THE EARTH'S ENERGY RESOURCES
GEOLOGY 115

1:30-2:20 MWF

This syllabus will be changed as needed to correct errors and to accommodate the needs of the class.

Instructor: Dr. Richard M. Kettler
Contact information: (402) 472-0882 or rkettler1@unl.edu leave messages at (402) 472-2663
Office Hours: Bessey Hall 321, MW 2:30-3:30; F 2:30-3:20 please call or email for an appointment at other times.

Teaching Assistant:
Contact numbers: or leave messages at (402) 472-2663
Office Hours: Bessey Hall p.m. please call or email for an appointment at other times.

Prerequisites: This is a 3 credit hour science lecture course with no prerequisites.

ACE Certification:
Student Learning Outcome #4-Use scientific methods and knowledge of the natural and physical world to address problems through inquiry, interpretation, analysis, and the making of inferences from data, to determine whether conclusions or solutions are reasonable.

You will have the opportunity to acquire this ability by attending the lectures, participating in the classroom group activities, and completing the problem sets. The lectures serve to provide the content and context necessary for the students to apply the material learned to the group activities, problem sets, and the outside world. The classroom group activities will require that you apply the concepts immediately after learning them in lecture and discussing them with your colleagues. The problem sets will initially reinforce basic concepts of dimensional analysis and scale; whereas later problem sets will be have a greater interpretive element

Your achievement is assessed through the nine problem sets, three hourly exams and a final exam. The problem sets are designed largely as learning exercises, wherein you will work through a set of calculations or the directed collection and analysis of some data. Each problem set does, however, have a summary question that assesses how well you learned the object of the assignment. In the case of the later problem sets you will demonstrate your knowledge and skills through your successful interpretation of the data and a short explanation of how you performed your interpretation. Almost all exam questions will require that you provide a short written answer. Each midterm exam requires that the student be able to define some terms. The bulk of the exam, however, comprises interpretation of graphs, maps, cross sections, geophysical logs and sections and burial history plots. Typical exam questions later in the term will present you with data and ask you to use the data to formulate a testable hypothesis.

Classroom: All classes will be held in 106 Avery Hall.

Course Goals:1)Students will develop an understanding of the abundance and distribution of geological energy resources. 2)Students will be able to research and read news reports about energy resources, synthesize and critique those communications prepared for the lay-public, and communicate their analysis to a third party.

Text:
Deffeyes K.S. 2001. Hubbert's Peak: The impending world oil shortage. Princeton University Press ISBN 0-691-11625-3, 208 pp. (Designated as HP in the course schedule below).

Deffeyes K.S. 2005. Beyond Oil. The View from Hubbert's Peak. Hill and Wang ISBN 0-8090-2956-1, 202 pp. (Designated as BO in the course schedule below).

Lec.	Date	Topic	Reading
1	08/25	One Thousand Barrels Every Second	HP CH 1
2	08/27	Scale: Thinking about problems	
3	08/29	All you need to know about thermodynamics!	
X	09/01	Labor Day- No Class	
4	09/03	Why are petroleum and natural gas so valuable? Introduction to Petroleum Chemistry and Refining(Problem Set No. 1 Due)	HP CH 2
5	09/05	Petroleum refining II	
6	09/08	Returning to Scale.	
7	09/10	An Introduction to Geology	HP CH 3
8	09/12	Sedimentary Basins: The Natural Habitat of Energy Resources (Problem Set No. 2 Due)	
9	09/15	The carbon cycle	
10	09/17	Petroleum Systems: Source Rocks	
11	09/19	Petroleum Systems: Reservoir Rocks (Problem Set No. 3 Due)	
12	09/22	Petroleum Systems: Traps and Seals	
X	09/24	Mid-term Exam No. 1	
13	09/26	Petroleum Systems: Timing is Everything	
14	09/29	Petroleum Exploration I	HP CH 4
15	10/01	Petroleum Exploration II (Problem Set No. 4 Due)	
16	10/03	Petroleum Exploration: Land Acquisition	HP CH 5
17	10/06	Drilling	
18	10/08	Adventures in Well Control (Problem Set No. 5 Due)	
19	10/10	Wild Wells	
20	10/13	Formation Evaluation	

21	10/15	Getting Fluids Out of the Reservoir	HP CH 6-8
22	10/17	How Did Hubbert Make His Prediction?(Problem Set No. 6 Due)	BO CH 3
X	10/20	Fall Break- No Class	
23	10/22	Does Hubbert's Analysis Work Everywhere?	
24	10/24	Natural Gas	BO CH 4
25	10/27	Natural Gas and Unconventional Gas Reservoirs	
X	10/29	Mid-term Exam No. 2	
26	10/31	Methane Hydrates	
27	11/03	Tar Sands (Heavy Oil)	BO CH 6
28	11/05	Tar Sands (Heavy Oil)	
29	11/07	Oil Shale (Immature Kerogen) (Problem Set No. 7 Due)	BO CH 7
30	11/10	Principles of Nuclear Fission	BO CH 8
31	11/12	Uranium, oxygen, and uranium deposits	
32	11/14	Uranium Deposits and mining methods (Problem Set No. 8 Due)	
33	11/17	The Oklo Natural Reactor	
34	11/19	Thorium and the next generation of nuclear reactors	
35	11/19	The Origin of Coal (Problem Set No. 9 Due)	BO CH 5
36	11/24	Mid-term Exam No. 3	
X	11/26	Thanksgiving Break-no class	
X	11/28	Thanksgiving Break-no class	
37	12/01	Mining Methods	
38	12/03	XTL: Converting Coal, natural gas, and other stuff into gasoline	
39	12/05	Could natural gas (and oil) have an abiotic origin?	
40	12/08	Geothermal Energy	
41	12/10	Why Hydrogen is (Often) Actually a Geological Resource	BO CH 9
42	12/12	Ethanol and Geological Means of Carbon Dioxide Sequestration	
		Final Exam	

The space below is provided for the names and telephone numbers of two of your classmates

THE FINE PRINT

Required Email Address: You are required to have an email account, preferably a University account, and to check it regularly. Enter your email address in the personal information part of the Blackboard web site, and keep it current so that you can be contacted if necessary.

Course Homepage: http://my.unl.edu/ and http://www.geosciences.unl.edu/~rkettler/wordpress/
Access to the Blackboard account is restricted to class members. Do not forget your password and login name.
Postings will include course information, assignments, announcements, and test schedules. If you miss class, you are responsible for informing yourself about missed announcements and material covered.

To access Blackboard for the first time, go to any computer terminal anywhere and type in the website address http:my.unl.edu. You will see blanks for "user id" and "password" in the upper right hand corner of the page. Type your Blackboard userid in the "userid" space and the password that you have been assigned in the "password" space. Click the login button. After you access your account you will notice a menu at the top of the page.

You are responsible for checking the class website for class announcements. Be aware that if your Internet provider has anti-spam software or a firewall it may prevent you from receiving any email messages sent to you through Blackboard

Lecture Period: You are responsible for all material covered during lecture periods, whether you are present or not.

Attendance: Most students benefit from attending class. I do not take attendance and you do not need to notify me if you are going to miss class. It is a polite thing to do, however.

Required Material: You will need a writing implement (typically pen or pencil) to complete the problem sets and exams.

Examinations: There will be three fifty minute mid-term exams given during the semester. These exams will cover material presented in lectures up to that time. No make-up mid-term exams will be given.

The final exam (2 hours) will be held as designated by the schedule of classes. It will emphasize material that follows the midterms but will also cover the entire semester.

Exams will comprise a series of short answer and short essay questions. The exams may include questions on any material contained in the text and material discussed or shown in class, including visual material shown on the screen, and demonstrations.

All examinations will take place in our regular classroom unless an announcement to the contrary is made.

Policy on Late Assignments: Assignments are due at 5:00 p.m. on the day designated in the syllabus and are to be handed in to the Teaching Assistant. Assignments handed in 0-24 hours late will be worth up to 50% of the original assigned values. Assignments handed in 24-48 hours late will be worth up to 25% of the original assigned value. Assignments handed in more than 48 hours after the due date will be corrected but will receive no grade.

Grades: The semester grade will be determined as follows:
Homework exercises 40% (Based on the scores of your 8 best problem sets)
Mid-term exams 30% (Based on the scores of your best two mid-term exams)
Final exam 30%
Each Problem Set will be worth 5 points, each Midterm will be worth 15 points, and the Final will be worth 30 points.
Your final grade will be calculated by summing the scores of your best 8 problem sets, top two midterm scores, and the score on your final exam.

Tentative Grading Scale: Plus and minus letter grades will be given.
A+ = 96 and above, A = 93-95, A- = 90-92, B+ = 87-89, B = 83-86, B- = 80-82, C+ = 77-79, C = 73-76, C- = 70-72, D+ = 67-69, D = 63-66, D- = 60-62, F = 59 and below.
I will alter the scheme as necessary to reflect class performance.

Accommodation: Students with disabilities are encouraged to contact the instructor for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, students must be registered with the Services for Students with Disabilities (SSD) office, 132 Canfield Administration, 472-3787 voice or TTY.

Expectations for the Classroom Environment: A good learning environment depends on maintaining an atmosphere of mutual respect among the instructor, the teaching assistant and all students. Please come to class on time and ready to learn, and to help promote a positive learning environment for yourself and others. The UNL Student Code of Conduct should be observed during all activities in this course. Any student who engages in disruptive, distractive or disrespectful behavior will be warned, and if the behavior persists, the instructor will ask the individual to leave the room for the remainder of the class period. Cell phones, beepers and other such devices must be turned off during classes.

Policy on Academic Dishonesty: Plagiarism, cheating on exams and quizzes, and other forms of academic dishonesty are not acceptable in this course.

The Student Code of conduct, printed in the Undergraduate Bulletin, sets forth the rules that govern student rights and responsibilities. Section 4.2 of this code states "The maintenance of academic honesty and integrity is a vital concern of the University community. Any student found guilty of academic dishonesty shall be subject to both academic and disciplinary sanctions."

According to the Code, academic dishonesty includes, but is not limited to:
1. Copying, or attempting to copy from another student's test or assignment,
2. Fabricating or falsifying any information used in academic work,
3. Plagiarism, which is presenting someone else's work as your own,
4. Using information from any source, including the Internet, without proper accreditation,
5. Misrepresenting or fabricating excuses for missed or late work,
6. Helping another student to commit an act of academic dishonesty.

In this course, a confirmation of academic dishonesty will result in a grade of zero for the class activity in which it occurs: a second offense may result in a grade of F for the entire course. All offenses will be reported in writing to the Office of Student Judicial Affairs.

I expect that you will discuss your homework assignments with your fellow students; it is a good way to learn. What you submit for grading should be your own work, however.

Study Hints and Strategies
1. Do all the reading. The two textbooks combined have about 410 pages of text presented at an elementary level. Read both books this weekend. Then reread them as the reading assignments indicate.
2. Science builds on basic vocabulary and fundamental principles. Take some time to learn the vocabulary we define in class. I believe you don't understand it if you can't define it.
3. Read actively and avoid highlighting. Science concepts are best mastered by outlining. Look for links: cause and effect, observation-hypothesis-conclusion, and consider which processes produce a particular result.
4. If you study better with a group, form a study group, if not, don't.
5. If you continue to encounter difficulties, seek help from Dr. Kettler. It is acceptable to admit that you don't know how to formulate a question.