GEOG/AOS/IES
332: THE GLOBAL WARMING DEBATE
FALL 2009

Instructor: Jack Williams, Associate Professor, Department of Geography
Science Hall 208, 5-5537, jww@geography.wisc.edu
Office Hours: Weds 3:30pm-5pm,
Thurs 4pm–5:15pm,
or by appointment

Lectures: 1641 Humanities Building, Tuesday/Thursday 2:30-3:45 pm
URL1 (Learn@UW): learnuw.wisc.edu
URL2 (public website): www.geography.wisc.edu/classes/geog332/

INTRODUCTION

This is an intermediate course targeted to undergraduate students with some background in earth system or atmospheric science (Geography/IES 120, 127; AOS 100, 101, or equivalent). The central thesis of this class is that as our understanding of the climate system improves, the debate over global warming is shifting from questions of detection and attribution (whether warming is occurring and whether we're responsible?) to questions of impact and response (what are the consequences and what should we do?). Because climate directly or indirectly affects almost everything we do (and vice versa), the 21st-century citizen simply must have an understanding of the fundamentals of climate science and policy. This class attempts to provide that understanding.

The first half of this class will review the fundamentals of climate-change science; the second half will explore 1) the possible impacts, risks, and benefits associated with climate change, and 2) adaptation and mitigation strategies. This course will draw heavily on the recent findings from the 2007 Intergovernmental Panel on Climate Change (IPCC) report and will consist of a mixture of lectures, in-class discussions, and self-directed exploration of on-line and published resources.

COURSE POLICIES

GRADE COMPONENTS

Homeworks	20%
Exam I	25%
Exam II	25%
Term Paper	30%

HOMEWORKS

Assignments are usually due a week after they are handed out; see the class schedule (below) for the scheduled dates. Assignments will be distributed using the Learn@UW course website (in the Content tab) and, unless otherwise specified, must be handed in using the Learn@UW Dropbox. Assignments are due by the start of class period – we will often use these assignments as a starting point for class discussion, so handing

assignments in on time is essential. Overdue assignments will be penalized by a set amount per day after the due date. Exceptions can be made if emergencies arise, but must be approved by instructor.

EXAMINATIONS

There will be two non-cumulative, short-answer and essay exams.

TERM PAPER

The paper will be developed over the course of the semester, in several stages:

Due Date	**Item**	**Proportion of Paper Grade**
Oct. 13	Outline and Initial Bibliography	15%
Nov. 17	Term Paper	60%
Dec. 1	Peer Reviews	25%

Outline and Initial Bibliography. Should consist of:

i) A 1-2 page outline describing your paper topic. Begin the outline with a 1-3 statement of your paper's thesis.

ii) A Bibliography with at least 10 resources, at least five of which must be scientific or policy articles (i.e. journal articles, books). Newspapers, magazines, and general-use websites can be included in the bibliography but do not count towards the first five.

Term Paper. A 10-15 double-spaced term paper on the topic of your choice (related in some way to the course material). See the Term Paper Guidelines handout for more information.

Peer Reviews. Each student's term paper will be reviewed by two other students, and each student will provide reviews of two other papers. All reviews will be anonymous. See the Peer Review Guidelines handout for more information.

Evaluation and grading of the term paper will be based on the reviews of your classroom peers and on my assessment of the paper.

READINGS

Dire Predictions: Understanding Global Warming (DP) by Michael Mann and Lee Kump. DK and Pearson Education, New York, 2009. (**Required textbook**)

The 2007 Fourth Assessment Report from the Intergovernmental Panel on Climate Change (IPCC07). Cambridge University Press. Consists of three Working Groups:
WGI (The Physical Science Basis),
WGII (Impacts, Adaptation, and Vulnerability,
WGIII (Mitigation of Climate Change).
All materials from IPCC AR4 can be downloaded as PDFs from http://www.ipcc.ch/
I will also post assigned chapters to Learn@UW.

Additional readings will be drawn from the 2007 IPCC report and supplementary articles. These will be distributed as PDFs through Learn@UW.

LEARN@UW

Learn@UW will be used to post news items, readings, assignments, and class slides. Copies of this syllabus and the term paper guidelines can also be found there. There is also a public course website at http://www.geography.wisc.edu/classes/geog332/ but this is mainly for advertising purposes.

MISSED LECTURES AND MEDICAL ABSENCES

The H1N1 'swine flu' virus places a premium on minimizing the risk of spreading disease. Specifically, **if you are running a fever over 100°F with a cough or sore throat, stay home!** Wait until 24 hours after your fever breaks before returning to class. The flu usually takes 3 to 5 days to run its course.

If you miss a lecture for any reason, and would like to learn about what you missed, either visit me during office hours or talk to a classmate. I will not respond to email queries or LearnUW-posted queries about missed lecture content. All lecture slides will be available at Learn@UW.

RESOURCES

OTHER GOOD BOOKS

Climate Modeling Primer (2nd ed.), by Kendal McGuffie and A. Henderson-Sellers. John Wiley and Sons, 1997

Earth's Climate: Past and Future by William F. Ruddiman. W. H. Freeman and Company, New York, 2001.

The Discovery of Global Warming by Spencer R. Weart, Harvard University Press, Cambridge, 2003.

Field Notes from a Catastrophe by Elizabeth Kolbert. Bloomsbury Press, 2006.

Six Degrees: Our Future on a Hotter Planet by Mark Lynas. Fourth Estate Press, 2007.

PEER-REVIEWED JOURNALS PUBLISHING CLIMATE-CHANGE RESEARCH (A PARTIAL LIST…)

Nature, Science, Proceedings of the National Academy of Sciences (PNAS), Climatic Change, Global Change Biology, Global and Planetary Change

ELECTRONIC RESOURCES FOR SEARCHING THE PEER-REVIEWED LITERATURE

GeoBase – good coverage of geographical, ecological, and environmental literature

Google Scholar – easy to use but still somewhat spotty coverage

LexisNexis – database of newspaper and magazine articles. See also ProQuest.

MadCat – UW search engine for books.

Meteorological and Geophysical Abstracts – good coverage of meteorological and climatic journals

ProQuest– database of newspaper and magazine articles. See also LexisNexis.

Web of Knowledge – massive database and allows searches of papers citing or cited by a paper of interest. Highly recommended.

OTHER RELATED WEBSITES: LINKS AND URLS

See course website. Suggestions always welcome!

Geography 332 Schedule, Fall 2009

Week	Date	#	Topic	Readings	Due Dates
1	9/3	1	Introduction, The IPCC		
2	9/8	2	Greenhouse Effect	DP 10-35, IPCC07 WG1 TS pp1-27	
	9/10	3	Other Radiative Forcings	IPCC07 WG1 TS pp28-35	
3	9/15	4	Global Carbon Cycle	Schlesinger Ch5 pp. 134-152, Ch9 301-316, Ch11 356-377	
	9/17	5	Global Carbon Cycle		**HW 1 Due**
4	9/22	6	Climate Sensitivity and Climate Feedbacks	CCCES pp55-67, DP 77-85, 94-97, 138-139	
	9/24	7	Climate Sensitivity and Climate Feedbacks		**HW 2 Due**
5	9/29	8	GCMs	Kolbert, Field Notes from a Catastrophe pp. 97-110.	
	10/1	9	Searching the Scientific Literature		
6	10/6	10	Terrestrial Carbon Sequestration	Economist 2009/06, Melnick&Gibbs	
	10/8	11	Searching the Scientific Literature		
7	10/13	12	Past Climate Variability	DP 41-47, CCES CH2	
	10/15	13	Detection: Is the Earth Warming?	IPCC07 WG1 TS pp35-58	**Term Paper Outlines Due**
8	10/20	14	Attribution: Are Humans Responsible?	IPCC07 WG1 TS pp58-66	
	10/22	15	Projection: What Will Happen in the Future?	DP 86-103, IPCC07 WG1 TS 66-80	
9	10/27	16	**Exam I**		
	10/29	17	Contrarian Perspectives	Inhofe Sept. 28, 2003 Floor Statement, State of Fear Appendix, Singer & Avery 2007	
10	11/3	18	Contrarian Perspectives		**HW 3 Due**
	11/5	19	Impacts: Ice Sheets, Sea Level Rise	DP 98-99, 107-111; IPCC WG2 TS pp26-58; Witze 2008 Nature	
11	11/10	20	Impacts: Terrestrial Ecosystems	DP 112-121, Kolbert Butterfly Effect	**HW 4 Due**
	11/12	21	Impacts: Terrestrial Ecosystems		
12	11/17	22	Impacts: Oceans	CCCES CH 8	
	11/19	23	Impacts: Water Resources & Agriculture	DP 122-125	**Term Papers Due**
13	11/24	24	Impacts: Human Health	DP 126-137	
	11/26	25	*Thanksgiving*		
14	12/1	26	Policy Options: Overview	DP 104-105, 141-177	
	12/3	27	Mitigation Solutions	IPCC07 WG3 SPM, Pacala and Sokolow, 2004, 2006	**Term Paper Reviews Due**
15	12/8	28	Adaptation Solutions	IPCC07 WGII TS 65-76, McLachlan et al. 2007	
	12/10	29	Geoengineering Solutions	DP 178-197	**HW 5 Due**
16	12/15	30	**Exam II**		