

NATURAL HAZARDS AND DISASTER PLANNING

GEOG 419/619

Spring 2008

6:00 – 9:20 PM
Mondays
Halsey Science 212

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Texts: Smith, Keith, *Environmental Hazards: Assessing Risk and Reducing Disaster*. 2004 (4th edition).
Colten, Craig E, *Unnatural Metropolis: Wrestling New Orleans from Nature*. 2005 (purchase recommended, copy on reserve in Polk Library)
Outside Readings as listed on page 2.

COURSE OUTLINE AND READING SCHEDULE

Class Meeting	Lecture / Discussion Topic	Assignment
February 4	Introduction: Definition of Hazards.	Smith, Chapters 1 Burton (2-Chapter 2)
February 11	Vulnerability to Hazards	Smith, Chapter 2 Cross (7), Mitchell (14) Adger (1)
February 18	Perception of Hazards.	Smith, Chapter 3 Burton (2-Chapter 4) Slovic (18)
February 25	Hazard Adjustments: Loss Sharing	Smith, pp. 54-64 Burton (2-Chapter 5) Ismail-Zadeh (12)
March 3	Hazard Adjustments: Loss Reduction	Smith, pp. 64-77 Monmonier (15), Cross (3)
March 10	Windstorm Hazards.	Smith, Chapter 8 Cross (5), Colten
March 17	Flood Hazards.	Smith, Chapter 10 Freudenburg (11), Oshkosh (16)
March 31	EXAM 1 ** Seismic Hazards.	Smith, Chapter 5 Curtis (9)
April 7	Volcanic Hazards	Smith, Chapter 6
April 14	Landslide and Avalanche Hazards.	Smith, Chapter 7
April 21	Frost and Heat Hazards	Smith, Chapter 9 Cross (6), Kocin (13)
April 28	Drought Hazards.	Smith, Chapter 11 Wilhite (20)
May 5	Hazards of Global Change & Technology	Smith, Chapters 12-13 van Aalst (19)
May 12	Natural Hazards of Wisconsin. EXAM 2 **	Scanlon (18)

* Assignments should be read before each class. You are expected to contribute to class discussions of the readings. Topic schedules are approximate.

** Exam 1 will be given the first hour of class; Exam 2 will be given the last hour of class.

OUTSIDE READINGS

1. Adger, W. Neil, Terry P. Hughes, Carl Folke, Stephen R. Carpenter, and Johan Rockström. 2005. "Social-Ecological Resilience to Coastal Disasters." *Science* 309 (5737): 1036-1039.
2. Burton, Ian, Robert W. Kates, and Gilbert F. White. 1993. *The Environment as Hazard*. New York: Oxford University Press. GB5014.B87
3. Cross, John A. 1988. "Hazard Maps in the Classroom," *Journal of Geography* 87 (6): 202-211.
4. Cross, John A. 1992. "Natural Hazards within the West Indies," *Journal of Geography* 91 (5): 190-199.
5. Cross, John A. 1992. "The Hurricane Hazard in the United States". Chapter 10 of *Natural and Technological Disasters: Causes, Effects and Preventative Measures* (Majumdar, S. K. et al.(eds.) Easton: Pennsylvania Academy of Science), pp. 125-137.
6. Cross, John A. 1994. "Agroclimatic Hazards and Dairy Farming in Wisconsin." *The Geographical Review*, 84 (3): 277-289.
7. Cross, John A. 2001. "Megacities and Small Towns: Different Perspectives on Hazard Vulnerability." *Environmental Hazards* 3 (2): 63-80.
8. Cross, John A. and Yasuyo Makido. 2004. "Natural Hazards and Disaster Information on the Internet." Chapter 26 of *International Perspectives on Natural Disasters: Occurrence, Mitigation, and Consequences* (Joseph P. Stoltman, John Lidstone, and Lisa M. DeChano (eds). Dordrecht: Kluwer Academic Publishers), pp. 445-456.
9. Curtis, George D., 1992. "Tsunamis-Seismic Sea Waves." Chapter 9 of *Natural and Technological Disasters: Causes Effects and Preventative Measures* (Majumdar, S. K. et al.(eds.) Easton: Pennsylvania Academy of Science), pp. 108-124.
10. Cutter, Susan L., Jerry T. Mitchell, and Michael S. Scott. 2000. "Revealing the Vulnerability of People and Places: A Case Study of Georgetown County, South Carolina." *Annals of the Association of American Geographers* 90 (4): 713-737.
11. Freudenburg, William R., Robert Gramling, Shirley Laska, and Kai T. Erikson. 2007. "Katrina: Unlearned Lessons." *WorldWatch* 20 (5): 14-19.
12. Ismail-Zadeh, Alik and Kuniyoshi Takeuchi. 2007. "Preventive Disaster Management of Extreme Natural Events." *Natural Hazards* 42 (3): 459-467.
13. Kocin, Paul J. 1992. "Snowstorms and Blizzards." Chapter 16 of *Natural and Technological Disasters: Causes, Effects and Preventative Measures* (Majumdar, S. K. et al.(eds.) Easton: Pennsylvania Academy of Science), pp. 208-222.
14. Mitchell, J. Kenneth. 1998. "Megacities and Natural Disasters: A Comparative Analysis." *GeoJournal* 49 (2): 137-142.
15. Monmonier, Mark and George A. Schnell. 1992. "Natural Hazard Mapping: Status and Review." Chapter 34 of *Natural and Technological Disasters: Causes, Effects and Preventative Measures* (Majumdar, S. K. et al.(eds.) Easton: Pennsylvania Academy of Science), pp. 440-454.
16. Oshkosh, City of. 2006. "Floodplain Zoning Ordinance for the City of Oshkosh, Wisconsin." (http://www.ci.oshkosh.wi.us/Municipal_Codes/Chapter_30-39-67.pdf)
17. Scanlon, Joseph. 2004. "A Perspective on North American Natural Disasters." Chapter 17 of *International Perspectives on Natural Disasters: Occurrence, Mitigation, and Consequences* (Joseph P. Stoltman, John Lidstone, and Lisa M. DeChano (eds). Dordrecht: Kluwer Academic Publishers), pp. 323-340.
18. Slovic, Paul. 1987. "Perception of Risk," *Science*, Volume 236 (4799): 280-285.
19. van Aalst, Maarten K. 2006. "The Impacts of Climate Change on the Risk of Natural Disasters." *Disasters*. 30 (1): 5-18.
20. Wilhite, Donald A. 2004. "Drought." Chapter 7 of *International Perspectives on Natural Disasters: Occurrence, Mitigation, and Consequences* (Joseph P. Stoltman, John Lidstone, and Lisa M. DeChano (eds). Dordrecht: Kluwer Academic Publishers), pp. 147-162.

Note: ***See end of this syllabus for additional library and internet references that may be useful in preparing your Research Project.***

COURSE OBJECTIVES

This senior-level course will utilize lectures, class discussions, demonstrations, and scenario modeling to accomplish the course objectives. These objectives are:

- 1) To review those atmospheric and geologic events that threaten human life and property, emphasizing the physical conditions which accentuate or ameliorate these threats and presenting scientific data concerning the spatial and temporal distribution of these events.
- 2) To demonstrate how human occupation and use of various lands creates hazards and that to understand and mitigate hazards both the physical environment and human behavior must be examined.
- 3) To provide the student with a broad base of planning tools that can be used to mitigate the hazards. These will include programs to educate the public and enhance public awareness, land use planning within hazard zones, structural adjustments, and evacuation procedures.
- 4) To introduce the student to the wide array of published materials and maps that can be used in planning for hazard mitigation and disaster recovery.

This course also addresses a variety of specific assessment goals that were established for the Geography Major. In particular, this course provides the student with:

4. Knowledge and understanding of the links between natural conditions and human activities and of the different ways of creating environments according to different cultural values, ethnic heritage, religious beliefs, socio-economic standings, political systems, and technical development.
8. Skills in using verbal, quantitative and symbolic data in the form of maps, text, photographs, graphs, tables, and diagrams.
10. Skills in using a variety of intellectual skills to explore geographical topics at scales ranging from local to global.
11. Skills in approaching geographic inquiry from the scientific perspective by (1) identification of the research problem and relating it to current knowledge; (2) development of research hypotheses; (3) identification of strategies to collect and to analyze data; and (4) interpretation of the results of these analyses and syntheses, making judgments and developing generalizations.
14. Value of the potential for using geographic knowledge and skills in seeking solutions to local, regional, national, and global problems, and
15. Value the concern that our use of our globe will influence the quality of the environment and human habitat for future generations, noting that these concerns about Global Change should also be viewed from the perspective of non-Western and Third World populations.

COURSE REQUIREMENTS

Course grades for undergraduate credit will be based upon student achievement on two exams, the preparation of a research paper, critical reviews of draft papers, and class participation. Although adjustments might be made in the final grading scale, students who obtain 93% of the points possible are guaranteed an "A", 88% an "AB", 83% a "B", 78% a "BC", 73% a "C", 68% a "CD", and 63% a "D". Graduate students must fulfill all undergraduate requirements plus complete additional graduate assignments.

Exams: Two exams will be given, each counting 20 percent of the course grade. These exams will contain both objective and subjective questions, covering lectures, class discussions and the reading

assignments.

Exam 1 covers all lectures, textbook and outside reading assignments and class discussions from February 4 through March 17.

Exam 2 covers all lectures, textbook and outside reading assignments and class discussions from March 31 through May 12.

Make-up Exams: It is expected that you will take exams at the assigned times. If illness should prevent you from taking an exam, you must notify your professor (phone 424-1217) or the department secretary (phone 424-4105) no later than the next day to explain your absence and schedule a make-up exam. Failure to promptly and adequately explain your absence will result in your receiving a grade of "0" on a missed exam.

New Orleans Disaster: Response Executive Summary and Action Plan: Following Hurricane Katrina, government officials are faced with providing an appropriate response to the destruction in New Orleans. Many government leaders, having numerous duties, lack the time to read the available studies that should guide their actions. Your duty is twofold:

- (1) prepare an executive summary of the historical geography of hazard mitigation within New Orleans, based upon the information provided in Craig Colten's *Unnatural Metropolis*. The summary, of between 800 and 1,000 words, should condense the information that the government decision maker must have when considering what action(s) should be taken to deal with the Hurricane Katrina aftermath in New Orleans, **and**
- (2) prepare a brief suggested plan of action that the Federal, State, or Local government should take now to deal with the destruction of New Orleans. Your suggested action must consider economic, environmental, and political reality, and should be explained in 500 to 750 words.

These typewritten (one side of page, double-spaced) summaries are due in class on Monday, March 17, at which time you should be prepared to verbally discuss and defend your suggested plan of action. Your executive summary and suggested action plan will each count for 10 percent of your course grade.

Research Project: Small groups of students (4 to 6 students) will jointly prepare a report on "The Natural Hazards of Wisconsin." In preparing the "Natural Hazards of Wisconsin" report, students are encouraged to examine Cross's "Natural Hazards within the West Indies," Hewitt and Burton's *The Hazardousness of a Place: A Regional Ecology of Damaging Events*, and Cutter, et al.'s "Revealing the Vulnerability of People and Places," plus chapters 8 – 17 in *International Perspectives on Natural Disasters: Occurrence, Mitigation, and Consequences* (Joseph P. Stoltman, John Lidstone, and Lisa M. DeChano, eds.) (All are on reserve). Each group of students should cooperatively search for appropriate reference materials, however each student is responsible for the preparation of a specific portion of this report. If a group consists of five students, it is suggested that the work be apportioned as follows: (1) tornado and other windstorm hazards, (2) snow, blizzard and frost hazards, (3) flood hazards, (4) drought hazards and (5) geological hazards. Miscellaneous other hazards should be distributed amongst the persons considering the five major listed hazards.

Each student's contribution to the research project should be distinctly identifiable and each student will be evaluated upon the quality of his/her contribution to the project. Your grade will not be influenced by the performance of the other members of your group. Each student's contribution

should average approximately 2,500 words of text and should be accompanied by maps illustrating those areas vulnerable to the hazard(s) being discussed and tables indicating past disaster occurrences. The discussion of vulnerability to the hazard that you select must include a consideration of both the physical dimensions of hazard risk and the social and economic characteristics of Wisconsin's population. Your paper must be well referenced, and you are strongly encouraged to consult a wide variety of sources, including, but not limited to, the *Hazard Analysis for the State of Wisconsin* (<http://emergencymanagement.wi.gov/docview.asp?docid=116>) and the *State of Wisconsin Hazard Mitigation Plan* (see: ftp://doafpt04.doa.state.wi.us/wem/Hazard_Mitigation_Plan/Index.htm), prepared by the Wisconsin Department of Military Affairs.

Students within each group are strongly urged to assist each other in finding appropriate references for their report. Students are encouraged to obtain appropriate reference materials from the Internet (see below), however Internet materials should **not** account for more than one-half of the references or material discussed in your paper. Furthermore, all material from the World Wide Web should be appropriately referenced by providing the complete URL (http) address, plus the name of the website and its sponsor. Although at times newspaper accounts may be helpful in providing background material, you must avoid writing a journalistic human interest story that merely relates the reaction of specific victims or witnesses to the hazard or disaster.

Research groups should form by the end of the second week of the semester and should prepare an outline and a tentative bibliography of potential references, which should be submitted to your instructor by February 18. Groups should schedule a meeting with their instructor during the following week to review their progress, potential references, and allocation of topics among the group members.

Draft copies of the paper should be prepared by **April 7** and submitted to your professor AND all members of your group. Your classmates in your group are responsible for reviewing your draft paper (by **April 21**) to eliminate contradictions among the chapters of your report and to find misspellings, incorrect grammar, and awkward construction. (Although your classmates are responsible for pointing out errors, they are not responsible for rewriting your portion of the paper.) Your final, edited (considering the reviews of your classmates and instructor), double-spaced (one side of paper only) typewritten report is **due in class on Monday, May 5**. Your course grade will be reduced by 1 percent for each calendar day that it is late.

Your "Natural Hazards of Wisconsin" research project counts 30 percent of your course grade. Papers will be evaluated based upon how thoroughly you cover your topic, how well the paper is written, and how well your paper is referenced. Remember that all quotes, statistics, and ideas which are not your own must be referenced. Altogether, quotations should not exceed 10 percent of the length of the paper. While any style of referencing which is described within Turabian's *Guide to Writers of Term Papers and Thesis* is acceptable, you may wish to follow the style used for the Outside Readings on page 2 of this syllabus. Data from the World Wide Web must also be referenced by giving the name and complete URL address of the websites consulted. Such website references should mimic this example:

Wisconsin Emergency Management. 2007. "Current Flood Recovery Information for the Public." (<http://emergencymanagement.wi.gov/section.asp?linkid=1180&locid=18>), website last accessed on January 2, 2008.

Students are reminded that plagiarism is considered an act of academic misconduct that is a violation of Chapter UWS 14 of the Wisconsin Administrative Code and will result in your failure in this course. (The College has recently purchased a license to the Turn-It-In software, and papers may be checked. For this reason, all students need to submit both a paper copy of their project plus an electronic copy of the text.)

Your review of the materials prepared by the other students within your group counts 10 percent of your course grade. Your review will be evaluated based upon how thoroughly you critique the content, grammar, and spelling of the materials prepared by your classmates. Because it is essential that you complete and return your reviews in a timely fashion so that your classmates can incorporate your corrections in their final drafts, your course grade will be reduced by 1 percent for each calendar day that any of them are late. Reviews are to be submitted to your professor who will redistribute them to the members in your group. You should not place your name on the materials that you are reviewing, but instead place your name on a cover sheet.

Extra Graduate Student Assignment: Graduate students enrolled in this course, in addition to the preparation of the research paper required of all students within this class, must prepare either a 2,000 word teaching plan for instructing their students about the impact of various natural hazards in Wisconsin **or** a 2,000 word emergency preparedness plan for the University of Wisconsin-Oshkosh.

- (1) The teaching plan should review the types of hazards found in Wisconsin, discuss their spatial distribution, and examine the role of these hazards in the lives of the state's residents, indicating how residents respond (or should respond) to these threats. In the development of your teaching plan, graduate students should identify various sources of information useful for the level of students who they will teach (or are teaching), **OR**
- (2) The emergency preparedness plan should include a critique of any existing emergency preparedness policies for the university and should attempt to provide appropriate policy guidelines in those areas that the existing policies are lacking. Furthermore, your emergency preparedness plan should review any existing policies to determine whether they are appropriate, given the various types of natural and technological threats which might threaten the university, its students and faculty, and its operations.

Whichever plan you prepare is due May 5 and will count 20 percent of the graduate student's grade. The points on the other assignments will be proportionally adjusted such that they collectively account for 80 percent of the grade for graduate students.

Graduate students are also responsible for reading both the regular reading assignments and all of Tobin and Montz's *Natural Hazards* (copy on reserve in Polk Library).

Class Participation: Students are expected to regularly contribute to class discussions concerning the text assignments and outside readings. Active participation also requires that the student regularly attends class and that all reading assignments are read in a timely fashion. Class participation will be considered in determining the grade for any student in a borderline situation.

Tape Recording: Students may make tape recordings of lectures only under the following conditions: (1) the recording will be used only by the student making the recording, another student within the class, or the student's tutor; (2) the recording will be erased within two weeks of the time

the lecture was recorded; and (3) the recording is done in a manner which is not disruptive to the instructor or other students within the class. Any other use of the recordings is prohibited and will be considered a violation of university regulations.

Office Hours: Office hours are maintained during which you may seek assistance with the course material. All students are encouraged to discuss their research paper topics with their professor. I am typically in my office on Monday, Tuesday, Thursday, and Friday mornings, plus most afternoons (but please do NOT try to see me during the hour immediately before class). Because of the unpredictable nature of administrative duties, students are encouraged to call (424-1217) before coming to my office or to make an appointment. My e-mail address is: cross@uwosh.edu

ADDITIONAL REFERENCE BOOKS

Additional books have been placed on reserve in the Polk Resource Center. These include:

- Alexander, David E. 1993. *Natural Disasters*. New York: Chapman & Hall. GB5014 .A4513
- Alexander, David E. 2000. *Confronting catastrophe: new perspectives on natural disasters*. New York: Oxford University Press. GB5014 .A46
- Bryant, Edward A., 1991. *Natural Hazards*. New York: Cambridge University Press. GB5014 .B79
- Hays, Walter, W., 1981. *Facing Geologic and Hydrologic Hazards: Earth-Science Considerations*. (U.S. Geological Survey Professional Paper 1240-B). Washington: Government Printing Office. I 19.16:1240-B
- Hewitt, Kenneth and Ian Burton, 1971. *The Hazardousness of a Place: A Regional Ecology of Damaging Events*. Toronto: University of Toronto Press. GF85 .H4
- Majumdar, Shyamal K, Gregory S. Forbes, E. Willard Miller, and Robert F. Schmelz (editors), 1992. *Natural and Technological Disasters: Causes, Effects and Preventive Measures*. Easton: Pennsylvania Academy of Science. GB5005 .N37
- Mileti, Dennis S. 1999. *Disasters by design: a reassessment of natural hazards in the United States*. Washington: Joseph Henry Press HV551.3 .M55
- Monmonier, Mark. 1997. *Cartographies of Danger: Mapping Hazards in America*. Chicago: University of Chicago Press. GB5014 .M66
- Stoltman, Joseph P., John Lidstone, and Lisa M. DeChano (eds). 2004. *International Perspectives on Natural Disasters: Occurrence, Mitigation, and Consequences*. Dordrecht: Kluwer Academic Publishers.
- Tierney, Kathleen J., Michael K. Lindell, Ronald W. Perry (eds.). 2001. *Facing the unexpected : disaster preparedness and response in the United States*. Washington: Joseph Henry Press HV551.3 .T54
- Tobin, Graham A. and Burrell Montz. 1997. *Natural hazards: explanation and integration*. New York: Guilford Press. GB5014 .T63
- White, Gilbert F. (editor), 1974. *Natural Hazards: Local, National, Global*. New York: Oxford University Press. GB70 .W45

SUGGESTED INTERNET WEBSITES

Numerous websites have been established which convey current hazard and disaster information. You may find the following sites of particular interest. Although the web addresses

were correct when checked in January 2008, changes may occur.

Best Sites for All-Hazard Information

- University of Colorado Natural Hazards Center
<http://www.colorado.edu/hazards/>
- U.S. Geological Survey Hazards Website
<http://www.usgs.gov/themes/hazard.html>
- Federal Emergency Management Agency Homepage
<http://www.fema.gov/>
- NASA'S Goddard Space Flight Center's Disaster Finder
<http://disasterfinder.gsfc.nasa.gov/>
- Wisconsin Emergency Management (Department of Military Affairs)
<http://emergencymanagement.wi.gov/>

Numerous additional websites exist, and it is recommended that you refer to the article by Cross and Makido (2004), "Natural Hazards and Disaster Information on the Internet," that has been placed on reserve for information about and web addresses for some of the most useful sites that deal with specific hazards.