits: Placer and paleoplacer <i>Summary of deposits in sedimentary environments</i>	I (331-334) II (307-308)

Class date	Lecture topic	
Part 5: Supergene processes and associated ore deposits		
April 20	Supergene ore-forming processes <i>In-situ</i> (pedogenic) supergene ores <ul style="list-style-type: none"> • Laterite and bauxite 	
	Supergene ores formed by overprinting of hypogene ores <ul style="list-style-type: none"> • Supergene Cu 	
	<i>Summary of supergene ores</i>	II (245)
April 25	Article review (Rasmussen et al., 2012)	
April 27 – May 2	Fossil fuels – oil/gas formation and coalification	
May 4	Graduate student presentations of term papers	
TBA	Exam 3 (not cumulative)	
May 12	5 PM – Deadline for graduate students to send the written part of the term paper	

POLICIES

STUDENT SUPPORT: U of A Cares offers a supportive and encouraging partnership with students by linking them with appropriate resources that will allow them the opportunities to overcome barriers on their path to success; both personal and educational at uofacares.uark.edu

EXCUSED UNIVERSITY ABSENCES are: (1) illness of the student, (2) serious illness or death of a member of the student’s immediate family or other family crisis, (3) University-sponsored activities for which the student’s attendance is required by virtue of scholarship or leadership/participation responsibilities, (4) religious observances, (5) jury duty or subpoena for court appearance, and (6) military duty. The instructor has the right to require that the student provide appropriate documentation for any absence for which the student wishes to be excused.

INCLEMENT WEATHER: If the University is open, class will be in-session. Call the Weather Hotline when in doubt at (479) 575-7000. The University’s inclement weather policy is available at emergency.uark.edu

ACADEMIC HONESTY STATEMENT: “As a core part of its mission, the University of Arkansas provides students with the opportunity to further their educational goals through programs of study and research in an environment that promotes freedom of inquiry and academic responsibility. Accomplishing this mission is only possible when intellectual honesty and individual integrity prevail. Each University of Arkansas student is required to be familiar with and abide by the University’s ‘Academic Integrity Policy’ which is found at <https://honesty.uark.edu/policy/index.php> Students with questions about how these policies apply to a particular course or assignment should immediately contact their instructor.” **No cheating or plagiarism will be tolerated.**

TECHNOLOGY POLICY: The use of cell phones, smart phones, tablets, laptops, etc., for purposes other than note taking or learning oceanography concepts is not allowed during class. You are in class to learn, not socialize with your media! **Flagrant violation of this policy will result in you being dismissed from class for the day!**

EMERGENCY PROCEDURES: Many types of emergencies can occur on campus. Instructions for specific emergencies such as severe weather, an active shooter, or fire can be found on the web at emergency.uark.edu

STUDENTS WITH DISABILITIES: It is the student’s responsibility to request accommodations each term from the Center for Educational Access (ada@uark.edu or 479-575-3104). Please provide me with the proper paperwork at the beginning of the semester and I will help coordinate accommodations for examinations and class materials.

SEXUAL ASSAULT AND DOMESTIC/DATING VIOLENCE: If you are in danger, dial 9-1-1. For confidential help, call the University Victim Advocate at (479) 575-7252. The University of Arkansas prohibits sexual harassment or acts of sexual assault, domestic violence, dating violence and stalking committed against students, employees, campus visitors, and other persons who use University facilities. Sexual assault is any form of sexual activity where consent is not consciously and voluntarily given. Anyone can be a victim of sexual assault. Sexual harassment is prohibited by University policy and is a form of sex discrimination prohibited by Title VII of the Civil Rights Act of 1964 and by Title IX of the Education Amendments of 1972. Sexual assault is a crime, as defined by the Arkansas criminal code. Important sexual assault information and guidance is available at: <https://report.uark.edu/sexual-assault-or-domestic-dating-violence/index.php> and respect.uark.edu. File a formal report at report.uark.edu

SEVERE WEATHER (e.g., Tornado Warning):

- Follow the directions of the instructor or emergency personnel.
- Seek shelter in the basement or an interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside.
- In a multi-story building, if you cannot get to the lowest floor, go to a hallway in the center of the building.
- Stay in the center of the room, away from exterior walls, windows, and doors.

VIOLENCE or ACTIVE SHOOTER (C.A.D.D.):

- CALL. 9-1-1
- AVOID. If possible, evacuate to a safe area outside the building. Follow directions of police officers.
- DENY. Barricade the door with desks, chairs, bookcases, or any items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it is safe.
- DEFEND. Use desks, chairs, cell phones, or whatever is immediately available to distract and/or defend yourself and others from attack.

CONCEALED CARRY ON CAMPUS: Handguns are only allowed on campus (including all classrooms) to the extent specifically authorized by state law. Everyone who lawfully possesses a handgun and an enhanced carry permit is always required to keep the handgun concealed from public view and is responsible for carrying the handgun in a safe manner. If an individual carries a concealed handgun in a personal carrier such as a backpack, purse, or handbag, the carrier must remain within the individual's immediate vicinity (within arm's reach). During this class, you may be required to engage in activities that require you to be physically separate from your belongings and you should plan accordingly. Any student who violates the concealed carry laws while on campus may be subject to criminal prosecution and/or discipline by the University, up to and including dismissal. If you observe someone displaying a handgun or other weapon on campus, it should be reported to the University of Arkansas Police Department (uapd.uark.edu). For more information: safety.uark.edu.