Global Change: GEOS 478/578
Syllabus
Fall 2012

Where and when: Tues-Thurs, 11:00-12:15, Saguaro Hall (old FCS) 114

Instructors and office hours:

Professor Scott Saleska, Ecology and Evolutionary Biology, Biosciences West 510, phone 626-1500, saleska@email.arizona.edu, Office hours Wed 2:00-3:30PM and by appointment

Dr. Paul Goodman, Geosciences, Gould-Simpson 305, phone 621-8484, pgoodman@email.arizona.edu
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Graduate Teaching Assistant: Diane Thompson, Geosciences, Gould-Simpson 127A, 626-3570, thompson0@email.arizona.edu
Office hours TBA, and by appointment

Class website: https://sites.google.com/site/uazglobalchange2012/home

Rationale: This class offers an interdisciplinary introduction to the principles of climate, ecology, and biogeochemistry needed to understand human impacts on the natural environment. We will also discuss global change prediction and the scientific bases for global change assessments and policy measures. This course is aimed at beginning graduate students pursuing global change research and at undergraduates who are well-grounded in a scientific discipline and are potentially interested in an environmental career or graduate education in a global-change related field. Students in social and policy sciences and other fields who have had a year of natural science coursework (beyond the NATS level) are welcome! Key topics are the physical climate system and its variability, the carbon cycle and related biogeochemistry and ecosystem/ecological processes, land use issues, the interactions among climate, ecosystems, and biogeochemistry, and the impact of global change on societally relevant parameters. Common threads in all of these topics will pervade the whole semester; these include the use of observations and models, the consideration of multiple scales of change (temporal and spatial), the interaction of human behaviors and choices with natural systems, and the linkages among aspects of global change science.

Prerequisites: This class has no specific prerequisites, but we strongly recommend that you have had at least a year of upper division (not NATS) science. You will be required to mathematically set up and solve quantitative problem sets for homework (no calculus) and to critically read and evaluate original scientific research papers. If you have never taken upper division science classes, or if you are strongly averse to math, you will have difficulty with these assignments.

Goals: This class aims to provide the interdisciplinary scientific principles of global change that are important for policy and assessments, including analysis of scientific literature and data. By the end of this class, you should have a critical understanding of basic global change principles in physical climate, biogeochemical cycles, and global change impacts (i.e., you should be able to review a scientific paper or talk critically) and you should be able to assess a global change-related topic or policy in the context of multiple disciplines. You should be able to address HOW we know as well as WHAT we know about global environmental change.

Reading assignments are listed on the schedule or will be provided as the semester proceeds. There's no test for this class; assignments will be posted online. Lecture outlines will be available online at the class website.

Class schedule: A daily schedule is linked online. Although subject to change by a day here or there, it’s a reasonable representation of the topics and assignments and their timing. The final exam date cannot be changed, but we may offer an optional earlier date to take it.

Grading: We will use a standard curve for assigning letter grades (A = 90’s, B = 80’s, C = 70’s, D = 60’s). Grades will be calculated as follows:

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<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tr>
<td>3 exams, non-cumulative</td>
<td>40%</td>
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<tr>
<td>Assignments</td>
<td>35%</td>
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<tr>
<td>Presentation (undergraduates) or proposal</td>
<td>20%</td>
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<tr>
<td>(graduates)</td>
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<tr>
<td>Class participation, discussion, attendance</td>
<td>5%</td>
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Undergraduates give short presentations in class and graduate students write a scientific proposal.
Exams: Two midterms and a final exam are scheduled. Exams are worth 40% of your grade. These are typically in short answer and essay form, with the possibility of simple calculations. Exams are not cumulative, each covers material since the last exam. However, there are common threads that run throughout the semester (notably climate and the carbon cycle) and later exams will draw on some of the material presented in the earlier parts of the class, to the extent that it is important for that exam period. Since exams often draw from the undergraduate homework assignments, understanding these homeworks is very helpful for doing well on the exam.

Assignments: For undergraduates, we will give SHORT homework assignments nearly every week. Homeworks will be due one week from when they are assigned, and we will drop your lowest grade. THE FIRST HOMEWORK GRADE CANNOT BE DROPPED. For graduate students, we will require 4 in-depth problem sets/assignments on specific topics, usually assigned 2+ weeks in advance; we will not drop grades for graduate homeworks. For all assignments in this class, we will penalize late assignments at 5% per day (and not accept them after 5 days late) - unless you have made prior arrangements with one of the instructors for extenuating circumstances. If you know you will be away for a given period of time in which an assignment is due, please see one of us in advance - we will be happy to work with you to find a way to meet your obligations.

Extra credit: You may receive the equivalent of one homework extra credit (3.5% of your final grade) by attending a research seminar on campus and writing up a one-page summary of this presentation. You must follow guidelines that will be provided here, and you must choose a talk from a list that we provide or get it approved in advance. Extra credit will not be automatically applied; this assignment will be graded for quality and can only be done once. The writeup must be turned in no later than one week following the talk, and must in any case be complete by November 30.

In-class presentations: These will be conducted by pairs of undergraduates, and the overall exercise counts for 20% of your total grade. Presentations will take place on 4 separate days scheduled throughout the semester. We would like you to choose a date and partner as soon as possible; a list of potential topics will be provided separately, or you may choose your own. You can email us as soon as you know, and if we have not heard from you by August 31, we will have you sign up that day in class for the topics we have identified. You'll be evaluated by your partners and the class, as well as by instructors. A handout detailing this assignment will be made available online during the first week of classes.

Graduate discussion: On the 4 days scheduled for undergraduate presentations, graduate students will meet separately for a discussion of current scientific research topics. We will assign background and discussion readings in advance, and we will ask you to come prepared with a one-page writeup of the papers under consideration. If you have ideas for particular topics/papers you'd like us to cover, please email the instructors.

Graduate proposal: As part of the requirements for GEOS 578, graduate students will write a scientific proposal on the topic of their choice. The proposal must be written originally for this class - it can be your thesis topic but not a proposal you have used for another purpose. (It is fine to write a proposal for us that you will later submit for funding; please see us if this is the case for you, so that we can discuss length and format.) The proposal should identify an unanswered scientific question and proposes a project to answer it (including specific description of methods: what observations, experiments, analyses, instruments etc. you will use). Details and deadlines related to this assignment will be posted online and discussed in class. No incompletes will be given to finish this assignment after the end of the semester, so begin thinking early about what topics you find interesting, and meet with an instructor to discuss this. The subject area must relate to global change and should have implications for policy and broader impact.

Intellectual Property: Please remember that all lectures are the intellectual property (i.e. copyrighted materials) of the instructors. Please do not make them available in ways that would violate copyright protections (e.g. posting on unrestricted websites outside the official course website, or making them available for commercial purposes. This does not preclude sharing them with others in the class, and we are usually happy to share them outside of class on request.

Other issues

Part of your grade (5%) is based on class participation; this includes regular participation in discussions and peer evaluations (when available) and attendance. These points are not automatic, so come to class and be ready to talk in discussions.

Academic dishonesty is not tolerated. This includes any representation of someone else's work as your own, such as copying material from the internet or a classmate. Please read the Geosciences department's statement on academic integrity and the University's Code of Academic Integrity, which govern how we will treat such incidents. For example, any work taken from other sources (web, papers, etc.) should be rephrased in your own words, and followed by a citation to the original source. The use of lengthy direct quotations in science is not good practice; please avoid this.) Working with others is fine but you should always rephrase your answers in your own words and style. Identical homeworks will be taken as evidence of academic dishonesty. Consequences for academic dishonesty in this class include penalties equivalent to double the value of the assignment (i.e., negative points), failing the class, and initiation of disciplinary procedures at the college level that can lead to suspension or expulsion from the university.

If you anticipate barriers related to the requirements or requirements of this course, please meet with one of the instructors so that we can discuss ways to ensure your full participation in the course. If you determine that disability-related accommodations are necessary, please register with Disability Resources (621-3268; dir.arizona.edu) and notify me of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations. Please do this within the first week of class.

Finally...

We welcome your feedback about how the class is going at any time! Please tell us if you have issues or complaints, so we can make adjustments before the semester is over. Your input will make the class better for the other students and for the instructors. Thanks.