Jan. 16, 2023

Geologic Resources: Minerals, Energy, Water

University of Texas at El Paso **Spring 2023**
Class: Geological Sciences 302 **GEOL 4315-5315-6315**
Mon/Wed 9-10:20 AM **CRN: 25580 -25125 - 25609**

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Office hours by request (email us)

Course Goals and Objectives

This course will provide an overview of the three primary geologic resources: mineral, energy, and water. Processes responsible for resource accumulation and redistribution, the role of geologists in exploration and extraction, and basic working principles of resource evaluation will be covered. The course will answer questions on metals, energy and water resources, such as: ***Where do they come from? How do they concentrate? How do we find, extract and use them?***

Learning outcomes

Among other outcomes, at the end of the course students will be able to:

- Describe concepts of geologic resource assessment
- Explain geologic resource consumption rates and current lifetimes
- Define critical minerals and their uses
- Recognize major classes of mineral deposits and their genesis
- Explain the role that fluids play in deposit development and redistribution
- Describe the role that geologists play in exploration, development, and extraction
- List major elements of a hydrocarbon play
- Understand how geologic energy resources form (hydrocarbon, uranium, and geothermal)
- Conceptualize mining of water in arid regions
- Understand linkages between energy, mineral, and water resources

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Textbook / Zoom / Blackboard

'Earth's Natural Resources'. **Recommended, not required.**
By John V. Walther (ISBN: 978-1-4496-3234-2). Published by Jones and Bartlett Learning. The book is also offered on eBook through VitalSource: https://www.vitalsource.com/products /earth-39-s-natural-resources-john-v-walther-v9781284084931.

Blackboard. Assignments and class messages will be announced in Blackboard and by direct email to students.

Grading

Grades will be calculated through a combination of assignments and exams (see schedule).

Maximum points = 100; 50 points each for weeks 1-8 (A. Arribas, Instructor) and weeks 10-16 (M. Engle, Instructor).

A. Arribas: max. 50 points, as follows: assignments 1, 2 and 3 (10 pts each), exam 1 (20 pts)

M. Engle: max. 50 points as follows: concept sketches 1-5 (2 points each), assignments 4 and 5 (10 points each), exam 2 (20 points)

Late assignment penalty: 20% from the score for each 24 hours that an assignment is turned in past due.

Exams will be taken in class on the dates shown, during the normal class period. Cannot be turned in late or made-up without a valid medical excuse.

Letter grade: A = 90-100, B=80 – 89.9, C = 70-79.9, D = 60-69.9, F = less than 60

CASS / Student Concerns

If you have a disability or if you are experiencing learning disabilities and need classroom accommodations, please contact the Center for Accommodations and Support Services (CASS) at 747-5148, or by email to cass@utep.edu, or visit their office located in UTEP Union East, Rm 106. For additional information, please visit www.sa.utep.edu/cass.

If you are struggling with this class or experiencing difficulties at the university, please reach out to your instructor or teaching assistant. If they are unable to help you, then please contact the Dean of Students Office at DOS@utep.edu or phone (915) 747-5648.\

Academic Misconduct

Academic dishonesty will be not tolerated in this class (please refer to the student conduct code handbook for details regarding university policy and definitions). Dishonesty includes, but is not limited to, plagiarism on term papers, unauthorized notes brought into an exam; copying answers from another student or letting another student copy your answers. The penalty for the first offense will be a grade of zero points on the exam or assignment. Penalty for the second offense will be an F for the course.

Helpful Hints

- Attend the lectures!
- Review material regularly - multiple short study sessions over a period of weeks are more effective than a single "cram" the night before an exam.
- Form a study group. Each member should study material on their own before meeting with the group for discussion and comparison.
- Ask questions if you don't know or are confused.
- Combine class notes, textbook, and web materials when studying. Each provides a different perspective.

Schedule (subject to change):

Weeks 1 to 8 (Prof. Arribas), 10 to 16 (Prof. Engle)

Week	Date	Topic	Exams/Assign. due
1	Jan. 18	Introduction. Minerals and Society	
2	Jan. 23, 25	Critical Minerals	
3	Jan. 30, Feb. 1	Metal/Mineral Enrichment Processes. Mineral Deposit Types: Magmatic Deposits	**Assign. 1 (2/5)**
4	Feb. 6, 8	Hydrothermal Mineral Deposits	
5	Feb. 13, 15	Sedimentary and Weathering Mineral Deposits	**Assign. 2 (2/19)**
6	Feb. 20, 22	Mineral Exploration	
7	Feb. 27, Mar. 1	Review and Exam	**Exam 1 (3/1)**
8	Mar. 6, 8	Group Presentations **(Assign. 3)**	**Assign. 3 (3/8)**
9	**Mar. 13, 15**	**Spring Break**	
10	Mar. 20, 22	U.S. and World Energy; Coal Geology	
11	Mar. 27, 29	Conventional Hydrocarbons; Petroleum Systems	Sketch 1 (3/27)
12	Apr. 3, 5	Tight Oil and Shale Gas; Induced Seismicity	Sketch 2 (4/3); **Assign. 4 (4/5)**
13	Apr. 10, 12	Nuclear and Geothermal Energy	Sketch 3 (4/10)
14	Apr. 17, 19	Intro to Water Resources; Controls on Precipitation Distribution	
15	Apr. 24, 26	Surface Water and Groundwater Processes & Supplies	Sketch 4 (4/24); **Assign 5. (4/26)**
16	May 1, 3	Water use for Energy and Minerals; Energy use for Water	Sketch 5 (5/1); **Exam 2 (5/3)**