

**GEOLOGY 205
EARTH RESOURCES**

BULLETIN INFORMATION

GEOL 205 - Earth Resources (3 credit hours)

Course Description:

Mineral, energy, and water resources with emphasis on geological processes governing their distribution. Intended for non-science majors

Note: Three lecture hours each week with occasional field trips

SAMPLE COURSE OVERVIEW

The course is intended for non-science majors. The course will discuss mineral, energy, and water resources with emphasis on the geological processes governing their distribution and the usage by society. The course introduces the basic principles and fundamentals of geology, with a focus on Earth Resources formation, energy related resources, and the impacts of resource and energy use on the environment and society. Some of the subjects to be covered:

1. Basic geological processes and earth formation: All resources we use come from the Earth.
2. Rock, carbon, and water cycles.
3. Mineral resources: Geological formation and global distribution, usage and environmental impacts of exploration and use.
4. Energy resources and availability, including fossil fuels (oil, natural gas, coal), nuclear, and renewable energy sources, including environmental impacts of different energy sources.
5. Climate change.
6. Water resources, pollution, and remediation.
7. The ultimate goal of this course is to become a better-informed citizen on how different resources are formed on earth and the impact of their use on the environment, so as to become a better future user and manager of these resources.

ITEMIZED LEARNING OUTCOMES

Upon successful completion of Geology 205 students will be able to:

1. Explain the fundamentals of plate tectonics, rock, carbon and water cycles.
2. Explain how fundamental geological, physical and chemical processes form usable resources (minerals, metals, hydrocarbons, drinking water).
3. Use basic geology principles to develop first order hypotheses on the location and distribution of specific natural resources (for example oil or copper deposits) on the planet, for exploration purposes.

4. Explain how changes in societal needs, for example population growth, affluence and technology, change the use and needs for different natural resources and energy.
5. Explain the environmental and societal impacts of mineral resource use, and possible means of remediation for varying types of pollution as related to earth resource use.
6. Evaluate and compare the pros and cons of the different types of energy generation, including their impacts (positive and negative) on the environment and society.
7. Explain the natural processes that form fresh water resources and how overuse can impact inexpensive access to fresh water
8. Evaluate, discuss and propose solutions on the issues associated with the distribution of surface waters between the Southeastern States, as a result of the increased demand for fresh water resources.
9. Apply the principles of geology and earth sciences to understand the formation, usage and future availability of natural resources in a changing society, and to formulate basic hypotheses, evaluate data and develop defensible conclusions related to the use of natural resources and energy.

SAMPLE REQUIRED TEXTS/SUGGESTED READINGS/MATERIALS

1. *Environmental Geology*, 9th Edition (2010), by Carla W. Montgomery, McGraw-Hill, (older versions are acceptable). Slides from the lectures will be available on Blackboard in advance of the lecture.

SAMPLE ASSIGNMENTS AND/OR EXAMS

1. **Exams:** There will be three (3) midterm exams and the final exam. The exams will be multiple choice questions designed to evaluate student understanding of the basic terminology and principles covered in the lectures.
2. **Quizzes:** There will be a series of 10 unannounced quizzes. The quizzes are designed to simulate the scientific method of inquiry, hypothesis, data collection and conclusion. The quizzes will be based on concepts presented during the class and the students will be asked to formulate hypotheses, present scientific facts in a logical manner and/or reach conclusions based on available data/facts.
3. **Group Paper:** There will be one group paper, where students in teams of 3 are asked to discuss a subject related to resource use and its relationship to societal or environmental issues. The paper should present facts in a logical manner, a discussion of the problem and present solutions that you think are possible. A series of topics will be given, but students are encouraged to select a project of their choice, in consultation with the instructor.

SAMPLE COURSE OUTLINE WITH TIMELINE OF TOPICS, READINGS/ASSIGNMENTS, EXAMS/PROJECTS

Week 1: Introduction, Basic Scientific principles, Earth Formation.

Week 2: Plate tectonics.

- Week 3: Plate tectonics (cont.)
Midterm 1
- Week 4: Rock Cycle
- Week 5: Ore formation and resources: Copper, Zinc, Lead
- Week 6: Ore formation and resources: Sulfides, Aluminum, Iron
- Week 7: Midterm 2
Placer deposits, Gold, Mining environmental impacts
- Week 8: Mining Environmental Impacts, Intro to Energy
- Week 9: Fossil Fuels, Oil, Gas, Coal
- Week 10: Fossil Fuels, Oil, Gas, Coal (cont.)
- Week 11: Midterm 3
Renewable energy
- Week 12: Nuclear energy
- Week 13: Water resources
- Week 14: Climate change
Group Paper due
- Week 15: Conclusions
Final Exam review
- Week 16: Final Exam according to University exam schedule