

COURSE SYLLABUS

HON 1360

Planet Earth

Fall 2008

Lecture: MWF 1:30—2:20

Professor: Tony Lowry (Department of Geology)
• Geology Bldg Room 106 (Phone: 797-7096)
• Email: Tony.Lowry@usu.edu
• Office Hours: 2:30—4:00pm MWF (or by appt)
UTF: Heather Johnson

COURSE DESCRIPTION

Hurricane. Earthquake. Tsunami. Volcanic eruption. Energy crisis. Environmental damage. Water wars. Global warming. These topics show up in the news headlines on any given day, and not surprisingly: In the 21st century, as global population grows and the global economy becomes ever more interdependent, natural disasters, resource limitations and processes of global change will pose some of our greatest challenges.

Many of these issues are tough nuts to crack, not only from a policy standpoint (where conflicting pressures from special interests often hold more sway than scientific findings) but also from the perspective of science itself. The processes underlying these problems are complicated interactions between realms that, traditionally, have been studied piecemeal in separate disciplines of physics, biology, geology, hydrology, meteorology and social science. There is growing recognition however that to inform policy-makers requires both a measure of community consensus and a more wholistic treatment of problems.

This class will introduce the multidisciplinary study of “Earth System Science”, which seeks to put these puzzle pieces together and arrive at a better understanding of our planet. Toward this we will:

- Explore components of the Earth system: solid Earth, atmosphere, hydrosphere, cryosphere and biosphere. Here we focus on understanding composition and structure of each, and the mass/energy flux between.
- Examine the dominant processes and cycles in each component.
- Think critically about what science is and how it is done, and how best to use scientific knowledge to optimize our future choices.
- Develop research skills and examine real data that point to the nature of earthquakes and rates of global change. Students will form teams and use a mix of data sources to evaluate and discuss what these natural (or anthropogenic) processes may mean for the future.
- More deeply examine topics related to Earth Systems when they grab news headlines.

NOTE: The attached schedule may look rigid, but we probably will deviate from this. If you have questions during class, we will answer them, and if this leads to more questions, we can pursue a topic more deeply. The schedule is meant to be flexible!

About the professor:

I am a geophysicist (“Physics of the Earth”) who focuses on measuring and understanding how and why planets deform. On Earth, this relates directly to processes of fault slip, earthquakes and volcanoes, but also has implications for mass transfer in the atmosphere, hydrosphere and cryosphere.

Course Text (Required):

The Good Earth: Introduction to Earth Science, (McConnell, Steer, Knight, Owens and Park). We will also read materials from other sources including newspapers, websites and journal articles.

SCHEDULE

Date	Topic	Reading	Due Dates
25 Aug	Orientation to class and to science		
27 Aug	Intro to Earth System Science	1-27	
29 Aug	The Earth and Solar System	30-44	
1 Sep	(No class– Labor Day)		
3 Sep	Earth's Energy Sources; The Sun; How solar radiation is created and transmitted	44-51	
5 Sep	The solid Earth– Earth structure and how we know it	51-52	
8 Sep	Near Earth Objects	59-79	
10 Sep	Tectonics– Basics of the tectonic cycle Plate motions and their consequences	82-109	
12 Sep	Tectonics and Earthquakes	111-142	
15 Sep	Tectonics and Volcanism	145-171	Exercise 1
17 Sep	Tectonics and Mountains	171-180	
19 Sep	The Rock Cycle (No class– Prof out of town)	181-211	
22 Sep	Sedimentary processes and time	213-241	
24 Sep	Weathering and soils	243-271	
26 Sep	Landslides & slope failure	274-289	
29 Oct	Rivers and Flooding	291-319	
1 Oct	The Earth's Hydrosphere: Getting at the budget	321-349	
3 Oct	The Cryosphere: Snow and Ice		
6 Oct	Quiz I		
8 Oct	The Carbon Cycle	495-501	
10 Oct	Oceans: Structure and Composition	351-363	
13 Oct	Solar Radiation revisited	394-399	
15 Oct	Ocean Circulation	364-370	
16 Oct	Temperature, Water and Pressure in the Atmosphere	389-394, 400-407	Exercise 2
17 Oct	(no class– Fall Break)		
20 Oct	Stability and vertical motion (relationship to clouds)	407-411	
22 Oct	Wind (pressure gradients, coriolis)	411-417	
24 Oct	General Circulation	419-432	

Date	Topic	Reading	Due Dates
27 Oct	Climate (Natural changes and causes of change)	451-485	Project Proposal
29 Oct	The Ocean-Atmosphere Link		
31 Oct	Life on Earth		
3 Nov	How Life Developed		
5 Nov	Quiz II		
7 Nov	(No class- Prof out of town)		
10 Nov	Life Development		
12 Nov	Climate regulation feedbacks and evolution of life		Exercise 3
14 Nov	Evolution of Life through Time		
17 Nov	Short-term Climate Variation		
19 Nov	Global Change	501-511	
21 Nov	Global Change		
24 Nov	Energy and Our Future		
26 Nov	(Thanksgiving Break)		
28 Nov	(Thanksgiving Break)		
1 Dec	(TBA)		
3 Dec	(Possibly no class)		
5 Dec	(TBA)		Course Project
10 Dec	Final Exam 11:30-1:20		

Web materials (incl. ppt's, course announcements, assignments) will be available at <http://anquetil.colorado.edu/~arlowry/Honors1360/index.html>

Field Trip: Optional but it's worth it! **Many past students who have attended the field trip consider it their favorite/most memorable experience from the class.** A Saturday that we choose...

Grading:

Quizzes	2 quizzes @ 100 pts each	200 pts
Exercises	3 @ 50 pts each	150 pts
Final Exam		200 pts
Project Proposal		10 pts
Research Paper		200 pts
Total		760 pts

My Late Policy: All assignments are due at the beginning of class (1:30 pm sharp!) on the date assigned. I will subtract 10% from points assigned for each 24-hour period after that.

Notice to veterans and students with disabilities: Students with ADA-documented physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations. Veterans may also be eligible for services. All accommodations are coordinated through the Disability Resource Center (DRC) in Room 101 of the University Inn, (435) 797-2444 voice, (435) 797-0740 TTY, or toll free at 1-800-259-2966. Please contact the DRC as early in the semester as possible. Alternate format materials

(Braille, large print or digital) may be made available with advance notice.

Some very important classroom guidelines.

As a courtesy to your fellow classmates and professor, PLEASE accept the following guidelines for class behavior:

1. During classes, exams or other class meetings, all electronic communication devices (cell phones, pagers, etc.) should either be turned off or in silent mode. Calls, pages, IM's, text messages, etc should never be answered in class by anyone, including the instructor. Exceptions may be made in an emergency or other unusual circumstance (in which case arrangements should be made in advance with the instructor).
2. PLEASE no cell phone photography during class.
3. Please do not surf the web on your laptop or phone during class. This can be VERY distracting to other students sitting nearby.
4. Electronic devices may only be used to record a lecture, presentation, interview or similar activity with prior permission of the individual being recorded, and should be done only for educational purposes. This permission does not extend to others who may be present - that is, I cannot grant permission on behalf of all the students in the class. Nor does my permission extend to TA's or guest lecturers.
5. Posting of audio, video, or still images from the class on any internet system, such as Youtube, Myspace, etc., is prohibited. Doing this may violate privacy and copyright law.

Notice: Students must be officially registered for this course. No assignments or tests of any kind will be graded for students whose names do not appear on the class list.

Other important university administrative dates:

Aug 31 - last day to add w/o signature of instructor

Sept 15 Last day to add classes; Last day to drop w/o notation (after this date, W is the course notation)

Nov 14 onward - No drops allowed

Dec 1-5 No test week