

GEOG 493 Geography of Climate and Environmental Change Spring 2008

SYLLABUS

Instructor: Martha Shulski (336 IARC, martha@climate.gi.alaska.edu, 474-7885)
Office hours: by appointment

Credits: 3

Dates: MWF 11:45 – 12:45 (1/24 to 5/5)

Place: Reichardt, 136

Prerequisites: BIOL 271 (Principles of Ecology), GEOG 401 (Weather and Climate), or permission of instructor

Description: This course is intended to serve as a 'synthesis' course enabling students to integrate across disciplines (climate, geomorphology, ecology) in the context of studying climate and environmental change. The major concepts of global climate processes and climate change will be reviewed on time scales ranging from deep in Earth history to El Niño. Basic concepts and integrations of extreme events and natural disasters on humans and the environment will be introduced as well as mitigation techniques. The impacts of natural and anthropogenic environmental change will be examined. Finally, changes taking place at high latitudes will be featured in detail.

Concepts that will be emphasized in this course include:

- Variation of geospatial and temporal scales of climate change and variability
- Concepts of human response / drivers of environmental change
- Synthesis of these concepts by reading the current literature

Objectives: This is a 'synthesis' course for upper division geography students, and students with adequate background in biologic or physical sciences. Main objectives of this course are to help students integrate and synthesize prior knowledge and experience gained in more discipline-based courses (climate, geomorphology, ecology). This will be achieved by examining the processes of environmental change from various geospatial and temporal perspectives, and from the premise that multiple and integrated variables are responsible as drivers of change, and in environmental response to change.

Instructional / Teaching Methods: The course will be structured around three major sections:

1. Geography of climate and climate change
2. Concepts of extreme events, hazards, and ecological change
3. Integration and synthesis into changes taking place at high latitude regions

This course will use a combination of traditional lecture format along with in-class discussions of directed reading material. In addition, experts in various disciplines will be brought in during the latter half of the class to share the current state of knowledge and research in topics related to environmental change.

Learning Methods / Student Assignments: The first two sections of the course will in general follow traditional lecture format and students will have an exam associated with each section. In addition, discussion and in-class quizzes on directed readings will also occur.

The third portion of the course will include directed readings and case studies of environmental change. Students will present a paper on a chosen topic of climate/environmental change.

Suggested Texts: *Global Change and the Earth System* by Steffen et al., 2005
Global Physical Climatology by D. L. Hartmann, 1994
Human Impacts on Weather and Climate by Cotton & Pielke, 1995
*All on reserve at Mather Library

Supplements: IPCC Report, 4th Assessment, 2007 (<http://www.ipcc.ch/>)
Arctic Climate Impact Assessment, 2004 (<http://www.acia.uaf.edu/>)
Wilhite, D.A., *The Enigma of Drought, Drought Assessment, Management and Planning*, 1993. National Drought Mitigation Center.
Serreze, M. C., J. E. Walsh, F. S. Chapin III, T. Osterkamp, M. Dyurgerov, V. Romanovsky, W. Oechel, J. Morison, T. Zhang and R. G. Barry, 2000: Observational evidence of recent change in the northern high-latitude environment. *Climatic Change*, 46, 159-207.
*Other papers/materials will be given out during the course of the semester

Course Website: <http://climate.gi.alaska.edu/courses/geog493/index.html>

<i>Grading:</i>	Quizzes/Homework	15%
	Discussion participation	15%
	Exam I	20%
	Exam II	20%
	Research Presentation	30%

<i>Grading Scale:</i>	90 to 100%	A (outstanding)
	80 to 89%	B (above average)
	70 to 79%	C (average)
	60 to 69%	D (below average, but passing)
	< 60%	F (failure to pass the course)

Attendance: Though attendance will not formally be taken, your active participation in the course during lectures with questions and discussion is expected.

Academic Integrity: Plagiarism and cheating are serious matters. The UAF Honor Code defines academic standards that are expected of each student.
(<http://www.uaf.edu/uaf/current/policies.html>)

Disabilities Services: The UAF Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. The course instructors will work with the Office of Disabilities Services to provide reasonable accommodation to students with disabilities. Please notify the instructor of any special needs.

Research Presentation:
Your final exam will be a research presentation to be given during the last week of class. You are to research a topic of your choice (related to climate and environmental change) and

present your findings to the class in a 20-minute presentation. More information will be given at a later date.

Course Schedule: (Subject to change)

* denotes quiz date or homework due

Week	Dates	Mon	Wed	Fri
1	1/25			Introduction to Course
2	1/28 – 2/1	The Earth Climate System	Energy Balance	Climate controls, Regional and global climates
3	2/4 – 2/8	Climate change time scales	Climate change time scales, cont'd	Non-linearities and sudden changes
4	2/11 – 2/15	Feedback processes	*GAIA discussion – living in daisyworld	Humans as drivers of change
5	2/18 – 2/22	Humans as drivers of change, cont'd	Making sense of the IPCC	* IPCC discussion
6	2/25 – 3/1	Responses to change	Global warming – two sides to every story	* Global warming discussion
7	3/3 – 3/7	Exam 1	Land degradation and land use	Land degradation and land use, cont'd
8	3/10 – 3/14	-- Spring Break --	-- Spring Break --	-- Spring Break --
9	3/17 – 3/21	Drought and desertification	Drought and desertification, cont'd	* Drought discussion
10	3/24 – 3/28	Pollution and toxic substances	Pollution and toxic substances, cont'd	* Pollution discussion
11	3/31 – 4/4	Climate and society: mitigation, adaptation, resilience	Climate and society: air and water quality	Climate and society: implications of sudden changes
12	4/7 – 4/11	Exam 2	Sea level change, erosion, and coastal communities	Sea level change, erosion, and coastal communities, cont'd
13	4/14 – 4/18	* ACIA report and High Latitude Change discussion	High Latitude Change: Temperature and Precipitation (John Walsh)	- No Class - UAF SpringFest
14	4/21 – 4/25	High Latitude Change: Sea Ice (Hajo Eicken)	High Latitude Change: Permafrost (Vladimir Romanovsky or TBD)	High Latitude Change: Hydrology (Daqing Yang or TBD)
15	4/28 – 5/2	High Latitude Change: Vegetation (TBD)	Wrap-up and Review	Student Presentations
16	5/5 – 5/9	Student Presentations	- Finals - No Class -	- Finals - No Class -