ENVIRONMENTAL DISASTERS
Tuesday Thursday (11:30-12:50)
Fall 2011; 62:460:215:01 Hill 108

Instructor: Dr. Adam Kustka; kustka@andromeda.rutgers.edu

Required materials:

- I-clicker (coupon included with textbook when purchased from bookstore).
- Environment: The Science Behind the Stories, 4th Edition. Withgott and Brennan. ISBN: 0321712730.
- Collapse: How Societies Choose to Fail or Succeed: Revised Edition by Jared Diamond. Publisher: Viking Penguin. 2011. ISBN: 0143117009
- Make sure the University has your correct email address for Blackboard.

Overview of Course: "Environmental Disasters" has an ominous name, and might conjure up images of exploding nuclear reactors, wrecked oil tankers, and massive fish kills. While these "acute" environmental disasters will be discussed throughout the course, much attention will also be given towards disasters that are less obvious, yet significant, in day-to-day life. Throughout the course, we return to two central points in order to put these disasters in perspective. First, environmental disasters are not just a consequence of the so-called "Industrial Revolution" since the late 18th century, (although the scale of many of these has increased dramatically). Second, we will often address whether these disasters could have been or could be avoided, how they could be avoided, as well as the physical, chemical, geological and social factors that thwart or promote this avoidance. There are modern-day success stories, in our backyard here in NJ and around the world. Thus, we can learn from disasters that have come to full fruition during our lifetimes, over the last several hundred years, and from ancient times as well as from would-be disasters that have been averted or minimized.

Learning Objectives:

- Achieve an introductory level of environmental literacy.
- Understand the scientific method and how it is applied towards better understanding environmental issues.
- Achieve the ability to interpret scientific data - pertaining to environmental issues – presented in graphical form.
- Understand the interaction between environmental science and non-science aspects that influence environmental decision making.

Course Notes:

1) There are two books for this class. The amount of required reading is indicated in the syllabus, averaging about 15 pages per class except when viewing movies in class. The book I've chosen this year is a dramatic improvement and I've been able to assign much less reading to convey the same information. The second book, "Collapse", runs about $10 and does a great job at discussing interactions between people (past and present) and their environment without being overly technical.

2) Class participation will be gauged by correct answers to in-lecture questions via I-Clicker. There should have been an I-Clicker discount coupon with your textbook if it was purchased from the bookstores. We will start using this on the 15 September lecture. Attendance and participation are worth 25% of your grade and will be gauged by way of I-clicker responses. Participation is worth 19% of your grade (reading assigned materials before class will all but guarantee a high score), while attendance alone yields 6%. (Note that absence yields zeros for both attendance & participation during a given class). You must attend class with your clicker to receive attendance credit.

3) There will be two hourly exams and one final exam; each of these is worth 25% of your grade for a total of 75% of your grade. You must arrive on time for these exams. Please bring both your i-clicker and a number two pencil to each exam.

4) Handouts will be used during class and should always be brought with you.

5) Office Hours: Tuesday 3:00-5:00, Smith 140A; by prior arrangement.

6) Please turn off or silence cell phones, and do not text during class. Phone/text use during exams or quizzes is prohibited. Hourly exams and the Final Exam are closed book, closed note. The University academic integrity policy will be enforced.

Environmental Disasters schedule and required readings, Fall 2011.

Tuesday Thursday Section

Date	Class Number	Topic	Readings from Withgott or Diamond (♦) before class.
1-Sep-11	1	Course approach and overview. The scientific method. Environmental Science versus Environmentalism.	18 pages from Withgott. Chapter 1
6-Sep-11	2	Chemical principles of life and the environment	10 pages from Withgott. Chapter 2: Chemistry, Energy and Life stopping at bottom of page 33.
13-Sep-11	3	Environmental Economics	13 pages from Withgott: Chapter 6: Start at "Economics-approaches and environmental implications on p. 146. Skip pp. 158-159. Skip the boxed Science Behind the Stories on pp. 152-153.
15-Sep-11	4	Legal aspects of Environmental Science in the US; pivotal events and environmental disasters that prompted the environmental movement.	18 pages from Withgott. Chapter 7: Environmental Policy. Start at p. 168 under "Environmental Policy: An introduction" and continue to bottom of page 177. Then, jump to "Approaches to Environmental Policy" on page 178 and continue to middle of page 185".
20-Sep-11	5	Earth system; flow of energy and materials.	10 pages from Withgott. Chapter 5: Environmental Systems and Ecosystem Ecology stopping at "Ecosystems interact spatially" on p. 118.
22-Sep-11	6	Air and Air Pollution: fundamentals, acid rain, smog, the role of coal, Pb (lead) profiles, Bhopal ; Indoor air pollution.	17 pages from Withgott. Chapter 17: Atmospheric Science and Air Pollution. (skip SBTS on p. 480-481 and on pp. 484-485). Skip "Large scale circulation systems produce global climate patterns" on p. 466 and resume at "We create outdoor air pollution" on p. 469. Stop at Many VOCs pollute indoor air on p. 488.
27-Sep-11	7	Water supplies and collapse of civilizations	20 pages of Collapse & 16 pages from Withgott. ♦Anasazi (Chapter 4). From Withgott Chapter 15:] Skip sub-sections starting with "Rivers", "Lakes", "Wetlands". Resume at "Groundwater" Stop at "Freshwater Pollution" p. 420.
29-Sep-11	8	Water contamination, pollution, treatment: Minimata Bay, Ocean Dumping, Hudson River PCBs; Oil spills.	6 pages from Withgott. Chapter 15: Start at "Freshwater Pollution" (p. 420) and stop at "We treat our drinking water".
4-Oct-11	9	Soils: Properties, fertility, erosion. Contamination and remediation.	20 pages from Withgott. Chapter 9: Soil. Stop at "Agricultural Policy" on p. 245.
6-Oct-11	Exam # 1	Covers lectures 1-8 and assigned readings.	
11-Oct-11	11	Resource use; deforestation - soil - water interactions.	♦Big business (Intro and Forestry; pp. 441-442; 468-479); additional readings TBA.
13-Oct-11	12	Where we live affects our environmental footprint.	Chapter 13: Urbanization (pages TBA)
18-Oct-11	13	Agriculture and genetically modified organisms.	Chapter 10: Agriculture, biotechnology. Stop at "Raising Animals.." on p. 267.
20-Oct-11	14	Agriculture, continued	Movie on agricultural & question sheet / study guide.
25-Oct-11	15	Sustainable Agriculture, energy and meat.	Chapter 10: Agriculture & biotech.(pp. 267-end); ♦Tikopia (pp. 289-293); Grass Fed Beef (posted on Bb)
27-Oct-11	16	Biofuels	6 pages from Withgott & 10 pages from Diamond. ♦New Guinea (pp 277-286); Chapter 20 starting at Bioenergy (p. 576) and stopping at Hydroelectric (p. 583).
1-Nov-	17	Fossil fuels: An energy crisis or old hype?	19 pages from Withgott. Chapter 19: Fossil Fuels. Start p. 531 "Sources of Energy". Skip SBTS boxes on pp. 542-543, 550-551

3-Nov-11	18	Oil movie	Movie: Crude Awakening & Movie question sheet / study guide.
8-Nov-11	19	The nuclear alternative; radioactivity and radioactive waste	12 pages from Withgott. Chapter 20: Conventional Energy Alternatives. Stop at "Bioenergy" on p. 576. Skip SBTS pp. 568-569, 572-573.
10-Nov-11	20	New technologies.	Movie: Environmental Technologies I & Movie question sheet. Chapter 21: New Renewable Energy Alternatives.
15-Nov-11	Exam # 2	Covers Lectures 9-20 and assigned readings.	
17-Nov-11	22	Fisheries and fishing; toxic phytoplankton	16 pages of Withgott and 5 pages of Diamond. Chapter 16 Skip "Marine Coastal Ecosystems" and resume at "Salt Marshes" on p. 442. Stop at "Marine Conservation". and ♦pp. 479-483; also "One particular form" paragraph on p. 428.
22-Nov-11		Catch up time	
24-Nov-11	Thanksgiving	Thanksgiving	Thanksgiving
29-Nov-11	23	Human Population and Demographics.	10 pages from Withgott, 3 pages from Diamond, and 6 pages from other sources. 1) Chapter 8: Human Population (Start at "Seven Billion", skip SBTS pp. 202-203 and end at "Population and Society"); 2) "Global population and the nitrogen cycle" , 3) ♦pp. 494-496.
1-Dec-11	24	Climate change.	11 pages from Withgott. Chapter 18: Global Climate Change. Up to "Current and Future Trends" on p. 503. Also, SBTS on p 44
6-Dec-11	25	Climate change	7 pages from Withgott & 11 pages from Diamond. Chapter 18: Global Climate Change. Starting at p. 516 and stopping at "States and Cities are advancing" on p. 522. ♦ "Objections to dealing with environmental problems" (Start at the section break on p. 503 to the break on p. 514).
8-Dec-11	26	Tying it all together	23 pages from Diamond. ♦Part Four: Practical Lessons (pp. 419-441).
13-Dec-11	27	Sustainable solutions	14 pages from Withgott. Chapter 24. Read up to "Strategies for Sustainability" on p. 679.
Final exam date TBA		Covers lecture 22 through end of semester.	