Geography 3401/5401: Spring 2010
Geography of Environmental Systems and Global Change
Class meetings: 10:10-11:00 MWF, 230 Anderson Hall
Course web page: http://www.tc.umn.edu/~klink/geog3401/

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If you have a disability that requires accommodation in this course, please notify Kathy as soon as possible. Appropriate accommodations will be made given suitable advance notice, consistent with Office of Disability Services policy.

Students interested in completing their senior project in conjunction with this course should contact Kathy no later than 19 February 2010.

What is this course about?
Geog 3401/5401 – Geography of Environmental Systems and Global Change is a broadly conceived introduction to environmental science and environmental change. Our focus is on understanding the environmental “systems” themselves – the climate, the biosphere, and the land surface – as well as how these systems interact with human decisionmaking to create our total “environment.” We use global climate change as one type of environmental change that has the potential for far-reaching consequences. We begin with a substantial unit on the science of climate: the flows of energy; the important roles of water; principles of atmospheric circulation and atmosphere-ocean interactions; and the resulting spatial patterns of climate on which much of human infrastructure (e.g., levees, building codes) and activity (e.g., agriculture, recreation) is predicated. We follow with units on soils/landforms and on ecosystems, including the processes at work that affect the functioning of these systems – nutrient cycles, weathering processes, disturbances (fire, earthquakes, etc.) – and that influence how humans have decided to live on, and use, the land. We spend the last several weeks of the semester looking specifically at questions of future climate change as presented in current reports on the “science” of climate change, its impacts, and possibilities for adaptation and/or mitigation. The activities and decisions of society in creating and/or altering environmental systems are infused throughout the course, including the values implicit in our activities and decisions.

The capstone project of the course – the term paper – is designed to bring together the science of the environment with the choices of society via a study of the likely impacts of climate change for a particular location. What environmental processes and human activities are important for that specific place? What kinds of climate changes may occur in that location, and how might these changes affect the environment and the people living in that area? What might people in that place “do” about these impacts? We will use various IPCC and U.S. CCSP assessment documents (see required texts, below) and the results of your own work as the basis
for a number of in-class discussions: Do different places have different concerns regarding climate change, and do they have different constraints in the ability of the people living there to mitigate or adapt to those changes? What is the role of individual choice and of social-political “rules” (e.g., availability of flood or crop insurance) in dealing with (or reacting to) environmental change? What are the global consequences of local (or national) environmental decisions (the ethics of international humanitarian relief, creation of “environmental refugees,” etc.)? It is unlikely that there will be consensus among us as to what should be “done” about climate change; enlightenment, however, is almost certain!

Required texts (all are available on-line):
http://www.uwsp.edu/geo/faculty/ritter/geog101/textbook/title_page.html

http://www.physicalgeography.net/fundamentals/contents.html

http://www.ace.mmu.ac.uk/Resources/gcc/contents.html
http://www.ace.mmu.ac.uk/Resources/gcc/Climate_Change_Study_Guide.pdf

Intergovernmental Panel on Climate Change (IPCC), Fourth Assessment Report (2007) [selections].
http://www.ipcc.ch/publications_and_data/publications_and_data_reports.htm

http://www.climatescience.gov/Library/sap/sap-summary.php
http://www.gcrio.org/library/sap-final-reports.htm

We also will have a few additional web-based readings. Check the class web site for current reading assignments.

What are “Environmental Systems”?

In this course, we use the term “Environmental Systems” to refer to the interacting elements of climate, the biosphere, and the land surface. Climate, the biosphere, and the land surface themselves can also be considered to be comprised of “systems” – for example, the climate “system” includes the atmosphere, oceans, sea ice, snow cover, and so on. A systems framework often is used in the earth and environmental sciences because it puts a focus on the interactions and interrelationships between elements of the environment. Increasingly, human society is considered another fundamental component of environmental systems, and in this course we will specifically consider humans as part of our “environmental system.”

Course objectives

Our approach to this course is based on our belief that the physical environment provides the resources that sustain humans, and that our well being depends crucially on our interaction and interdependence with the physical environment.
Our objectives for this course are:

• to increase understanding of the physical processes governing environmental systems and how these processes and systems can influence each other;
• to understand how societal decisionmaking and political/economic policies often are predicated on our current understanding of the processes at work within the physical environment;
• to comprehend how changes in the processes governing environmental systems (due either to “natural” or human factors) may influence the evolution of these systems;
• to become better able to critically evaluate scientific questions and claims, especially those concerning the environment;
• to assess how human decisionmaking and societal choices can have environmental consequences at local, regional, and global scales;
• to reflect on the importance of scientific, social, economic, and cultural knowledge in assessing environmental issues; and
• to think about our own roles as agents of environmental change.

We approach our objectives by using global climate change (natural or human-induced) as an example of an environmental change that has the potential to create far-ranging impacts via:

• the potential for propagation of change through the environment, e.g., a change in the climate resulting in a change in vegetation;
• the amplification or suppression of change by “feedbacks” in the natural environment, e.g., an amplification of temperature increase through a decrease in ice and snow cover;
• the impact of differences in the rate of change of different components of the natural environment, e.g., a rapid change in atmospheric temperature but a slow change in vegetation and soils in response to the temperature change;
• the potential for multiple human impacts to reinforce each other, e.g., both agriculture and industrialization contributing to increased carbon dioxide and global warming;
• the potential for a single human impact to have opposing effects, e.g., the potential opposing effects of carbon dioxide (warming) and sulfur dioxide (cooling), both of which are released in the burning of fossil fuels; and
• the possibility that environmental change is not “bad” for everyone.

Applicable Student Learning Outcomes

• identify, define, and solve problems
• locate and critically evaluate information
• master a body of knowledge and a mode of inquiry
• communicate effectively
• acquire skills for effective citizenship and lifelong learning
Course Requirements

• **Exams:** There will be two in-class essay exams and a final essay exam. About one week before each exam you will be given a set of questions 2 to 3 times longer than the number of questions you will be asked to answer on the exam. At the exam I will select the questions you will answer: three questions for the in-class exams and six questions for the final.

• **Term Paper:** The final (term) project involves evaluating the local effects of global climatic change. Your analysis will focus on a location within the United States (for which information may be more easily available than may be the case for other countries). Your paper will include: (1) an analysis of the current physical environmental setting for your location (climate, vegetation, topography, and soils); (2) the likely climatic changes at your location under increased atmospheric greenhouse gases as predicted by some recent climate models; and (3) the probable changes in physical/biological environments, along with some of the probable consequences for human systems, of the predicted climate change. Preliminary parts of your paper will be due at several points during the semester (see class schedule). The completed project will consist of a short “press release” and a longer formal paper, both of which must include appropriate diagrams and figures that support the text.

  *If you have a compelling reason to study a location outside of the United States for your term project, please contact me before 19 February 2010 so we can discuss this option.*

• **Short Projects:** You will complete four short projects during the semester. The projects are designed to help you identify resources and begin some preliminary data analyses for your term paper.

• **Class Participation and Attendance:** I expect that you will attend class and participate in our discussions. Please note that attendance is mandatory for the last two days of class.

• **Students Enrolled in Geog 5401:** You will complete two additional essays and a longer term project. Grading for all course requirements will be more stringent than that applied to students enrolled in Geog 3401.

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**CLASS POLICIES**

**Exams and Due Dates**

Students are required to take exams on the announced dates, except in cases of University-excused absences (you must let me know ahead of time) or for documented emergency reasons.

Class assignments are due at the beginning of class on the scheduled due dates, unless announced otherwise in class (see the Course Schedule for a list of due dates). Late assignments will be penalized by one letter grade per day (excluding weekends and University holidays). There will be no exceptions except for documented reasons as noted above. Assignments turned in more than 15 minutes after class has started will be considered “late”.

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All assignments must be turned in as hard copy. Electronic copies will not be accepted (except for the term project’s Press Release) unless you have checked with me first and gotten permission to do so (for example, if you are traveling as part of a University activity and are not going to be in class when something is due).

**Incompletes**

Incompletes will be awarded only in rare circumstances and only when there is a documented medical emergency, documented family emergency, or documented legal reason for not completing the required course work by the end of the semester. Awarding an incomplete requires a written agreement between instructor and student outlining how and when the work will be completed.

**Grading**

*Students enrolled in Geog 3401:* Your final grade will be computed using the following weighting scheme:

- Exam 1: 10%
- Exam 2: 10%
- Final Exam: 15%
- Final Paper: 30% (total)
- Short Projects: 35% (total)

*Students enrolled in Geog 5401:* Your final grade will be computed using the following weighting scheme:

- Exam 1: 10%
- Exam 2: 10%
- Final Exam: 10%
- Final Paper: 35%
- Short Projects: 25% (total)
- Two Essays: 10% (total)

For all students, a maximum of 5 extra percentage points may be added to your final course percentage (grade) via documented participation in in-class discussions. **Failure to attend class on May 5 or May 7 will result in 5 percentage points being deducted from your final course percentage; if you miss both days, 10 percentage points will be deducted from your final course percentage.**

The quality of your writing will be an explicit factor in the grading of all of your work. Extra credit (outside of class participation, as described above) is not offered in this course.

Exams, assignments, and your final course grade will be assigned based on your percentage of the total possible points. The grading scale will be approximately as follows: 90% and above = A/A-, 80-89 = B+/B/B-, 70-79 = C+/C/C-, 60-69 = D+/D, 59 and below = F. The grading scale may get easier, but it won’t get harder.

University guidelines state that for undergraduate courses, one credit is defined as equivalent to an average of three hours of learning effort per week (including class time) necessary for an average student to achieve an average grade in the course. For this 4-credit course, then, to achieve “an average grade” you can expect to spend an additional 9 hours per week outside of class time on your coursework.
Per University regulations, included below are the University-approved Definition of Grades:

- **A (4.00):** Achievement that is outstanding relative to the level necessary to meet course requirements.
- **B (3.00):** Achievement that is significantly above the level necessary to meet course requirements.
- **C (2.00):** Achievement that meets the course requirements in every respect.
- **D (1.00):** Achievement that is worthy of credit even though it fails to meet fully the course requirements.
- **S:** Achievement that is satisfactory, which is equivalent to a C- or better.
- **F (or N):** Represents failure and signifies that the work was either completed but at a level of achievement that is not worthy of credit, or was not completed and there was no agreement between the instructor and the student that the student would be awarded an I (incomplete).

**Procedure for disputing a grade**

Any dispute regarding a grade on an assignment or an exam question must be submitted in writing (on paper or via e-mail) no more than 48 hours (including weekends and holidays) after the assignment or exam has been returned. You must provide clear rationale for why you believe that your assignment or exam question deserves a higher score. Statements like “I think I’m right” or “I think I met all of the requirements of this assignment” are not sufficient rationale.

**General course expectations**

Here is what you can expect me and from your TA:
- Plan the course and provide a structured, supportive learning environment.
- Answer questions clearly and follow up on questions when appropriate.
- Provide helpful feedback on exams and lab projects.
- Be available during office hours or by appointment to help with questions or concerns regarding this class.
- Respond to e-mail queries within 48 hours.
- Treat you, as adult learners, with dignity and respect.

And here is what we expect from you:
- Attend and actively participate in class: ask questions, listen to answers.
- Take exams on the scheduled dates and complete assignments on time.
- Take responsibility to foster your own learning.
- Honesty and integrity in all aspects of the course.
- Treat me, your TA, and your classmates with dignity and respect.

**Statement on classroom conduct**

Courteous, respectful behavior is expected at all times. Disruptive classroom conduct may result in disciplinary action. The University Student Conduct Code defines disruptive classroom conduct as “…engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach or student learning. The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of
program-based requirements or related activities.” Discussions of alternative viewpoints are encouraged in this class but I expect that any such discussions will be constructive and courteous. Questions on class material are always welcome but I ask that extended discussions of such questions be conducted outside of class time.

Statement on use of personal electronic devices in the classroom
Using personal electronic devices in the classroom setting can hinder instruction and learning, not only for the student using the device but also for other students in the class. To that end, I ask that you please turn off cell phones and other electronics when you come to class, with one exception: you are welcome to bring (and use) your laptop or smartphone for the purpose of taking notes or reviewing on-line course material. Ringing (or vibrating) phones, texting, reading/sending e-mail, Twittering, Facebooking (are those verbs?), and the like are distracting for me and disruptive for your classmates. If I notice such behavior or receive complaints about it, I will remind you of these expectations. Repeated infractions may result in the loss of electronic devices for the duration of the class period.

Statement on academic conduct
Academic integrity is essential to a positive teaching and learning environment. All students enrolled in University courses are expected to complete coursework responsibilities with fairness and honesty. Failure to do so by seeking unfair advantage over others or misrepresenting someone else’s work as your own can result in disciplinary action. The Student Conduct Code defines scholastic dishonesty as follows:

Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis.

Scholastic dishonesty may result in disciplinary action and/or a penalty up to and including an “F” or “N” for the entire course. If you have any questions about what constitutes scholastic dishonesty, ask.

Statement regarding sexual harassment
Students are expected to observe University policies regarding sexual harassment, defined as “unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature when: (1) submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment or academic advancement in any University activity or program; (2) submission to or rejection of such conduct by an individual is used as the basis of employment or academic decisions affecting this individual in any University activity or program; or (3) such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program.” Violation of this policy may result in disciplinary action.
Relevant University policies:
http://www.policy.umn.edu/Policies/Education/Education/STUDENTWORK.html
http://www.policy.umn.edu/Policies/Education/Education/GRADINGTRANSCRIPTS.html
http://www.policy.umn.edu/Policies/Education/Education/CLASSROOMPED.html
http://www.policy.umn.edu/Policies/Education/Education/STUDENTRESP.html
http://www.policy.umn.edu/Policies/Education/Education/INSTRUCTORRESP.html
http://www.policy.umn.edu/Policies/Education/Education/UNDERGRADLEARNING.html
http://www1.umn.edu/regents/policies/academic/Student_Conduct_Code.html
http://www1.umn.edu/regents/policies/humanresources/SexHarassment.html