

Spring 2024 | GEOL 0220 | Fossil Fuels

Professor: Ryan Kerrigan

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Class time: Monday, Wednesday, & Friday, 9:00 - 9:50 AM

Office Hours: Tuesdays 1:00 - 3:00 PM or by appointment

Office Phone: (814) 269-2942

Class Room: Krebs 220

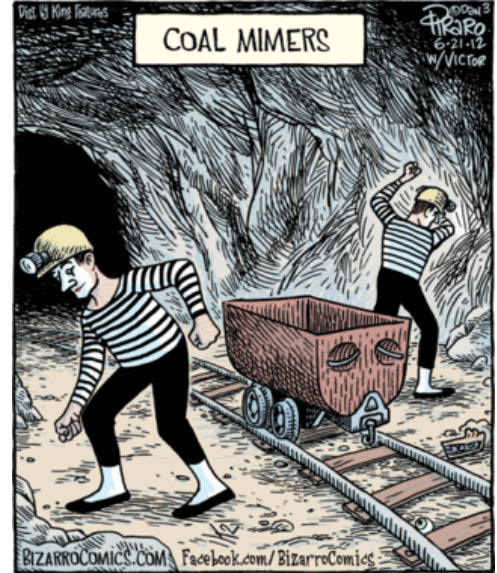
Welcome to Fossil Fuels!

This course will cover numerous aspects of many economically viable naturally occurring earth materials. It will be designed to introduce students to the geology of ore bodies and fossil fuels deposits, their creation and preservation, the extraction of these valuable resources, their uses and their economic important in a global economy.

Goals and Outcomes

By the end of this course, students will have an understanding of the following topics:

- ore bodies and their importance in economic geology
- the generation, extraction, and uses of various fossil fuel resources
- the impacts of mining and resource extraction and the mitigation associated with these endeavors
- power generation and power needs
- renewable resources and green energy production



COURSE RESOURCES AND RULES

Text (required): Earth Resources and the Environment (4th Edition), 2011, Craig, J.R., Vaughan, D.J., and Skinner, B.J., Pearson-Prentice Hall, p. 508, ISBN – 978-0-321-67648-1. You can find used copies online for ~\$30 used, ~\$100 new. Additionally, I have asked the library to have a copy on reserve. You will complete assignments using it and I will refer to its contents in lecture frequently.

Other Texts (not required): Depending on your level of interest, you may want to pick up some of these texts as additional resources. I will be using material from these books since they are packed with good information. They will be on reserve at the library.

- Economic Geology: Principles and Practice, 2007, Pohl, W.F., Wiley Blackwell Publishing. p. 663
- Earth's Natural Resources, 2014, Walther, J.V., Jones & Bartlett Learning. p. 428.

Web-material: Course materials (schedule, power points, problem sets, study guides, etc.) will be posted on Canvas for your convenience.

WAMAP: There will be several assignments that will need to be completed on a website called WAMAP. I will have more information on this soon, I am still trying to figure out some details.

Clean-up: Please don't make a mess, but if you choose to make a mess, please clean up after yourself.

Safety: Use your brain, do not do anything that would endanger yourself or your classmates.

Academic Integrity: Although there will be opportunities for group work in this course, all students are responsible for understanding the material and should indicate with whom they collaborated on any assignment. Group work does not mean that one person does all the work and everyone else puts their name on it...this is considered cheating. Students **should not:** claim other's ideas as their own, turn in other's work as their own, copy sources without proper citation (plagiarism), allow others to take their work or ideas, or pass off past projects as original work. If you have questions about academic honesty, see the instructor or refer to the document "Academic Integrity at the University of Pittsburgh at Johnstown." (<https://www.johnstown.pitt.edu/sites/default/files/landing-images/upj-academics-integrityguidelines.pdf>). Anyone found to be in violation of the Pitt-Johnstown standards for academic integrity will fail the course.

Student Accommodations: If you will be requesting accommodations, you are encouraged to contact both the instructor and the Office of Health and Wellness (G-10 Student Union Building, 814-269-7119) to schedule an appointment as early as possible in the term. The Office of Health and Wellness will review your case and determine reasonable accommodations for this course.

Diversity and Inclusion: Our classroom will be one of acceptance and inclusion. Any form of discrimination, bullying, etc. will not be tolerated. Please review the university's statement of Equity and Inclusion, if you are unfamiliar: <https://www.johnstown.pitt.edu/about/office-president/equity-and-inclusion>

Late Work: Any work not received by the due date and time will have points deducted, except when pre-excused by the instructor (which will require documentation). Up to 10% of the total possible points will be deducted each day late (this includes weekends and holidays). No work will be accepted after the last day of classes.

Outside Resources: Perhaps there are questions that I cannot answer, or issues you feel you cannot discuss with me, UPJ has outlets these issues. Kara Bernard, the Natural Sciences division administrative assistant, is a wealth of knowledge about random stuff. If you have a problem me or a problem you don't feel comfortable talking to me about please see: Steve Stern, Chair of the Natural Science Division; he is my boss.

EVALUATION

1. Fossil Fuels Debate Project:

Three guest lecturers will be coming into the class to discuss various aspects and perspectives regarding fossil fuel exploration. Students will be asked to complete a written summary of the information presented by the guest lecturers which should include: a summary of topics presented, fact-checking of assertions made by the presenters, and a discussion of the pros and cons of fossil fuels exploration using specific examples. Lastly, this project will culminate in a class discussion/debate (participation required).

2. Field Trips:

There will be one field trip associated with this course. I am still finalizing the details of the trip but it is expected that all students will attend. There will be a short assignment connected with the field trip. I will discuss everyone's schedule the first week of class and determine if people have conflicts. It is your responsibility to alert me of any conflicts within the first month of class. I need to be made aware of any conflict you have within the first month of class and a make-up project will be assigned. If you do not make me aware of any conflicts it will be assumed you can attend and you will forfeit any chance at a make-up assignment.

3. Problem Sets:

Problem sets will be distributed weekly, they will be posted on Mondays and due the following Monday unless otherwise specified. The problem sets will be a combination of calculations, short answer, essay, or summaries of assigned reading. Problem sets will heavily reinforce topics discussed and covered in class so attendance to class will be imperative. If for some reason you are unable to attend class please contact your classmates for the missed material. The problem sets will be worth 40% of your total grade.

Several of the problem sets will be lengthier and will require additional time. These lengthier assignments will be worth multiple problem set grades. I will talk more about these assignments as they approach.

4. Exams:

There will be three unit exams during the semester (including the final). The tentative dates of these exams are shown on the Course Schedule found below. The exams will be generally 60% multiple choice and 40% of short answer/drawings/labeling/calculations/etc. The exams will comprise 50% of your total grade. The first two exams will be 15% each of your total grade. The final exam will be held on a date to be determined Krebs 220 and will be a cumulative exam worth 20% of your total grade.

Exams will emphasize material presented in lecture; however, students will also be tested on material contained in the readings. Exams will not just test your factual knowledge of the material; students will also be expected to *apply* your knowledge and understanding of the course material. In this regard, it is of prime importance to understand geologic concepts, more than just “facts.” Some memorization will be necessary, but is considered of secondary importance. Exams are closed-book. There are no make-up exams. If you know you will be missing an exam, see me and we may be able to arrange to have you take the exam early.

5. Research Paper and Presentation:

Students will be asked to complete a semester-long research project that will culminate in the presentation of the independent investigation on a topic of their choosing. A separate sheet will be distributed discussing expectations, timelines, formats, and potential topics.

ASSESSMENT

- 30% Problem Sets
- 5% Field Trip
- 50% Exams (first two exams will be 15% each and the cumulative final will be 20%)
- 15% Research Paper and Presentation
- Standard grade cut-off apply (100-96.6 =A+, 96.6-93.3=A, 93.3-90=A-, etc)

TENTATIVE CLASS SCHEDULE

Schedule of Events			
Week	Monday	Wednesday	Friday
1	<u>January 8, 2024</u> Introduction and Population	<u>January 10, 2024</u> Resource Classification	<u>January 2, 2024</u> Earth & Plate Tectonics
2	<u>January 15, 2024</u> NO CLASS MLK DAY	<u>January 17, 2024</u> Rock Cycle & Plate Tectonics Problem Set #1 Due	<u>January 19, 2024</u> Fractional Crystallization
3	<u>January 22, 2024</u> Ores & Ore Deposits (Igneous) Problem Set #2 Due	<u>January 24, 2024</u> Ores & Ore Deposits (Igneous)	<u>January 26, 2024</u> Ores & Ore Deposits (Ig & Meta) Research Paper Topics Due
4	<u>January 29, 2024</u> Ores & Ore Deposits (Meta & Sed) Problem Set #3 Due	<u>January 31, 2024</u> Ores & Ore Deposits (Sed)	<u>February 2, 2024</u> Ore Abundances
5	<u>February 5, 2024</u> Abundant Metals Problem Set #4 Due	<u>February 7, 2024</u> Minor & Trace Elements	<u>February 9, 2024</u> EXAM I
6	<u>February 12, 2024</u> Electricity and Units	<u>February 14, 2024</u> Energy Resources & Coal Geology	<u>February 16, 2024</u> Coal Geology Research Paper Citations Due
7	<u>February 19, 2024</u> Coal Geology and Deposits Problem Set #5 Due	<u>February 21, 2024</u> Coal Mining	<u>February 23, 2024</u> Coal Mining & Hazards
8	<u>February 26, 2024</u> Petroleum Geology Problem Set #6 Due	<u>February 28, 2024</u> Petroleum Geology & Chemistry	<u>March 1, 2024</u> Fingerprinting oil

Schedule of Events			
Week	Monday	Wednesday	Friday
9	<u>March 4, 2024</u> Guest Lecture: PA survey Problem Set #7 Due	<u>March 6, 2024</u> Guest Lecture: Oil & Gas	<u>March 8, 2024</u> Guest Lecture: Sierra Club
10	<u>March 11, 2024</u> NO CLASS SPRING BREAK	<u>March 13, 2024</u> NO CLASS SPRING BREAK	<u>March 15, 2024</u> NO CLASS SPRING BREAK
11	<u>March 18, 2024</u> Exploitation of oil and gas PS #8 Debate Summary	<u>March 20, 2024</u> Review	<u>March 22, 2024</u> EXAM II
12	<u>March 25, 2024</u> Oil and Gas Exploration	<u>March 27, 2024</u> Drilling and Recovery	<u>March 29, 2024</u> Oil Shales & Tar Sands Research Paper Outline Due
13	<u>April 1, 2024</u> Tight Gas & Fracking Problem Set #9 Due	<u>April 3, 2024</u> Methane sources	<u>April 5, 2024</u> Petroleum Economics
14	<u>April 8, 2024</u> Alternative Energy: Solar Problem Set #10 Due	<u>April 10, 2024</u> Alternative Energy: Hydro & Ocean	<u>April 12, 2024</u> Alternative Energy: Tidal & Wind
15	<u>April 15, 2024</u> Alternative Energy: Geothermal Problem Set #11 Due	<u>April 17, 2024</u> Alternative Energy: Climate	<u>April 19, 2024</u> Research Paper Presentations
16	Monday April 22, 2024 8:00-10:00 FINAL EXAM		

* Tentative Schedule – Changes may be made to adjust for material flow