UColorado

Senior
UCO Global Change 1060

**GLOBAL CHANGE – An Earth Sciences Perspective**
**GEOL 1060, section 010, Fall 1997**

Lecture M-W-F, 1-1:50 PM, Geology Room 121
Recitations Wed. and Thurs. afternoons as scheduled

(NOTE that we will move to the new Earth Sciences building in November; stay tuned for details)

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TA's: David Lubinski, Ken Mack, Frank Urban
Office hours TBA

Class home page:
http://www.Colorado.EDU/GeolSci/courses/GEOL1060/1060.home.html

Text: *The Blue Planet*, B.F. Skinner and S.C. Porter
Supplemental readings - on reserve at Earth Sciences Library and/or available on the Web

If you have a learning disability that requires accomodation, please see me early in the semester so we can make appropriate arrangements.

Objectives: This course is designed to provide you with a basic understanding of the Earth's natural systems and their interactions, with particular emphasis on the processes that contribute to global environmental change. We define Earth's systems broadly to include the solid earth, the atmosphere, the hydrosphere (ocean and freshwater), and the biosphere. At the end of this course, we hope you will have mastered a basic foundation of factual, observational information on these systems, and more importantly, we hope that you will learn how to use scientific methods to form logical conclusions from these observations. For example, when you read conflicting reports in the newspapers about global warming, how can you know what to believe? We want you to be able to assess evidence and apply it to form your own conclusions, rather than relying on authoritarian pronouncements. By the end of this course, you should have a reasonable understanding of the processes that contribute to environmental change, and you should be able to evaluate critically articles in the popular press that address these issues. This background is important for an informed citizen who may be asked to vote on environmental issues, and it will provide the foundation for further coursework in many areas of science at CU.

This course is intended for students who are not currently science majors, although it can be applied towards majors in Geological Sciences and Environmental Science (and perhaps other programs). Because this course has no prerequisites, we will not require complex skills in mathematics or chemistry. But this is a science course: it satisfies the

university's Core Curriculum requirement in Natural Sciences, and we will stress scientific methods (including simple numerical exercises) in addressing issues relevant to the global environment. Graphical information is critical for identifying trends and relationships in earth system science; we expect that you know how to read, comprehend, and construct simple graphs. We also expect a working knowledge of global geography, as we will be addressing many issues that have specific regional patterns or effects. Finally, some of the homework assignments will require that you access the Internet (World Wide Web), and the class home page contains lecture notes that you will find useful. The recitations will incorporate these skills on a regular basis.

Summary: The science of global environmental change draws on many areas of knowledge that traditionally existed as separate disciplines, particularly atmospheric sciences, geology, oceanography, hydrology, and ecology. Increasingly, global change scientists recognize that these traditional disciplines do not give us the most complete picture of how global change operates. For example, the concentration of atmospheric carbon dioxide is increasing due to human activity. $CO_2$ concentrations are also affected by the activity of the biosphere (growing plants) and the oceans (gas exchange and chemical reactions). Increasing atmospheric carbon dioxide may lead to future changes in atmospheric and hydrologic systems (which then influence human activities). Evaluating global change processes and their impacts requires an understanding of the basic earth systems and how they interact. In this course, we will take an interdisciplinary approach to the science of Earth systems that directly addresses the interconnections among these systems. This approach includes the backdrop of the geologic and historical record of past global change; we can learn much from the past about the natural variability of the Earth's major systems.

In the field of global change (past, present, and future), nearly all major issues relate to changes in the primary Earth systems: the solid earth, atmosphere, hydrosphere, and biosphere. We will spend the first two-thirds of the course with a focus on these primary systems – what are their defining characteristics, how do they operate, how do they interact. We will discuss processes related to the deep earth, the earth's surface, the continental hydrologic cycle, the oceans, the atmosphere, and the biosphere. Throughout the class, we will focus on instances where these systems are coupled and influence each other - for example, the effects of volcanoes on climate, or the relationship between deforestation, erosion, and coastal ecosystems. In the final third of the class, we will look at examples of global change issues in today's world and at how we anticipate future changes. Societal aspects of global change will be addresssed to some extent throughout the course, but with greater emphasis in the last third.

Grading: We will give two hourly exams, each worth 25% of your final grade, and a final exam, worth 25%. The remainder of your grade (25%) will be based on your performance in recitation, including quizzes, homework, and participation in discussions. The hourly exams will cover material since the previous exam; the final will be comprehensive and require you to integrate what you've learned over the semester, although the more recently presented material will be stressed.

We have a textbook, *The Blue Planet*, and text readings will be assigned regularly to supplement the material presented in lecture and recitation. But lectures will not strictly

follow the book, and you can expect that we will skip around somewhat in the order of the chapters. Furthermore, I will present information in class that is not in the text, and the text covers many topics in greater detail than we will expect you to learn. So come to class. Exams will be based primarily on lecture and recitation material; these (not the text) should be your main source of information. Additional readings will be identified and placed on reserve in the Earth Sciences Library (2nd floor Geology building) or linked over the Web to the class home page.

All class notes for my lectures will be posted on the class home page, and I will try to get them there before class so you can bring them with you to help guide and simplify note-taking in lecture.

Exams are scheduled well in advance; if you have an irreconcilable conflict or are ill, you need to inform me before the exam. The final exam is scheduled for Thursday Dec. 18, at 11:30 AM. By University regulation, the date and time of the final are fixed. If you have three or more finals in one day, please see me before October 6 and we will arrange an alternative. Dates for the hourly exams are indicated on the course outline but may change by a day or two depending on our progress; I'll give adequate notice.