

# ENV 385

## Energy, Resources and Policy

### Spring, 2008 1-LEC (6478)

#### Lectures – T TH

Bldg. 19 Rm. 103 9:35-10:50 am

#### INSTRUCTORS:

##### **Dr. Diana Elder-Anderson**

Office: Physical Sciences Room 137

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Office Hours: T TH 2:00 – 3:00 PM or by app't

##### **Dr. David Ostergren**

<http://jan.ucc.nau.edu/~dmo2/>

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Office Hours: T 8:00- 9:00 in Biology Rm 157: or by app't. in the School of Forestry, 232

##### **TA: Avi Henn**

Ah359@nau.edu Phone 523-0501

Room 157 Office hours : Wednesday 12:30-1:30 and Friday 12:30-1:30 or by appointment.

#### Laboratories

Section 1 (M): Bldg. 19, Rm. 113, 2:00-5:00 pm (# 6476)

Section 2 (Th): Bldg. 19, Rm. 113, 2:00 - 5:00 pm (# 6474)

**Course Prerequisite:** ENV326/ENV280

**Course Description:** ENV 385 is the fourth course in the majors sequence for the Environmental Sciences Program. It builds upon your environmental biology, chemistry, geology, and policy. In particular, we will study;

- 1) how common renewable and non-renewable resources are formed, discovered, and utilized--including oil, gas, coal, nuclear, geothermal, solar and mineral resources.
- 2) the processes we use to obtain these resources,
- 3) some of the environmental effects of our energy resource use,
- 4) and the policies that control our use of these resources.

These are complicated topics whose understanding requires an ability to cross from science to policy and back again repeatedly. Simply understanding either the science or the policy is insufficient. As you will learn, policy controls what *is* done, but science determines what *can* be done. The course will be taught by two professors who will be interacting on every topic. You will find that neither of us knows everything about the topics we cover, in part because the subject area is so vast and changes constantly, and in part because we change the course topics significantly each year.

#### **Course Objectives:**

1. To learn how society integrates science and politics to develop effective energy policy.
2. To study the geology associated with energy and mineral resources, especially of the desert southwest.
3. To understand the science behind some of our geologic resources, and the technologies that might allow us to use less of these resources.
4. To become familiar with the intricacies of US and global energy and resource policies.
5. To apply scientific information to create policies guiding energy resource extraction and use.
6. Because this is the course that fulfills the junior writing requirement, each student will complete at least 20 pages of revised writing assignments.
7. Effective presentation of concepts and facts related to energy and mineral resources.
8. To become familiar with issues and topics relevant to the Colorado Plateau including coal, oil, gas and mineral exploration and extraction, hydropower and the Colorado River, Yucca Mountain, alternative energy resources, and the policy implications of decisions related to each topic area.

***Course structure/approach:***

The course will meet for three hours of lecture and three hours of laboratory each week. Labs will include scientific laboratory exercises, computer simulation exercises, debates, and a field trip.

***Textbook, lab book, and readings:***

Craig, James R., David J. Vaughn & Brian J. Skinner 2001. *Resources of the Earth: Origin Use and Environmental Impact*. 3<sup>rd</sup> Edition, Prentice Hall, 520 pp.

Simon, Christopher A. 2007. *Alternative Energy: Political, Economic, and Social Feasibility*. Lanham, Roman & Littlefield Publishers. ISBN 0-7425-4909-7

**Course readings on electronic reserve in Vista Shell and on Dr. Ostergren's web page**

**<http://jan.ucc.nau.edu/~dmo2/>.**

Copies of Merritts et al., 1998 and Botkin and Keller, 2007 have been placed on reserve at Cline, as additional references. Merritt's et al. (1998) has a better description of geological processes than does Craig et al. (2001). We have a great deal of geology to cover in this class, so it is best to read up early in the semester. Dr. Anderson can help provide you with appropriate chapters to read, and is happy to discuss and clarify any points with you outside of class.

***Class attendance, homework and exams:***

Students assume full responsibility for class and laboratory work missed by class absence. Lecture and laboratory instructors are under no obligation to make special arrangements for student absences unless the absence has been excused by a formal institutional excuse. If you must be absent for an exam day, you must notify us and come to a formal agreement with us (i.e. not just leave a message on a phone machine) *at least 24 hours before the exam*. Institutional excuses permit students to be absent from classes to represent the University at athletic, extracurricular, or academic activities. These must be approved and signed by the Associate Vice President for Academic Affairs, the Dean of Students, and the Dean of the pertinent College, and presented to the instructor before the absence.

**Late assignments—assignments are due by 4:00 PM.**

Part of professional life is meeting deadlines. 10% of the points will be deducted for the first 24 hours, 20% for 48 hours and 5% per day after that.

***Written assignments:***

The scientific reports must follow the format of accepted peer reviewed journals from the Geological Society of America (you will be given their Instructions for Authors, which is also available on the Cline Library web site research start web page). You may also use the APA format if your emphasis is the social sciences, this resource is also available on Cline. You will be expected to turn in a report for each laboratory or exercise assigned. All papers will be typed and follow a standard format of 1" margins, 1.5 to double spacing, 11 or 12 font, no separate title page, and **NO paper clips or plastic covers** - a simple staple will do.

**Grades:**

The maximum percentages needed to guarantee a specific letter grade are as follows:

90 - 100%	=	A
80 - 89.9%	=	B
70 - 79.9%	=	C
60 - 69.9%	=	D

Your final grade will be based upon the following point schedule:

2 exams (100 points each)	200 points
Lab Assignments	150 points
In class assignments/participation	50 points
Two reference papers (see syllabus, 4 x 25)	100 points
One major science/policy paper (100 points, 40 for draft, 60 for final)	<u>100 points</u>
<b>TOTAL</b>	<b>600 points</b>

Please note the point structure on the papers. It is set up to encourage you to do a good job on your draft, as skipping the draft entirely would mean that the best you could get with a perfect final paper would be a D (and no one ever writes a perfect paper!). We are incorporating a writing-intensive component to this course. Our goal is to help you improve your **SCIENCE** writing skills. You are highly encouraged to make use of the Writing Workshop (Bldg. 18, Room 228, 523-8992). They will work with you on improving your prose, tightening up your arguments, etc., and have experience with science writing.

**Laboratory sections:**

Your laboratory section is essential to understanding the practices and procedures for environmental professionals. You will gain practical experience as well as develop your writing skills. Labs will include writing exercises, in-class laboratory and computer exercises, and field trips. Detailed requirements for laboratory performance will be discussed in the first lab session. If you have any questions about proper note-taking, discuss them with your lab instructor during the first lab meeting.

**Required field trips:**

**There are two required weekend field trips for this course.** One is on **February 9<sup>th</sup>, Saturday, all day** (you will not meet in lab during the following week).

Then on **April 21 & 22 (Monday and Tuesday)** We will go to Albuquerque to tour several elements of a city going green. Wind Solar, building in engineering and policy initiatives are all part of making a city green. We **insist** upon attendance because it is the best way to learn the practical applications of course material and because it is a great opportunity to learn in more detail than you could ever get in a class or lab setting. We will provide institutional excuses for your absence, so that any missed work in other courses can be made up. You will need personal camping gear. If you do not have gear, and cannot borrow it, it can be rented cheaply from NAU Outdoors.

## Several Important Policies

**Special needs** -- At any time, we encourage students to come to us for help in understanding the readings, lecture-discussions, writing assignments, or for other course-related assistance. All that we ask is that you respect office hours. If you can not make our scheduled office hours, we can make an appointment to see you at another time. Remember that our telephones have Voice Mail, so you can always leave a message. We will respond!

**Challenges to Assigned Grades** -- Challenges to assigned grades are welcomed because they demonstrate that you are seriously thinking about the material in the course. However, we will only consider challenges in writing. A written format provides you with (1) the opportunity to present an articulate and well considered argument (and therefore more likely that we will favor your challenge with an improved grade); and (2) a record of the grade transaction in case there are questions at a later time. Challenges must be submitted within one week.

**Incompletes** -- Our policy is not to assign a grade of Incomplete except in extreme circumstances.

**Withdrawals** -- The last day to Drop/Delete is Friday, Feb. 9, 2007, and the last day for Withdrawal (last day to drop with a W) is Friday, March 16, 2007. For other deadlines, please refer to the University Calendar.

### SAFE WORKING AND LEARNING ENVIRONMENT POLICY

NAU's Safe Working and Learning Environment Policy seeks to prohibit discrimination and promote the safety of all individuals within the university. The goal of this policy is to prevent the occurrence of discrimination on the basis of sex, race, color, age, national origin, religion, sexual orientation, disability, or veteran status and to prevent sexual harassment, sexual assault or retaliation by anyone at this university. You may obtain a copy of this policy from the college dean's office. If you have concerns about this policy, it is important that you contact the departmental chair, deans office, the Office of Student Life (523-5181), the academic ombudsperson (523-9368), or NAU's Office of Affirmative Action (523-3312).

### STUDENTS WITH DISABILITIES

If you have a learning and/or physical disability, you are encouraged to make arrangements for class assignments/exams so your academic performance will not suffer because of the disability or handicap. If you have questions about special provisions for students with disabilities, contact the Counseling and Testing Center (523-2261). It is your responsibility to register with the Counseling and Testing Center. Application for services should be made at least eight weeks before the start of the semester.

If the Counseling and Testing Center verifies your eligibility for special services, you should consult with your instructor during the first week in the semester so appropriate arrangements can be made. Concerns related to non-compliance with appropriate provisions should be directed to the Disabilities Support Services coordinator in the Counseling and Testing Center.

### ACADEMIC INTEGRITY

The university takes an extremely serious view of violations of academic integrity. As members of the academic community, NAU's administration, faculty, staff, and students are dedicated to promoting an atmosphere of honesty and are committed to maintaining the academic integrity essential to the education process. Inherent in this commitment is the belief that academic dishonesty in all forms violates the basic principles of integrity and impedes learning. Students are therefore responsible for conducting themselves in an academically honest manner. Individual students and faculty members are responsible for identifying instances of academic dishonesty. Faculty members then recommend penalties to the department chair or college dean in keeping with the severity of the violation. The complete policy on academic integrity is in Appendix F of NAU's *Student Handbook*

**Cheating:** Any evidence of cheating or plagiarism on any assignment, exam or lab will, at the *very* least, result in a 0 score. At the discretion of the professor and department, the student may receive an "F" for the course, and/or be expelled from the program. Please see the Student Code of Conduct and the section on Academic Dishonesty in the NAU Student Handbook.

<b>Date</b>	<b>Day</b>	<b>Subject</b>	<b>Readings (do before class)</b>	<b>Assignment</b>	<b>Prof</b>	<b>LAB Exercise</b>
1/15	T	Introduction to blending Science and Policy and introduction to each other. Topic papers/field trip.	ID# assignment. 5 pts. (in-class)	Handout citation guide with syllabus. Hand out paper requirements/guidelines.	All	<b>NO LAB</b>
1/17	TH	Intro to Geology	Craig Ch. 1 and 2		DA	
1/22	T	Policy analysis and Energy Politics	Davis, Energy Politics on Vista Al Gore on Vista		DO	<b>NO LAB</b>
1/24	TH	Paper 1 Topic variable. Geology of our region and the History of Resource Use	Craig Ch. 3	Paper 1 4pgs total. Three pages plus 4-5 references & the FIRST page attached to document (25 pts)	DA	
1/29	T	The long term repercussions of the 1872 Mining Act.	Mineral Law CRS document on VISTA SHELL		DO	Make your own Hydropower
1/31	TH	Impacts of Resource Exploitation	Craig Ch. 4	Return Paper 1 Current events paragraph (see papers handout) 5pts	DA	
2/5	T	Hubbert's Peak and the infamous reserves/resources graphic	Hubbert's Peak E Reserve Simon Chapter 1		DO	Geologic Interpretation <b>2/9 Saturday all day field trip</b>
2/7	TH	Metals	Craig Ch. 7, Craig Ch. 8	Paper 1 revisions due (25 pts)	DA	
2/12	T	Global Warming and Global Misery	Winters and Podesta 08 6 Political Turmoil As China goes		DO	Mire to Fire Coal Power
2/14	TH	Coal Formation	Craig Ch 5: 129-152	Current events paragraph (see papers handout) 5 pts	DA	
2/19	T	Coal Bed Methane	CB Methane readings in VISTA; Craig Ch 5: 155		DA	Coal Bed Methane Lab
2/21	TH	Coal Policy a history and current debate.	SMCRA (Vista) Clean Air and 110 <sup>th</sup> (Vista)		DO	
2/26	T	Traditional Energy Overview from an oil perspective.	Simon Chapter 10		DO	Movie- A crude awakening
2/28	TH	Oil Policy	Petro Politics on Vista		DO	
3/4	T	Oil and gas formation and geology	Craig Ch 5: 153-189		DA	Movie- Power of community
3/6	TH	Energy Economics CAFÉ standards	Tietenburg Hand Out Simon Chapter 2:	Paper 2. <b>Combines science and policy. 12 pages. 40 pts.</b>	DO	

			Energy Tax Articles	analysis/opinion plus references.		
3/11	T	<b>EXAM # 1</b>	<b>EXAM # 1</b>	<b>EXAM # 1</b>		Politics Lab Prep-Assignment.
3/13	TH	Nuclear Power – Policy Evolution and the Atomic Energy Commission	Balogh Ch. 9 Vista		DO	
3/17-21		<b>SPRING BREAK</b>	<b>SPRING BREAK</b>	<b>SPRING BREAK</b>		
3/25	T	Uranium geology and mining	Craig Ch 6: 190-210, 235-6		DA	Yucca Mt
3/27	TH	Nuclear Power – Science Yucca Mtn. – nuclear waste storage	TBA	Return Paper 2	DA	
4/1	T	Emerging Energy Policy	Simon Chapter 3 & 4		DO	Present info from Politicians and role play
4/3	TH	Emerging Energy	Simon Chapter 8 & 9	Current events paragraph (see papers handout) 5 pts	DO	
4/8	T	Other Energy Sources H Cells	TBA	<b>ARD</b>	DA	Local Field Trip
4/10	TH	Future Resources	Craig Ch 13	Paper 2 revision with opinion due (60 points) <b>ARD</b>	DO	
4/15	T	Biomass Energy Geothermal Energy	Craig Ch 6: 226-235 Simon Ch 7	<b>ARD</b>	DA	Local Energy efficiency trip (ARD)
4/17	TH	Solar Energy	Craig Ch 6: 210-217 Simon Ch 5	<b>ARD</b> Paper 3. 4 pgs due 25 pts	DO	
4/22	T	<b>OFF FOR FIELD Trip</b>				<b>No Lab</b>
4/24	TH	Wind Energy Hydropower Energy	Craig Ch 6: 217-226, 228 Simon Ch 6	Return Paper 3	DA	
4/29	T	Energy Future - Discussion	Simon Chapter 11 State Actions (pdf)		DO	Sustainable living Presentations
5/1	TH	Energy Future – Discussion		Paper 3 revisions due. 25 pts.	All	
5/6	T	<b>FINAL EXAM (= 2nd Exam)</b>	<b>TUES. MAY 6 7:30-9:30 AM</b>	<b>NOT CUMULATIVE</b>		