

HONOR 2750: Energy, Water, Air, and Metals: Sustainable Use and Development

Spring Semester 2020

Time: MWF 10:45-11:35
Location: MHC 1205

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Office Hours: MW 1:00 – 2:00,
immediately after class, or by
appointment

1. Course Description:

Modern society has utilized the vast fossil fuel and metal reserves of the Earth to increase both its technological sophistication and the standard of living for its residents. However, this progress has come at a price. Access to clean water and air is no longer guaranteed for millions of citizens and regional/global conflicts have arisen as countries attempt to control the raw materials which fuel our society. This course will explore the environmental pressures exerted by continued economic development and evaluate various technologies and strategies aimed at creating a more sustainable society. To the extent possible, discussions, debates, and homework will focus on locally relevant and timely issues.

HONOR 2750 is a Physical/Life Sciences Intellectual Exploration (SF) course and adheres to university policies regarding course content and delivery.

General Education Learning Outcomes:

- Quantitative Literacy
- Written Communication
- Foundations and Skills for Lifelong Learning

2. Course Outcomes/Objectives:

At the end of the course, the student should be able to:

- Understand the physical basis of some major contemporary societal problems, such as energy and resource production, water quantity and quality, and air quality;
- Be able to identify, analyze, and assess information from a variety of sources and perspectives;
- Be able to formulate an argument and express that argument clearly and cogently both orally and in writing;
- Demonstrate literacy in basic quantitative methods; and
- Be prepared to participate and collaborate as informed members of local and global communities.

3. Prerequisites:

None. However, all students must be actively enrolled in the honors program to participate.

4. Required Textbook:

None. All reference material and reading assignments will be provided through the CANVAS course pages.

5. Course Outline:

Class #	Date	Topics
Air Quality (Module #1)		
1	1/6	Class Overview What Does Sustainability Mean?
2	1/8	Introduction to the Atmosphere
3	1/10	Air Pollution Terminology and Sources Effects of Air Pollution on Visibility, Health, Ecosystems, and the Economy Role of the Environmental Protection Agency
4	1/13	Effects of Air Pollution on Climate
5	1/15	Kyoto Protocol and Amendments
6	1/17	Persistent Cold Air Pools (PCAPs) and Their Impact on Local Air Quality
	1/20	***** University Holiday – No Class *****
7	1/22	Air Quality Index Air Quality in Utah and the United States
8	1/24	Stratospheric Ozone Production Catalytic Ozone Destruction in the Stratosphere
9	1/27	Antarctic Ozone Hole Discovery and Evolution
10	1/29	Description of Ozone Hole Remediation Efforts Montreal Protocol
11	1/31	In-Class Discussions: 1) What are the Best Strategies to Improve Local Air Quality? 2) Why was the Montreal Protocol more Successful than the Kyoto Protocol?
Energy (Module 2)		
12	2/3	Overview of World Energy Usage
13	2/5	Fossil Fuel Reserves
14	2/7	Electricity Generation Methods Where Do Utahns get their Electricity?
15	2/10	Nuclear Power Generation
16	2/12	Oil Exploration/Extraction Methods
17	2/14	Major Pipelines (e.g., Trans Alaska Pipeline, Keystone Pipeline)
	2/17	***** University Holiday – No Class *****
18	2/19	Trends in the Adoption of Alternative Energy Sources
19	2/21	In Class Discussions: 1) Should Oil Drilling Be Allowed in the Arctic National Wildlife Refuge? 2) Should Rocky Mountain Power be Forced to Pay Retail Rates for Excess Solar Energy Generated by Home-Scale Systems?
Water Quality and Availability (Module 3)		
20	2/24	Overview of Water Quality and Availability US Water Laws
21	2/26	Water Quality Issues in Utah: Algae Blooms
22	2/28	Water Quality Issues in Utah: Mercury Contamination
23	3/2	Water Quality Issues in Utah: Groundwater Contamination
24	3/4	Effects of Climate Change on Water Availability in Utah
25	3/6	Mega-Droughts in the Southwestern United States

	3/9	***** Spring Break – No Class *****
	3/11	***** Spring Break – No Class *****
	3/13	***** Spring Break – No Class *****
26	3/16	What is Happening to Terminal Basin Lakes Around the World?
27	3/18	History and Importance of the Great Salt Lake Ecosystem
28	3/20	Results of the Great Salt Lake Dust Plume Study
29	3/23	Proposed Utah Water Infrastructure Projects (e.g., Bear River Dam Project, Lake Powell Pipeline Project)
30	3/25	What Can be Done to Save the Great Salt Lake?
31	3/27	In Class Discussions: 1) Should the Bear River Dam and Lake Powell Pipeline Projects be Built? 2) Should Nutrients be Removed by Sewage Treatment Plants?
		Mining and Metals (Module 4)
32	3/30	Overview of Metals (Resources and Use)
33	4/1	Mining of Lithium and Rare Earth Metals Lithium Ion Batteries
34	4/3	Use and Development of Metal Alloys, Metal Recycling
35	4/6	Effects of Mining on Air and Water Quality
36	4/8	In Class Discussions: 1) Should the Proposed Pebble Mine in Alaska be approved? 2) Should the Lisbon Valley Mine in Utah be Allowed to Extract Copper by Injecting Sulfuric Acid Directly into the Ore Body?
		In-Class Presentations
37	4/10	Alternative Energy/Sustainability Student Presentations
38	4/13	Alternative Energy/Sustainability Student Presentations
39	4/15	Alternative Energy/Sustainability Student Presentations
40	4/17	Alternative Energy/Sustainability Student Presentations
41	4/20	Alternative Energy/Sustainability Student Presentations

6. Grading Policy:

Grades will be based upon your participation in classroom and online discussions, homework assignments, laboratory assignments, in-class presentation, and a written paper. The weighted contribution of each of these items to your final grade is given below:

	Weight
In-Class Discussion/Participation	10%
Homework Assignments	40%
Online Discussion/Participation	10%
Oral Paper Presentation	15%
Written Paper	25%
	100%

Final grades are based on the following scale:

Score	Grade
> 92.5%	A
90% - 92.5%	A-
87.5% - 90%	B+
82.5% - 87.5%	B
80% - 82.5%	B-
77.5% - 80%	C+
72.5% - 77.5%	C
70% - 72.5%	C-
67.5% - 70%	D+
62.5% - 67.5%	D
60% - 62.5%	D-
< 60%	E

Sometimes cutoff points are lowered to produce more natural break-points and a reasonable distribution of grades, but please don't count on it.

7. Other Class Policies:

Students must attend every class. Failure to attend without receiving instructor permission prior to the class period will result in an unexcused absence and loss of participation points for that day. Plagiarizing, copying, cheating or otherwise misrepresenting ones' work will not be tolerated and will be dealt with as harshly as permitted under University Policy. The Student Code for the University of Utah can be found at: <http://regulations.utah.edu/academics/6-400.php>

8. Use of Canvas:

This course depends on students using Canvas to access class content, submit assignments, participate in online discussions, etc. Students not familiar with Canvas are expected to complete the online tutorials, contact support at classhelp@utah.edu, or call 581-6112 immediately.

9. The Americans with Disabilities Act:

The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 801-581-5020. CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in an alternative format with prior notification to the Center for Disability Services.

10. Addressing Sexual Misconduct:

Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365,

or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

11. Student Names and Personal Pronouns Statement:

Class rosters are provided to the instructor with the student's legal name as well as "Preferred first name" (if previously entered by you in the Student Profile section of your CIS account). While CIS refers to this as merely a preference, I will honor you by referring to you with the name and pronoun that feels best for you in class, on papers, exams, group projects, etc. Please advise me of any name or pronoun changes (and update CIS) so I can help create a learning environment in which you, your name, and your pronoun will be respected. If you need assistance getting your preferred name on your UIDcard, please visit the LGBT Resource Center Room 409 in the Olpin Union Building, or email bpeacock@sa.utah.edu to schedule a time to drop by. The LGBT Resource Center hours are M-F 8am-5pm, and 8am-6pm on Tuesdays.

Note: This syllabus is meant to serve as an outline and guide for our course. Please note that I may modify it with reasonable notice to you. I may also modify the Course Schedule to accommodate the needs of our class. Any changes will be announced in class and posted on Canvas under Announcements.