

Week 8
Oct. 10

Environmental Law and Regulation
Environmental laws & regulations

Readings: Sustainability of Ground Water Resources pp. 55-76
Handouts
Assignment 5 announced

Week 9
Oct. 17

Hydrology

Intro., hydrologic cycle, aquifers and groundwater, pollution potential, discussion of readings

Week 10 **Assignment 4 presented**

Oct 24

Week 11

Oct 31.

Environmental Management

Discussion on Environmental Management Systems and implications of impacts on energy and natural resources.
Guest Lecturer: Dr. Phil Barnes
Reading: Environmental Law & Sustainability of Ground Water Resources pp.1-54
Other Readings – as announced

Week 12

Hydrology & Water Quality

Ground & surface water pollution problems, landfills
Case studies *

Week 13

Hydrology & Water Quality

World water concerns; drought, overuse
Case studies * - GEMI

Nov 7.

Readings – China's drought, ND's Water Management plan, CA water storage
- GEMI – Water Project

Nov. 14

Assignment 5 group discussions
Reading: Smart Growth

Week 14

Nov. 21

Planning (proposed)

Land use planning; Smart Growth issues as related to hydrology, air quality, and mineral extraction.
Time available to work on project

Week 15

Nov. 28

Final Project

Assignment 5 presented

GEOLOGY 560 : Earth Resource Management

Dr. Geidel
Fall 2011
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The course will consist of three different approaches:

- a. Regular lecture format
- b. Invited speakers, from both inside and outside of the University on specialist topics
- c. Seminars and discussion. The hope is that about an hour a week will be devoted to discussion of the class topics, individual presentations, and/or assigned reading. This may vary from week to week for on occasion an entire class may be devoted to a seminar.

Books: Sustainability of Ground Water Resources, USGS circ. 1186 (available on line)

Readings: As assigned in class and on the syllabus; collections of papers and articles.

Learning Outcomes:

The purpose of this class is to have students explore, expand, integrate and assess their knowledge in three broad areas of earth resources: energy and materials management problems; water related concerns; and current environmental issues, in an interdisciplinary manner. By the end of this course, each class member will have:

- Revisited many of the fundamental scientific principles that apply to their various majors
- Evaluated interdisciplinary principles that must be integrated into managing the earth
- Have an understanding of the differences between various energy resources and their uses
- Reinforced their understanding of numerous scientific principles
- Acquired a basic understanding of the underlying legal principles guiding the environmental issues
- Acquired skills enabling them to explain science in uncomplicated terms
- Becoming more accomplished at public speaking and making presentations
- Become more aware of environmental/resource concerns for sustainability

There will be individual assignments and group reports with presentations. Grades will be based on class participation (i.e. questions and discussion contributions), individual assignments, and the group reports.

	Undergraduate Grading	Graduate Grading
	<u>% of grade</u>	<u>% of grade</u>
Assignment 1	5	5
Assignment 2	10	5
Assignment 3	-	20
Assignment 4	35	25
Assignment 5	35	30
Class participation	15	15

Assignments: There will be two types of assignments, individual and group assignments.

Individual assignments will usually involve reading a paper and reporting either or both oral and written.

Group Assignments will be joint efforts of a group of three to four students and concern specific topics.

The principle assignments will be term reports in which each person contributes a section, a single report will suffice but each person must add a personal interpretation/conclusion to the joint report. Teams will be chosen to represent the variety of interests and backgrounds of class members.

The emphasis of the class is to focus on the essential integration of a technical, economic, environmental and management approach to problem solving. The best solution to a problem from only one aspect is seldom the best when all aspects are taken into account.

The goal of the class is to cover three broad topics: the energy and materials management problems, water related concerns and current environmental issues. These are broad ranging topics and as the depth of coverage will reflect class interest, some topics will be more exhaustively covered than others.

Assignment 1

Gulf Oil's management has to decide how to allocate the available corporate funds and whether the shortfall should be taken from US activities or from overseas operations. Read the document and come prepared to have one member of the class make a presentation followed by a class discussion. Be prepared to **discuss**:

1. how you would allocate the fund and
2. the reasons for your choice.

The parameters to consider:

- a. production costs (and therefore profits) in the stable areas :
- b. political risks of take-over
- c. does the company look for replacement of reserves or increased production?
- d. Profit margin

Based solely on the Gulf report, how would you prepare to maximize profit, how to maximize security and how to increase reserves? These are personal judgment calls; consequently the reasons for your choices are as important as the choices themselves. Hand in your **written assessment** prior to the class discussion – this does not have to be long and can be in outline form.

Assignment 2

Read the history of Dome Petroleum Ltd. and comment on the wisdom of their acquisition of Hudson's Bay Oil and Gas Co. Make your **written** report on the economics involved, why acquisition proved to be desirable/necessary, the magnitude of the debt commitment and whether the assessment of world conditions at the time made it a wise investment, reasonable risk or foolhardy.

We will have a class discussion after one member from the class presents the case history.

What went wrong with Dome Petroleum, could it have been avoided?

Under the circumstances how do you think the company should have handled the Hudson's Bay deal?

Was Dome well enough financed to have made a major undertaking?

How long before Dome could expect financial returns from the Beaufort Sea to have a significant effect on their bottom line?

Was it realistic to have gone so far without the assurance that they had Canadian Bank support?

Assignment 3 (Group Project) – Graduate students only

This is the first group project. Select a non-fossil fuel energy source (such as nuclear, bio-fuels, hydrogen, solar, etc.) and prepare a long-term report to submit to the US government as if you were a select committee of the National Research Council. The purpose of the report is to discuss the future demand growth within the US (or you may select to discuss this on a worldwide basis), evaluate how these resources are controlled and/or owned and hypothesize what the future will hold 50 years from now as these resources change or develop. In looking towards the future, suggest how aspects of human life may change: will the transportation sector change, will houses be re-designed, could cities be re-planned to accommodate new realities, etc. You will have four weeks to complete this and make a class presentation when you turn in your report. (**Rpt = 50% of grade; presentation = 50% of your grade**) This assignment is for Graduate students only, however, undergraduate students will be responsible for learning the material presented. Please inform me of the energy source you have selected by September 12. By September 19, please provide the class with at one article to read (preferably which can be made available on Blackboard).

Assignment 4 – All Students

You are the new ventures group of a large minerals group to whom you are presenting a **PLAN** for the exploitation of a major copper discovery, one you consider too large for the group to ignore, which has been made in a third world country. You have analyzed the economic potential of the deposit based on limited geological information, as the country has never been mapped. As a result of preliminary discussions you can see ways of financing through the Export-import bank, World Bank, AID and even through the national government. (Read the paper on Chilean nationalization of its copper resources). In your report, summarize the geology of the deposit, what is going to be needed in terms of manpower, negotiations concerning free import of equipment, export of profits, whether there will be advantages in processing the ore in the country or whether it will be more economical to export the ore. The development costs are such that a long-term contract, whether as a potential joint venture either with other copper mining concerns or with the national government, will probably be necessary. You anticipate that as part of the negotiations you will have to face the need for the development of harbor and airport facilities, the development of transport within the country, the need for accommodation, medical and educational facilities within the scope of a long term contract. You must consider the World Market to assess the demand, now and in the future, for copper and what the chances are for stable long-term contracts for your product. You will have four weeks to complete this and make a class presentation when you turn in your report. (**Rpt = 50% of grade; presentation = 50% of your grade**) .

Assignment 5 – All Students

Your team has been requested to submit a plan for an integrated irrigation scheme in a hot arid region in a competitive bid. You will have to provide not only for irrigation of a large area and the selection of crops (which means soil and fertilizer requirements), but for a drastic increase in population as the scheme develops, which will involve the farming community, its health, education, communication, and social needs as well as the anticipated influx of nomadic herders attracted by the existence of semi-permanent water supplies. You may assume that within a reasonable distance you can channel water from a permanent river (or from a distillation plant built for the purpose), you will have to decide whether to develop only the irrigation or whether to establish reservoirs to maintain water levels. Be ambitious in what you intend to do and assume that finances are forthcoming whatever your required budget. Be prepared however to justify your requests and to have a contingency plan in case funds are curtailed. You should include some estimate of the anticipated economic impact, population the project will serve, income which will be generated (and applied to the cost of the project). You may select an actual country or create one of your own.

You will have one week to decide upon what you intend to do and present a breakdown of who will do what, there will be an intermediate discussion with the UNESCO manager (guess who?) and a formal presentation on the final day of class. (**Rpt = 45% of grade; presentation = 45% of your grade; peer review = 10% of your grade**) Each class member will be asked to submit an evaluation for each plan presented and a written evaluation of the plan selected as the best and the basis of the choice.