2015

ESCI-151-52 Earth, Environment, and Humanity

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EARTH, ENVIRONMENT, AND HUMANITY

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Books: Merritts et al., Environmental Geology, 2nd edition
McPhee, The Control of Nature

Course Description: Catastrophic events such as hurricanes and tsunamis and the specter of global climate change affirm the centrality of Earth Science in a well-rounded liberal arts education. This course explores three intertwined questions: 1) How do Earth's different systems (lithosphere, hydrosphere, atmosphere, biosphere) function and interact to create the environment we live in? 2) What are the causes of, and how can we protect ourselves from, geologic hazards such as earthquakes, flooding, and landslides? 3) How are human activities modifying the environment through changes to the composition of the atmosphere, biogeochemical cycles, and soil erosion, among other factors? While serving as an introduction to the Earth Science major, this course emphasizes those aspects of the science that everyone should know to make informed decisions, such as where and where not to buy a house, whether to support the construction of an underground nuclear waste repository, and how to live more lightly upon the Earth. Because this course fulfills the quantitative analysis requirement, most lab exercises allow students to brush up on their math skills in addition to polishing their writing. All work involving math will be approached from the ground up in a thoroughly encouraging, non-threatening environment.

DATE	DAY	CLASS	READINGS	LAB
1/28	Wednesday	Intro to Earth System Science and each other	Chp. 1	
1/30	Friday	Lithosphere: Plate Tectonics	35 - 48	
1/30	Friday			Discovering Plate Boundaries
2/4	Wednesday	Lithosphere: Plate Tectonics, Earthquakes	48 - 58, 61 - 68	
2/6	Friday	Lithosphere: Earthquakes continued	68 - 89	
2/6	Friday			Plate Tectonics - Geoworld
2/11	Wednesday	Lithosphere: Matter and Minerals	93 - 103	
2/13	Friday	Lithosphere: Metamorphic and Igneous Rocks	103 - 106, 111 - 113	
2/13	Friday			Earthquakes and Seismology
2/18	Wednesday	Lithosphere: Sedimentary Rocks	107 - 111, 113 - 133	
2/20	Friday	Lithosphere: Volcanoes	139 - 149, McPhee - Cooling the Lava	
2/20	Friday			Minerals, Ig. & Met. Rocks
2/25	Wednesday	Lithosphere: Volcanic disasters	149 - 163	
2/27	Friday	Geologic Time – relative dating	167 - 175	
2/27	Friday			Sed. Rocks
3/4	Wednesday	Geologic Time continued – absolute dating	175 - 187	
3/6	Friday	Pedosphere: Soils - weathering processes	skim Chp. 7, particularly 195 - 199, 227 - 242	
3/6	Friday			GIS Lab - Geologic Time

3/11	Wednesday	Pedosphere: Soils - profiles, erosion, conservation	242 - 257	
3/13	Friday	Mid-term		
3/13	Friday			Extended time to finish midterm

SPRING BREAK, 3/15 - 3/29, HAPPY VACATION!

4/1	Wednesday	Pedosphere: Mass wasting	257 - 263, McPhee - Los Angeles Against the Mountains	
4/3	Friday	Hydropshere: Watersheds and streams	269 - 284	
4/3	Friday			Angle of repose
4/8	Wednesday	Hydropshere: Floods and human controls	284 - 295, 301 - 302, McPhee – Atchafalaya	
4/10	Friday	Hydrosphere: Ground Water	321 - 342	
4/10	Friday			**Casperkill stream flow**
4/15	Wednesday	Hydrosphere: Ground Water continued	342 - 355	
4/17	Friday	Atmosphere: Structure and Properties	359 - 369	
4/17	Friday			**Groundwater flow**
4/22	Wednesday	Atmosphere: Circulation and Environmental Issues	369 - 383, 390 - 400	
4/24	Friday	Oceans: Properties and Circulation	405 - 424	
4/24	Friday		386 - 390	GIS Lab – Hurricanes
4/29	Wednesday	Oceans: Coastal Issues	424 - 450	
4/29	Friday	Climate Change: Causes	521 - 541	
5/1	Friday			Tree ring analysis
5/6	Wednesday	Climate Change: Ways of Knowing	541 - 556	
5/8	Friday	Global Environmental Change	Chp. 15	
5/8	Friday			**Shawangunk Ridge fieldtrip**

GRADING

1 semester exam worth 20%
1 final worth 20%
10 labs worth 4-6% each for a total of 50%

Choice of one short reaction paper from the following topics (paper worth 10%): Prediction of natural hazards and the political problems associated with prediction, massive human modification of the landscape to allow habitation in desirable locations (LA against the mountains by McPhee), and pros and cons of the US Army Corps of Engineers work on the Mississippi River (Atchafalaya by McPhee). Each reaction paper will be due 2 weeks after the topic has been covered in class. The approximate dates the assignments will be given are as follows: 10/2 -

geologic hazard prediction, 10/30 - human modification of the landscape, 11/6 - Army Corps of Engineers work on Mississippi and other streams.

The following language concerning grading criteria comes from the Vassar catalog:
A indicates achievement of distinction. It involves conspicuous excellence in several aspects of the work.

B indicates general achievement of a high order. It also involves excellence in some aspects of the work, such as the following: Completeness and accuracy of knowledge, sustained and effective use of knowledge, independence of work, and originality

C indicates the acceptable standard for graduation from Vassar College. It involves in each course such work as may fairly be expected of any Vassar student of normal ability who gives to the course a reasonable amount of time, effort, and attention. Such acceptable attainment should include the following factors: familiarity with the content of the course, familiarity with the methods of study of the course, evidence of growth in actual use both of content and method, full participation in the work of the class, evidence of an open, active, and discriminating mind, and ability to express oneself in intelligible English

C–, **D+**, and **D** indicate degrees of unsatisfactory work, below standard grade. They signify work which in one or more important respects falls below the minimum acceptable standard for graduation, but which is of sufficient quality and quantity to be counted in the units required for graduation.

Work evaluated as **F** may not be counted toward the degree.

A NOTE ABOUT MY GRADING OF WRITTEN WORK:

When grading writing, whether essays or answers to questions on problem sets, I make a lot of comments on grammar and style in addition to content. I have a repressed copy editor living inside my body and your writing assignments will probably be returned to you covered in ink regardless of whether your final grade is a C- or an A+. I simply can't help myself! Please do not take it personally or think that I don't like you when you get a paper back full of comments. One of the most important skills you can take away from Vassar is the ability to write well, and as your professor, it is my job to help you hone a clear and engaging style to go along with your argument.

LATE POLICY

Labs are due at the end of the following week's lab period unless otherwise noted. Each student will be allowed to hand in 3 labs 1 day late without penalty. If labs are more than 1 day late, 2% of the final grade will be deducted for each day the assignment is overdue.

ACADEMIC ACCOMMODATIONS

Academic accommodations are available for students registered with the Office for Accessibility and Educational Opportunity. Students in need of ADA/504 accommodations should schedule an appointment with me early in the semester to discuss any accommodations for this course that have been approved by the Office for Accessibility and Educational Opportunity, as indicated in your AEO accommodation letter.

SUSTAINABILITY POLICY

Students are welcome to submit papers and lab write-ups on recycled paper or to use double-sided printing.