Earth Resources
GEOL 205

Instructor: Dr. Michael Bizimis
Office: PSC 519
Phone: (803) 777-5565
Email: mbizimis@geol.sc.edu
Office Hours: Monday, Wednesday 1 pm-2 pm, or by appointment. Best to catch me after class

Teaching Assistant: Mr. Paul Beguelin
Contact information
Office: EWS 518
Email: pbeguelin@geol.sc.edu
Office Hours: TBD

IMPORTANT: If you are going to email either of us a question related to the class, please put in front of your message subject the phrase “GEOL 205”. This ensures a quicker response. Example: GEOL 205: Question on exam schedule.

Class meets at: M,W,F 12PM- 12:50PM, Close-Hipp Building 008

Textbook: Environmental Geology, by Carla W. Montgomery, McGraw-Hill, (various versions between 2009 and 2014 are acceptable). Textbook is recommended but not strictly required. Slides from the lectures will be available on Blackboard in advance of the lecture.

Course Description: This three-hour course satisfies the University of South Carolina Core Scientific Literacy requirement for a 3-credit Science Course. This 3-hour 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 their 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:

- Basic geological processes and earth formation: All resources we use come from the Earth.
- Rock, carbon, and water cycles.
- Mineral resources: Geological formation and global distribution, usage and environmental impacts of exploration and use.
• Energy resources and availability, including fossil fuels (oil, natural gas, coal), nuclear, and renewable energy sources, including environmental impacts of different energy sources.
• Climate change.
• Water resources, pollution, and remediation.
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.

Learning Outcomes:
Upon the completion of this course the student will:
• Understand and explain the fundamentals of plate tectonics, rock, carbon and water cycles. (Carolina Core Scientific Literacy LO1).
• Understand and explain how fundamental geological, physical and chemical processes form usable resources (minerals, metals, hydrocarbons, drinking water). (Carolina Core Scientific Literacy LO1).
• 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. (Carolina Core Scientific Literacy LO2).
• Understand and explain how changes in societal needs, for example population growth, affluence and technology, change the use and needs for different natural resources and energy. (Carolina Core Scientific Literacy LO3).
• Understand and 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. (Carolina Core Scientific Literacy LO1, LO3).
• 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. (Carolina Core Scientific Literacy LO2, LO3).
• Understand and explain the natural processes that form fresh water resources and how overuse can impact inexpensive access to fresh water (Carolina Core Scientific Literacy LO1, LO3).
• Evaluate, discuss and propose solutions on the issues associated with the distribution of surface waters between the Southeastern United States, as a result of the increased demand for fresh water resources. (Carolina Core Scientific Literacy LO2, LO3).
• In the most fundamental way, the student will learn how to apply the principles of Geology and Earth Sciences to understand the formation, usage and future availability of natural resources (Carolina Core Scientific Literacy LO1), in a changing society (Carolina Core Scientific Literacy LO3), and to formulate basic hypotheses, evaluate data and develop defensible conclusions related to the use of natural resources and energy (Carolina Core Scientific Literacy LO2).

Evaluation and grading policy:
The class includes the following three means of evaluating student performance and comprehension of the material:
• There will be three (3) mid-term 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 (Carolina Core Scientific Literacy LO1). NOTE: The lowest grade of the three mid term exams will be dropped from your overall grade calculation. Each of the remaining two (2) midterms and final are worth 25 points, for a total of 75 points.

- There will be a series of 10 unannounced in-class 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 (Carolina Core Scientific Literacy LO2). The quizzes will be worth a total of 10 points of your grade.

- 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 (Carolina Core Scientific Literacy LO1, LO2, LO3). A series of topics will be given, but students are encouraged to select a project of their choice, in consultation with the instructor. The paper is worth 15 points.

Grading summary:

- 3 Midterm exams (lowest score of the three is dropped), so 2 midterms x 25% 
- Final Exam 
- Class quizzes 
- Group paper 

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<th>Points</th>
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<tr>
<td>3 Midterm exams</td>
<td>50</td>
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<td>Final Exam</td>
<td>25</td>
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<td>Class quizzes</td>
<td>10</td>
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<td>Group paper</td>
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<td><strong>Total</strong></td>
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Letter grading:
- 90% or more = A
- 87% or more = B+
- 80% or more = B
- 77% or more = C+
- 70% or more = C
- 55% or more = D
- Below 55% = F

Extra credit (5 points) will be given to those who are present in all 10 quizzes.

Student Responsibilities:
Students expected to display appropriate conduct in accordance with the USC Code of Student Academic Responsibility (see Carolina Community: Student Handbook and Policy Guide, [http://www.sa.sc.edu/carolinacommunity/](http://www.sa.sc.edu/carolinacommunity/)). Cheating and/or plagiarism will result in an F and a letter to the Dean. Appropriate classroom etiquette is expected – turn off cell phones, be on time, and do not disturb your classmates. Serious violations are grounds for expulsion.
Finally, ask questions in class! There is no better way to learn than ask questions.
American with Disabilities Acts (ADA) statement: This University and its faculty will make every effort to accommodate any and all students with special needs. 
http://www.sa.sc.edu/carolinacommunity/stdev/

Attendance Policy: Attending the classes is highly recommended. PDF slides for each lecture will be posted on Blackboard, but not everything (e.g. discussions) will make it into the slides. Remember: extra credit is only available in class through participation in the quizzes.

Tentative Lecture Schedule, Fall 2015.
Week 1 (8/24-8/28): Introduction, Basic Scientific principles, Earth Formation.
Week 2 (8/31-9/4): Earth Formation (cont.), Plate tectonics.
Week 3 (9/7-9/11): 9/7 No class, Labor day. (9/9-9/11): Plate tectonics (cont.).
Week 4 (9/14-9/18): Mid Term 1 on Friday, Sept 18th. Rock Cycle,
Week 6 (9/28-10/2): Copper, Zinc, Lead (cont.), Sulfides, Aluminum.
Week 7 (10/5-10/9): Iron, Review, Mid term 2 on Friday Oct. 9th.
Week 8 (10/12-10/16): Placer deposits, Gold, Mining environmental impacts
Week 9 (10/29-10/23): Mining Environmental Impacts (cont.), Intro to Energy
(10/23): No class, Fall break
Week 9 (10/26-10/30): Energy, Fossil Fuels, Oil, Gas, Coal.
Week 10 (11/2-11/6): Fossil Fuels, Oil, Gas, Coal (cont.), Review.
Week 11 (11/9-11/13): Mid Term 3 on Monday, Nov. 10th. Renewable energy
Week 12 (11/16-11/21): Nuclear energy, Water resources
Week 13 (11/23): Water resources (cont.). PAPER IS DUE on Monday, 11/23!!!
Week 14 (11/30-12/4): Climate change, Final exam review.
FINAL EXAM: December 11th, 12:30 pm.