

## **UW GEOL 3600: Earth and Mineral Resources Course Syllabus - 2012**

Instructor: James D. Myers

phone: 766-2203

Office: ESB 3030

e-mail: magma@uwyo.edu

Office hours: MWF 10:00-11:00 am

Web site: <http://www.gg.uwyo.edu/geol3600/>

### **Course Objective**

Citizens of modern democracies are continually faced with decisions about a variety of resource issues: e.g. Should a limestone quarry be allowed next to a new subdivision? Will a proposed heap-leach gold mine affect adversely local water supplies? What are the likely economic and social ramifications of constructing a metal ore smelter? Typically, citizens formulate their responses to these questions based on a limited understanding of the resource, its origin and distribution, perceived economic, political and social impacts and an imperfect appreciation for potential short- and long-term environmental impacts. Making an informed decision requires:

- mastery of a range of basic skills (fundamental literacies);
- knowledge of specialized scientific abilities (technical literacies);
- an understanding of how resource development impacts local, regional, national and international social groups (citizenship literacies); and
- a scientific understanding of the resource's geology, extraction and processing methods and the impacts of its ultimate use and disposal.

This course is designed to provide you, a citizen of an industrialized democracy, with the skills necessary to formulate successfully informed and reasoned responses to a variety of Earth and mineral resource issues. You will increasingly encounter these types of issues as a citizen.

Many advanced environmental, legal and political science courses take a similar approach to discussing resource development. This course differs from them in three important aspects.

- First, this course assumes that a geologic understanding of the resource in question is a critical component for developing that resource in a most effective manner. Thus, unlike other courses it starts with a sound geologic background.
- Second, the intended audience for this course is likely to play a very different role in public resource discussions than those of the more advanced courses. To illustrate, consider a public hearing convened to discuss the potential impact of a proposed copper mine on the local community. The advanced courses are designed to prepare the professionals who would be sitting in front of the meeting conducting it. In contrast, this course is designed to meet the needs of the citizens sitting in the audience. Many of you in this course are unlikely to become professionals dealing with resource issues. However, most of you, if not all, are likely as citizens to be impacted by a host of decisions made about resource extraction and use.
- Finally, this course explicitly recognizes the importance of supplemental skills (literacies) necessary to utilize scientific knowledge in the resolution of societal issues. Thus, it provides you with ample opportunity to master these literacies while also acquiring scientific knowledge. Mastery of these skills will aid you in many other endeavors outside this course.

As a citizen you will probably need to make decisions about a variety of local, regional and national issues. In addition, you will have to evaluate conflicting claims on these issues. To help insure your decisions are informed and constructive, this course will allow you to:

- practice, frequently and continually, qualitative assessment, quantitative calculation and graph interpretation skills (*fundamental literacies*) needed to assess resource issues geologically and economically;
- learn the techniques (*technical literacies*) necessary for evaluating the geological aspects of resource issues;
- master the methods (*citizenship literacies*) for assessing the social impacts of resource extraction and use;
- study the geologic content needed to understand the origin and distribution of a variety of critical Earth and mineral resources; and
- build an awareness of comparative, international and global processes through historical and contemporary case studies of resource extraction.

Upon completing the course, you will be able to:

- identify data/information needed to make an informed decision about a particular resource issue;
- understand the basics of the geologic formation of a variety of Earth and mineral resources;
- assess the range of potential social impacts associated with particular resource development; and
- formulate means of evaluating systematically proposed Earth resource development projects.

### Literacies

To understand the content of a scientific discipline, it is necessary to master a number of different skills, i.e. literacies. These literacies fall into three basic groups: fundamental, technical and citizenship. The fundamental literacies allow you to manipulate the data and information of a science. Although they are ones you should have used previously in your educational career, you may have not had much practice with them recently. The fundamental literacies include the:

- ability to *read* a table and *interpret* a graph or chart;
- facility to *make* qualitative assessments;
- capacity to *estimate* the magnitude of simple quantitative calculations; and
- aptitude to *perform* simple quantitative calculations correctly.

For many sciences like geology, which describes the formation and setting of many Earth and mineral resources, an additional set of technical literacies are necessary. These literacies allow you to understand and appreciate the scale of geological change and structures. Because of their more advanced nature, you may have had limited practice with some of these technical literacies. Indeed, some may be completely new to you. The **geosciences technical literacies** consist of the:

- skill to *read and interpret* different types of maps;
- ability to *visualize* in three dimensions; and
- capacity to *conceptualize* changes through time.

The application of scientific understanding to societal problems requires both discipline specific knowledge as well as the ability to predict how modification of natural systems will affect different cultures and societies. The **citizenship literacies** allow you to assess resource issues as they impact different social and political groups. As with the technical literacies, your previous experience with these literacies may be very limited. The citizenship literacies comprise:

- critical thinking literacies
  - ability to *identify* social, cultural and political consequences (manifest and latent)

- capacity to *recognize* impacts (short- and long-term) to the physical environment
- power to *ascertain* economic externalities, i.e. hidden and shared costs
- social context literacies
  - an appreciation of historical background & significance
  - an understanding of population demographics
  - a knowledge of economic context
  - an awareness of different cultural & social viewpoints/perspectives
- informed engagement literacies
  - capacity to devise alternative solutions/plans
  - ability to achieve common ground

This course will provide you with practice mastering all of these literacies as you learn the scientific and geologic basics of Earth and mineral resources.

### Course Organization

This is a lecture-lab course. The geology, production and use of a variety of Earth and mineral resources will be presented through lectures and lecture activities. From the lectures, you will gain an understanding of the technical aspects of resource extraction and development. The labs will introduce you to the skills (literacies) necessary to apply this scientific and technical background to various resource issues or problems.

Most of the labs will consist of case studies spanning three weeks. Each case will focus on a particular resource, e.g. gold, copper, etc., in a particular international (South Africa) or national (Upper Peninsula) setting. The first week of a case study will concentrate on the geologic aspects of the resource and employ the fundamental and technical literacies. The second week will deal with the economic aspects of the resource. It will use mostly the fundamental literacies. The final week of a case study, will look at the societal and cultural aspects of resource extraction. These sessions will introduce the citizenship skills so important in gauging the social and cultural impact of resource development. Literacies will be progressively added as we move through the semester. By the middle of the semester, you will have had practice with all the fundamental, technical and citizenship literacies and should be able to use them independently in the remaining lab activities. Each week, the lab will be introduced with a short narrative describing a real world instance where the topics discussed in the lab have impacted real people. These case studies will be selected to present both a national and international perspective of resource exploration, development and exploitation.

For each lab, you will be asked to formulate a course of action and articulate and defend that position in both written and oral arguments. As with real world issues, there are no clear-cut answers to the policy decisions that must be made. Rather, you must defend your position using the geologic knowledge you have learned and the literacies you have mastered.

### Course Structure & Web Site

This course is a lecture/lab class that uses the World Wide Web. Via the Web you have access to: 1) the course syllabus; 2) the course schedule; 3) lecture, lab, exam and reading questionnaire schedules; 4) an Announcements page; 5) diagrams, photographs, videos and animations shown in lecture; 6) past lecture exams and their answer keys; 7) reading questionnaires; 8) your grades; 9) lab background material (there is no lab manual); 10) lab activities; 11) activity worksheets; and 12) lab quizzes. The software you need to use the site is available free on the Web and we provide links to the sites from which you can download them.

### Using the Classroom Management System (CMS)

During the semester, your grades and reading questionnaires will be managed using the Classroom Management System (CMS). Because this system is independent of the University's registration system, you will have to register with the CMS system for this course. Registering is simple. On the Log-in page (accessed from the drop-down menu in the title frame), there is a link for registering. Enter your personal information and the class password. You have to do this only once during the semester. Once you have registered for CMS, you can log-in with your username and password. For CMS, your username is assigned but you can choose your password. Usernames are created by combining, in order, your last name, first initial and middle initial. Thus, James T. Kirk's username would be KirkJT (case is not important). Class password: lithium

You must be registered for CMS by Friday, August 31, 2012 (your first online is due Monday, September 3). CMS will not let you register after this date. If you haven't registered by then, you will have to see me about special instructions for registering.

### Grading

Your grade will be based on a total of 1130 points that are divided between three lecture exams, a final exam, lecture and lab reading questionnaires, lab quizzes, pre- and post-course surveys, lab exercises and lecture activities. The large number of graded activities should ensure that if you do poorly on one graded task, e.g. an exam, your final grade need not be adversely affected if you perform well on other tasks. The grading scheme for the course is summarized in the table below:

<i>activity</i>	<i>number of points</i>	<i>percentage of final grade</i>
lecture reading questionnaires (14 @ 10 pts/ea)	140	12
lecture activities	-	-
lecture quizzes	-	-
lecture worksheets	-	-
lecture exams (3 @ 100 pts/ea)	300	27
knowledge survey (2 parts @ 10 pts/ea)	20	2
lab (see breakdown below)	470	42
final exam	200	18
<b>Total Points</b>	<b>1130</b>	

*I reserve the right to modify exam dates or the grading system in response to unforeseen events that may occur during the semester. You can find an up-to-date summary of the class' grading scheme by going to the Class Grading Scheme page on the Web site.*

Each week there will be a weekly lecture reading questionnaire due every Friday. They will constitute 140 points of your final grade (12 %). Each questionnaire covers a section in the lecture notes or Web site and consists of ten short-answer questions. The questionnaire is due by midnight on the due date. Questionnaires must be submitted via the Web. (They will also be graded online.) You can work on a questionnaire as many times as you wish before the due date. After midnight on the due date, you can no longer change the questionnaire although you can view your answers and the correct answers.

A total of 20 points (2 %) can be earned by completing a knowledge survey that will help me and you evaluate your learning during the course. The knowledge survey consists of a pre- and post-course component. The two components are identical and designed to assess the degree of improvement in your understanding of Earth and mineral resources during the semester. Each part of a survey is worth 10 points toward your final course grade. Thus, the survey is worth 20 points; however you will receive these points only if you complete *both* parts of the survey. Survey due dates are summarized in the table below.

survey	pre-course due date	post-course due date	setting	points*
knowledge	07-Sep-12	7-Dec-12	outside class	20

\*you must do both literacy surveys to receive credit for these activities

Both knowledge surveys are done online and the links to the surveys are provided on the Survey page.

Three hundred points (27 %) will be from lecture exams. The exams will be on:

- Monday, October 1, 9:00 am, EN3102
- Friday, November 2, 9:00 am, EN3102
- Monday, December 3, 9:00 am, EN3102

Each exam will be worth 100 points. They will cover the material presented in lecture and any assigned reading but not the labs. You must obtain prior permission to take an exam at any time other than during the scheduled period. If you skip an exam, you fail it with a zero. Note that Lecture Exam III is during the final week of classes.

There will also be a 200-point final exam (18 %) on Monday, December 10 at 8:00 - 10:00 am in EN3102. This exam will be comprehensive and have approximately twice the number of questions as one of the hourly exams.

The lab will make up the final 470 points (42 %) of the course grade. The breakdown for the various lab activities and their points are:

<i>activity</i>	<i>value</i>	<i>#</i>	<i>total points</i>	<i>% of lab grade</i>
lab reading questionnaires	10	12	120	26
lab exercises	25	4	100	21
lab quizzes	10	4	40	9
lab oral presentations	10	4	40	9
lab written reports	15/25	8	170	36
Total Points			470	100

All students must participate in lab and complete the assigned exercises. Unlike lecture, attendance of lab is mandatory. You must receive a passing lab grade to pass the course. The lab syllabus, which you will receive the first week of lab, more fully describes how the lab will work. There will be no lab final. Until September 26, there will be weekly lab quizzes. After that date, you must prepare and give oral and written reports to present the results of your evaluation of a particular resource problem. As with all real life resource questions, there are no clear-cut answers to the problems you will address. The conclusions you reach and the reports you present will be graded on how well you justify your conclusions.

Each week there will be a weekly lab reading questionnaire due on Tuesdays. They will constitute 120 points of your lab final grade (24 %). Each questionnaire covers a section on the Web site and consists of ten short-answer questions. The questionnaire is due by midnight on the due date. Questionnaires must be submitted via the Web. (They will also be graded online.) You can work on a questionnaire as many times as you wish before the due date. After midnight on the due date, you can no longer change the questionnaire although you can view your answers and the correct answers.

There will be no grading curve for this course. Final grades will be assigned according to the following scale:

<i>Grade</i>	<i>Percentage</i>	<i>Point Range</i>
A	≥ 90	≥ 1017
B	80-89	904-1016
C	70-79	791-903
D	60-69	678-790
F	< 60	≤ 678

A fixed grading scheme emphasizes that you are not competing with your peers for a grade. It also means your grade in the course is based on the quality of your work, not on how poorly your peers do in the course. If all students in the course earn an A, I would be very pleased. It would indicate you all worked hard and mastered the subject matter. One way of achieving this is by working with your peers to understand the topics presented in lecture and lab. (Every year I have taught this course the final grade distribution worked out such that I would not have curved the grades even if I did not have the no-curve policy.)

### **Extra Credit**

Twenty points (2 %) of extra credit can be earned by doing pre and post assessments of lab cases studies. Again there are pre and post components of the survey and you must complete both to receive the 20 points. Each pre and post-component consists of an online portion and a short paper part. You do the online portion outside of class according to your own schedule. Links and due dates are provided on the Pre-Post Assessment page. The paper portions of the assessment will be done in class. To earn credit for either the pre or post section, you must do both parts of the assessment, i.e. online and paper. Additional assessments may or may not be added during the semester depending upon other factors. If they are added, I will announce them in class and you will earn additional points for completing them.

### **Communicating with me**

My office is in ESB 3030 and my office hours are MWF 10:00-11:00 am. There are four ways to communicate with me: during my office hours, by phone, via email, and by appointment. Perhaps the best way to reach me is via email. I generally respond to campus email immediately. If your questions are related to a matter that affects the entire class, I will post your question and my answer on the *Announcements* page. Check this source frequently for class information and announcements, particularly if you miss a class.

### **Textbook**

There is no textbook for this course. Weekly readings will use sessions from the Web Gallery, library reserve material and various Web sites. The background materials on the Web for each lab are where you will find the answers for the lab reading questionnaires.

### **Academic Dishonesty**

University Regulations (UNIREG 802) define academic dishonesty as an act or attempted act which misrepresents one's involvement in an academic task in any way, or permits another student to misrepresent the latter's involvement in an academic task by assisting in the misrepresentation. Some examples of academic dishonesty include: a. representing as one's own work material copied or borrowed from any source, written or otherwise, public or private, without proper citation of the source; b. using a ghost writer, commercial or otherwise, for any type of assignment; c. doing a class assignment for someone else or allowing someone to copy one's assignment; d. using notes or prepared information in an examination unless authorized by the instructor; e. taking an examination for someone else or allowing someone to take an examination for oneself; f. copying from, or assisting, another student during an examination; or g. stealing, or otherwise improperly obtaining, copies of

an examination before or after its administration. Academic dishonesty will result in failure of the course.

**Special Needs**

If you have a physical, learning, or psychological disability that requires accommodations, please let me know as soon as possible. You will need to register with, and provide documentation of your disability to University Disability Support Services (UDSS) in SEO, room 330 Knight Hall, 766-6189, TTY: 766-3073.