

OXFORD COLLEGE

Geology 250Q – Mineral Resources, Energy and Power

Spring 2013

Goals for the course: Geology 250Q (Mineral Resources, Energy and Power) has been designed for the Environmental Studies major. As such, it serves as an intermediate breadth level course (200 level) in the Earth Sciences discipline area. Because this course has no prerequisites, it also has been found to be a very good science course for students interested in International Studies and Political Science. It can also serve any student who wants an interesting and timely introduction to resources and energy issues. No prior background in geology is assumed or necessary. This course will give students an understanding of scientific investigation as it relates to the geologic origin of the Earth's mineral and energy resources. Some of the key elements in the study of geology include the scientific method and observational skills. The course will introduce those early in the semester and continue to reinforce them throughout the rest of the term. At the end of the course students will understand how the scientific method applies to geology. Their observational skills will be considerably improved through the analysis of mineral and rock specimens. The course emphasis is on the geologic nature of nonmetallic, metallic, and energy resources. Students will also gain knowledge and appreciation of the historic development, uses, environmental concerns, and future potential of these resources. This course connects to other disciplines such as history and economics and involves a large amount of writing. When this course is over, students will have considerable insight when they use a metallic object or turn on a light.

COURSE ANNOUNCEMENTS

Instructor: Dr. Stephen W. Henderson

Office: 106 Pierce Hall

Office Phone: (770) 784-8345

Office Hours: Monday and Wednesday (10:45-12:00) and other times by appointment or stopping by. I'm usually in my office and available.

Text: There is no text or laboratory manual for this course. Field trip notes will be kept in a required composition notebook. Recommended: Gibson, 2011, What Things Are Made Of, published by Booklocker.com, Bangor, Maine

Organization: The class will meet for lecture two times each week: Tuesday & Thursday from 11:50-1:30. The laboratory section is from 1:40-4:40 p.m. on Tuesday and includes three Saturday field trips.

Attendance: All students are expected to attend all scheduled lecture and laboratory sessions. Attendance will be taken. No unexcused cuts are allowed in lab. Two of the three Saturday field trips are required. Any student can go on all three of the Saturday field trips. If a student goes on a third field trip and writes up the field trip report for it, he/she will have the opportunity to receive an additional 3% grade. Students who have an unexcused absence in lab will have their final grade reduced 3%age points per absence and won't be able to turn in a field trip report. A student who has three or fewer lecture absences for the entire semester will receive the addition of 2%age points to the final course average. There are no excused absences. Students having five or more lecture absences will have their final course grade reduced 1%age point per absence starting with the fifth absence. Being late to class can be rude and distracting. If it happens, please be as unobtrusive as possible when you enter class. Three late entrances will be considered equal to one absence. If you come in late, it is your responsibility to see me immediately after class to ensure that you are marked late and not absent. No adjustments will be made at a later time. When you are in class, you must be attentive and not disturb others. Leaving class early counts as an absence as does sleeping through a class or being generally inattentive. Cell phones are to be turned off and can't be used during lecture or laboratory tests (including use as calculators).

Honor Code: The Oxford College Honor Code applies to Geology 250Q. All quizzes, tests, and exams will be done individually with no non-sanctioned additional materials or help. The laboratory exercises can be done with other students and with the instructor's help. Field trip reports should be based primarily upon **your field notes** and **must be done individually** without help. If any additional outside sources are used they must be cited correctly. If unsure whether or not how a particular assignment falls under the Honor Code, **ask** the professor prior to doing the assignment. The Honor Code at Oxford College is quite serious.

Grading System: Geology 250 will use the plus-minus grading system. The distribution of grades is as follows:

A	93-100	C+	77-79
A-	90-92	C	73-76
B+	87-89	C-	70-72
B	83-86	D+	67-69
B-	80-82	D	60-66
		F	59 and below

Evaluation: Lecture work will comprise 39% of your final average, lab will be 34%, the research project will be 22%, and class participation in the entire class is 5%. It is broken down as follows.

Highest Half-Test	12%
(Lowest half-test grade dropped)	
Lecture Half-Test #1 on 1/31	
Lecture Half-Test #2 on 3/28	
Lecture Mid-term Exam on 3/5	12%
Final exam on 8 May @ 9:00 a.m.	15%
Lab Practical on minerals & rocks on 2/5	8%
Field Trip reports (6)	18%
Lab report on correlation	2%
Group hydrocarbon exploration project	3%
Lab report on ethanol from corn	3%
Annotated Bibliography due 4/4	3%
Individual research report due 4/18	8%
Group oral PowerPoint presentation 4/23	8%
Individual oral presentation 4/23	3%
Class participation	5%

The **lecture half-tests and final exam** will consist of short to medium-length essays, combined with objective multiple choice and matching questions. The **lab practical exam** will consist of identification of industrial minerals and rocks and their uses. The **lab reports** will be due one week after the lab. The **field trip reports** will be submitted double-spaced and will be due one week after the activity. The **original field notes (or Xeroxed copies)** will be a required part of the field trip reports and the field notes will be the primary source for the reports.

Class participation is based primarily upon responses in lecture, including asking questions, providing insights into the material, and answering questions. In other words, being part of the discussion. Being an active learner is an excellent way to gain much from the course and receive the high participation grade that you deserve.

Tentative Lecture Schedule

Day	Topic
Tu 1/15 Th 1/17	Introduction to Resources & Plate Tectonics
Tu 1/22 Th 1/24	Minerals
Tu 1/29 Th 1/31	Rock Genesis Lecture Half-Test #1
Tu 2/5 Th 2/7	Dimension & Crushed Stone Industries Igneous-based Mineral Resources

Tu 2/12	
Th 2/14	Sedimentary-based Mineral Resources
Tu 2/19	
Th 2/21	Metamorphic-based Mineral Resources
Tu 2/26	Weathering
Th 2/28	Weathering-based Mineral Resources
Tu 3/5	Lecture Mid-term Exam
Th 3/7	The Iron Industry & The Industrial Revolution

SPRING BREAK

Tu 3/15	
Th 3/17	Fossil Fuels: Coal
Tu 3/19	Fossil Fuels: Oil & Natural Gas
Th 3/21	
Tu 3/26	
Th 3/28	Lecture Half-Test #2
Tu 4/2	Nuclear Energy
Th 4/4	Annotated Bibliography Due
Tu 4/9	Renewable Energy: Geothermal, Hydropower, & Wind
Th 4/11	Renewable Energy: Solar
Tu 4/16	
Th 4/18	Where do we go from here?
Tu 4/23	
Th 2/25	

Lab Day	Topic
1/22	Industrial Minerals: Analysis & Identification
1/29	Industrial Rocks: Analysis & Identification
2/5	Lab Practical Exam
2/12	Fieldtrip: Building stones of the Oxford College campus
2/19	Fieldtrip: Analysis of stone use in the Historic Oxford Cemetery
2/26	No Lab
3/5	Correlation & Subsurface Geology
3/19	Hydrocarbon Exploration

3/26	No Lab
4/2	Fieldtrip: Georgia coal-fired Power Plant Scherer, Juliette, GA
4/9	Ethanol from corn
4/16	Fieldtrip: Emory's Sustainability Initiatives – LEED-certified buildings: Math & Science Center (Decatur)
4/23	Group Presentations

Two of these three Saturday fieldtrips are required:

Feb 9: Tellus Science Museum, Cartersville, GA

Mar 23: Consolidated Gold Mines & Gold Museum, Dahlonega, GA

Apr 13: KaMin kaolin clay mine & processing plant, Sandersville, GA

Group Oral Presentation for Geology 250Q (Spring 2013):

This is a group project in which all members of the group are expected to significantly contribute to the group effort. Most groups will constitute three members. Each member must do a portion of the research that will be written up as a research paper, properly cited and representing their own work. Every member of the group will receive the same grade on the PowerPoint presentation. All members of the group must have a role in the oral presentation. Each member of the group will receive individual grades for their annotated bibliography, research paper, and oral presentation. The annotated bibliography is 3%, research paper is 8%, the PowerPoint presentation is 8%, and the individual oral presentation is 3% of the final course grade, making the project worth 22% of the course grade. The research paper and the PowerPoint presentation have to be well referenced with proper citations. It is expected that current articles and books, combined with Internet sites (especially government sites) be used as primary sources. An annotated bibliography will be due on April 4th in class. The oral presentations will be 20 minutes long. They will be presented in the laboratory session on Tuesday, April 23rd from 1:40-4:40. The **Chicago Manual of Style** will be used for in text citations and references cited. Here is the list of potential topics. The instructor might approve additional topics proposed by the students.

1. Asbestos: its role as a resource and environmental concerns with its mining and use
2. Drilling for oil in ANWR (Arctic National Wildlife Refuge): geology and politics
3. Drilling for oil in the deep Gulf of Mexico: geology & environmental concerns
4. Innovative transportation: the present & future of “greener” vehicles
5. Iraq and oil: geology and politics
6. Energy use in China: past, present, and future trends
7. Gem stones: changes in taste and marketing though the years
8. Mineral resources under the sea: mining potential

9. Reducing greenhouse gas emissions in the energy industry: technology & economics
10. Greenhouse gas emissions and climate change initiatives
10. Acid rain: formation and environmental concerns
11. Green ideas for the new Oxford College science building
12. Gold mining: economics & environmental concerns
13. Low tech solutions for living off the grid – solutions for developing countries
14. Rare earths: what are they, why are they important, what are the economic & political issues?
15. Economic & political issues of hydraulic fracking used in the production of hydrocarbons