

Syllabus
GEOGRAPHY 597.02: Integrated Earth Systems: Confronting Global Change
WINTER, 2006

Lecture: Derby Hall 1080: 8:30 - 9:48 a.m.: Tuesday and Thursday

Recitation: Derby Hall 140 (in basement): Wednesday (10:30 - 11:48 am)

Professor: Dr. Ellen Mosley-Thompson (thompson.4@osu.edu)

Office: Derby Hall 1140; Telephone: 292-6662 or 292-2580

Office Hours: Tuesday and Thursday: 10:15 to noon or by appointment

Graduate Teaching Assistant: Joseph Lewis

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Office hours: Tuesday: 1:00 to 3:00 pm; Wednesday 8:30 am to 10:30 am; or by appointment

Course Objectives: This course is taught in a lecture / recitation format and is designed to provide a basic understanding of both natural and anthropogenic (human produced) climate change. You will explore the key issues surrounding 20th century climate change (including global warming and sea level rise) and the role of human activities in shaping the physical, chemical and biological characteristics of the environment that sustains life on Earth. Lectures will provide an introduction to the mechanisms that control the Earth's climate regimes, basics of ecosystems interactions, and actions to help ensure sustainable supplies of water, energy, clean air, soils and food for the Earth's growing population. A key objective is to provide you with the knowledge base and skills to critically evaluate information you read or hear concerning climate change, global warming and related environmental issues.

Textbook and Recitation Materials (required): Note this text was used in 2005 so you may be able to find it used.

(1) *Sustaining the Earth*, G.T. Miller, Jr. Wadsworth Publishers, 2005 (7th Edition)

(2) The lecture syllabus, the recitation syllabus, your recitation exercises, computer tutorials and additional required reference materials will be available at the appropriate time on the class web page. You merely visit the class web page and print them at your convenience. I suggest that you bookmark the class web page in your internet browser. The class web address is <http://geog-www.sbs.ohio-state.edu/courses/G597.02/> If you have trouble getting to the web page by typing this in - log into the Geography Dept. web page [www.geography.ohio-state.edu] and from here click onto the classes and then on 597.02. Throughout the quarter additional reading and reference materials may be required. **ALL** reference materials (unless otherwise noted) will be placed on closed reserve in the **Geology Library in Orton Hall** [the building with the bell tower on the south side the Oval]. They will be filed under Geography 597.02.

Please Note: To be allowed to make up work or tests you **must** have a written note from your physician. Quizzes **WILL NOT** be available for makeup as they are given impromptu and answers are posted on the class web page virtually immediately. The lowest quiz score will be dropped so you can miss one quiz without affecting your grade.

Important additional resources for this class:

1) <http://www.brookscole.com/biology/member/student/sustaineearth/index.html>. This web site offers tutorials, quizzes, etc. for your text book and best of all it is free.

2) Info Trac - this is a free online library available to you for 4 months after you activate it with the information provided with your textbook. Info Trac links you to many scientific articles related to the topics that you will cover in the textbook. To activate your account log into <http://www.infotrac-college.com> and enter your passcode (you received this with your book). I noticed that some of the publications are dated (meaning more than 2 years old). In climate change studies, our knowledge advances so rapidly that a 2 year-old publication could be obsolete. I will attempt to include links on the class web page to a few key papers in the peer-reviewed literature on the topics we will be covering throughout the quarter.

Weekly topics and reading assignments:

Week 1: January 3 (Tues) **Topic 1:** Key environmental issues facing us in the 21st Century: An overview. Key questions to be addressed include: What are Global Climate and Environmental Change (GCEC)? What is up with all the talk about global warming, climate change, stratospheric ozone depletion, and rising sea levels? In this course you will explore the many processes that are changing your environment. You will learn about other disruptions in the Earth system and consider why human resource usage is a critical driver of climate, social, political and economic changes. **Assigned Reading:** Pages 1-4, Chapter 1 (all), Chapter 2 (pp. 15-24)

Week 1: January 5 (Thurs) and **Week 2:** January 10 (Tues) and 12 (Thurs) **Topic 2:** The Earth as a System; Key questions to be addressed include: What has been the Earth's climate history? How does the Earth system work? How does the Earth stay warm? What is the natural Greenhouse Effect (GHE)? What is the enhanced Greenhouse Effect? What is the role of human activity in the enhancement of the GHE? **Assigned Reading:** Chapter 12 (pp. 253-269) Also: The Chapter entitled "Solar and Terrestrial Radiation" in the book "*The Atmosphere*" by Lutgens and Tarbuck that is on reserve in the Geology Library (Orton Hall). Three copies are available there. I also strongly recommend that you review the Chapter entitled "Global circulation" in Edition 5 and "Circulation of the Atmosphere" in Edition 6 of the same book. This augments the chapter on climate in your text that is deficient in some important concepts. The discussion of the Earth's climate history relies heavily on information from the lecture.

Week 3: January 17 (Tues) and 19 (Thurs); **Topic 3:** Earth's Ecosystems: The Basics. Key questions to be addressed include: What are ecosystems? How do they function? What practical lessons can we learn from studying ecosystems? What is their role in the carbon cycle? **Assigned Reading:** Chapter 2 (pp. 24 – 35; 38-45); Chapter 3 (all)

Week 4: January 24 (Tues) and 26 (Thurs); **Topic 3:** Earth's Ecosystems (continued): Ecosystems on Land and in the Water; **Assigned Reading:** Chapter 4 (all)

Week 5: Jan 31 (Tues); **Topic 4:** Deforestation and Loss of Biodiversity; sustaining biodiversity, comparing ecosystem and species approaches. Key questions to be addressed include: How do species interact within ecosystems and how do ecosystems change over time?

Why are terrestrial and aquatic ecosystems important and vulnerable?

Assigned Reading: Chapter 6 (all); Chapter 7 (pp. 126-139)

Week 5: Thursday (Feb. 2): **Mid-Term examination: bring pencil, eraser**

Week 6: February 7 (Tues) and 9 (Thurs) **Topic 5:** Human population and dynamics. Critical questions to be addressed include: Why is it important to understand population dynamics and human population growth? What are the basic characteristics of all populations? What dynamics drive human population growth and decline? **Assigned Reading:** Chapter 5 (all)

Week 7: February 14 (Tues) and 16 (Thurs) **Topic 6:** Energy for Planet Earth. Questions to be addressed include: What are the primary renewable and non-renewable Earth resources? Why is their allocation and use so important? Can we use resources more efficiently? How?

Assigned Reading: Chapter 10 (all)

Week 8: February 21 (Tues) and 23 (Thurs); **Topic 7:** Water for Planet Earth. Questions to be addressed include: Have you considered the quality of the water you drink? What is the hydrologic cycle? How is water distributed and used? **Assigned Reading:** Chapter 9 (all)

Week 9: Feb 28 (Tues) **Topic 8:** **Topic 8:** The Air You Breathe. Questions to be addressed include: What is the quality of the air you breathe? What are the health effects from air pollution? **Assigned Reading:** Chapter 12 (pp. 273-286)

Week 9: March 2 (Thurs) and **Week 10:** March 7 (Tues); **Topic 9:** Food and Soil. Questions to be addressed include: How are we going to feed the growing world population? How severe is the degradation of the Earth's soils? Is the use of pesticides creating a problem? What will be the long-term impact upon the ability of the Earth to feed its growing population? **Assigned Reading:** Chapter 8 (all) and Chapter 2 (section 2-5; pp. 35-38)

Week 10: March 9 (Thurs) **Topic 10:** Sustaining your environment. Questions to be addressed include: How can economies grow without depleting critical resources? What is the Kyoto Protocol and is it important? What are the different world views and are they sustainable? What is sustainability? Does it mean the same thing to everyone? Can it be achieved? How can you as an individual make a difference? **Assigned Reading:** Chapter 14 (all)

Final examination: Tuesday: Mar 14 from 7:30 to 9:18 a.m. in Derby 1080

Grading:

Mid-term exam: 25%

Recitation exercises: 25%

Final exam: 25%

Final Project: 15%

Quizzes: 5%

There will be 6 to 8 impromptu quizzes; some will be at the beginning of lecture, some at the beginning of recitation (so be on time). There is no makeup for the quizzes.

Participation: 5%

Attendance will be taken by Mr. Lewis. You are allowed 2 unexcused absences from either lecture or recitation; after that you will lose participation points for each unexcused absence from class.

NOTE: Throughout the quarter there may be a few special lectures to attend for "extra quiz credit."

There will be a **Final Project**. This will be due before the end of the quarter and more details will be forthcoming during the recitation session in the second week of classes.

Additional Class Materials:

Additional materials will be placed on reserve throughout the quarter. The list of these will be maintained on the class web page under Reserve Materials. All materials (unless otherwise indicated) are on closed reserve in the ***Geology Library in Orton Hall*** [the building with the bell tower on the south side the Oval]. All materials will be filed under Geography G597.02 unless otherwise indicated. Other class related materials will be made available at the appropriate time, either from the class web page or in a binder that will be placed on reserve in Orton Library. Some material will be made available by electronic reserves. You will be informed in class and by email regarding the location of any ancillary class materials.

An Important Note about Plagiarism and Academic Misconduct:

Plagiarism and other forms of cheating will not be tolerated. Please see the Code of Student Conduct (http://studentaffairs.osu.edu/resource_csc.asp). University rules provide severe penalties for academic misconduct, ranging from course failure to dismissal from the university. University rules are found in the handbook used in all survey courses: "University Survey - A Guidebook and Readings for New Students." Any questions about this policy, or your grade, should be brought directly to the attention of Dr. EMT.

Students with Disabilities and Special Needs:

Any student needing special accommodation on the basis of any disability must advise the instructor at the beginning of class. All necessary accommodations will be made upon presentation of relevant certification, presented in a timely manner. Students are also responsible for making contact with the Office for Disability Services at 292-3307, 150 Pomerene Hall, prior to or at the beginning of the quarter.

I look forward to working with you as a group and individually as you learn more about your environment and the Earth's climate system - past, present and future.