

Environmental Studies 235

FUNDAMENTALS OF ENVIRONMENTAL STUDIES

Spring 2006

SYLLABUS

Course objectives

The field of environmental studies is motivated by the desire to solve existing environmental problems and avoid future problems. Environmental problems are defined here as problems that result from interactions between humans and the natural environment. This course is designed to provide: (i) a conceptual framework for understanding and analyzing environmental problems; (ii) an introduction to the scientific basis of key environmental problems; and (iii) an introduction to efforts to find solutions to environmental problems.

Unlike most introductory courses, this course is designed for students in at least their second year. The course is open to highly-motivated first year students, but previous students have reported that the reading and workload exceeds that of a typical introductory course (this explains the course number). Though the course satisfies the college's natural science distribution (exploration) requirement it was specifically designed to serve that purpose. Rather, it was designed as the first course in the environmental studies curriculum.

Instructor

Peter Schulze, Moody Science 320, Ext. 2284, Box 61588, pschulze@austincollege.edu
Office Hours: T 8:30-10:00, F 1:30-2:30 and by appointment. **NOTE: I do not check my e-mail every day. Please call my office phone if you wish to reach me rapidly.**

Schedule

Lectures and discussions: 9:00-9:50 MWF, Moody Science 302.
Lab: 1:30-4:20 M or W, Moody Science room 323.

Other opportunities in environmental studies

Major and Minor in Environmental Studies

The college offers a major and a minor in environmental studies. The requirements of the major and the minor are included at the end of this document (after the course schedule, before the field trip safety form). The environmental studies program website has more information (www.austincollege.edu/Category.asp?1450). Please see Dr. Schulze if you have questions about the major or the minor.

Non-curricular Opportunities in Environmental Studies

Lunch forum: The Environmental Issues Lunch Forum meets, as the title suggests, at lunch on Tuesday once or twice a month (see schedule below). The lunch forum provides information on opportunities for students, a chance to hear about your peers' projects and those of the faculty, a chance to hear from alumni and others who work in environmental careers, and extra credit for ENVS 235.

Summer internships: The Center for Environmental Studies sponsors a summer internship program that gives Austin College students opportunities to intern at exceptional environmental organizations. Contact Dr. Schulze and study the summer internship pages of the program website (www.austincollege.edu/Category.asp?1450) if you are interested. These internships provide excellent opportunities to build credentials and "try out" different career paths.

Sneed prairie restoration: This ongoing prairie restoration project provides a variety of opportunities for student participation. The lab session for this course will introduce you to the project. If you are interested, you may also take the January term course *Hands-on Conservation: Restoration of a Native Prairie*, or join a group of volunteers who work at the site one or more Saturdays each semester. Other means of participating include directed studies and honors projects.

Student – faculty research: Thanks to a grant from the Priddy Charitable Trust, the Center for Environmental Studies has funds to support students who collaborate on research with faculty members during the summer. Some of the available projects are described at the program website (www.austincollege.edu/Category.asp?1450). Click on the "Current Projects and Activities" page and contact Dr. Schulze for more information about any project that interests you.

Additional information is available on the Environmental Studies Program's website (www.austincollege.edu/Category.asp?1450) and on the bulletin board across from the coffee shop in the WCC. The website can be accessed through the "academic programs" link at the college's home page.

All interested students are encouraged to take advantage of these opportunities. You need not plan to minor or major in environmental studies to participate in these activities.

Academic Integrity Policy

No student may unfairly advance his or her academic performance or impede the performance of other students. Any activity that unfairly gives an advantage to a student or group of students is a violation of academic ethics and will be punished according to College policy.

Examples of violations include: using unauthorized notes on an exam; failure to give credit to a collaborator; failure to give credit to an author whose work is cited (failure to thoroughly reference sources); fabrication of data; removing items from the library in violation of library policy (e.g. removing journal issues from the library building).

Any source of information you use for a report, paper, or presentation should be cited.

inspire careful preparation, class sessions will begin with an opportunity for you to write a response to a question about the assigned reading. For each particularly strong response your average for the semester will be increased 1%. For each particularly weak response your average for the semester will be reduced 1%. Satisfactory responses will not affect your course grade. Unexcused absences will be treated as unsatisfactory responses.

4. Lab reports: Scientific information often alerts societies to environmental concerns, but data are usually complicated and their interpretation is rarely obvious. Therefore, students of environmental issues need to develop an appreciation for the inherently incomplete nature of scientific information and need to develop an ability to draw conclusions and decide upon appropriate actions despite incomplete information. Thus, three of the lab activities involve data collection, analysis and reporting. Detailed guidelines will be presented in separate handouts.

5. Extra credit: Extra credit will be given for attendance at the Environmental Issues Lunch Forum. Your semester average will be increased by 1% for each lunch session that you attend. If you have a course conflict at that time (12:00-1:00 Tuesday), you have the alternative of writing a maximum two page, double spaced summary of an environmental issue that is described in the *New York Times*. To receive credit such reports must represent A or B level work. These reports should concisely summarize the issue, its implications, and any sources of controversy. A single, extensive *New York Times* article will be considered sufficient resource material. (These assignments are intended to take approximately the same amount of time as participating in the lunch forum.) Satisfactory reports will increase your semester average by 1%. You may submit as many reports as there are lunch sessions held during the semester.

Grades

3 exams (45% of course grade) Exams will include material from lectures, discussions, readings, and laboratory activities. The first mid-term exam will be worth 10% of the course grade. The second mid-term exam will be worth 15% of the course grade. The final will be worth 20% of the course grade. The second mid-term exam will emphasize material that was not covered on the first mid-term, but questions may require integrating material discussed before the first mid-term. The final will be comprehensive, but will emphasize material presented after the second mid-term exam.

Proposal to reduce the College's environmental impact (35% of course grade)

Components of the proposal assignment will count toward your course grade as follows

Progress report	5%
Written proposal	8%
Practice presentation	5%
Final presentation	7%
Revised written proposal	10%

Lab reports (15% of course grade, 5% each)

Preparation & participation (5% of course grade) The success of this course will depend upon the active engagement of the students. Plan to be called on during class to summarize or

comment on the readings assigned for scheduled discussions. Full credit for preparation and participation requires that you attend class regularly and routinely contribute to class discussions. Your preparation and participation grade will be reduced by 40% (2% of course grade) for each unexcused absence from lab.

After calculating your semester average on the basis of your exams, project, lab reports and participation, that average will be adjusted in response to your performance on the in-class essays that are described above in the "Assignments" section of this document and the extra credit awarded for your participation in the Environmental Studies Lunch Forum or its alternative (see above).

Letter grades will be assigned on the basis of numerical grades. Letter grades are defined in the Austin College Bulletin as:

- A Unusual and superior achievement
- B Intelligent, articulate achievement, above-average in fulfilling course requirements
- C Passing work, representing graduation average
- S Satisfactory achievement
- D Passing work below the standard required for graduation
- F Failure without privilege of re-examination
- U Unsatisfactory work

Late Policy

Work submitted late will be reduced 1/3 of a letter grade for each day. In other words, an assignment submitted one day late that would have received an A will receive an A-. An assignment submitted 3 days late that would have received a B will receive a C.

Field Trips

Some labs will be held at field sites. You should wear comfortable clothes that you would not mind getting dirty. We recommend boots, long pants, a long sleeve shirt, a hat, sunglasses, and water to drink. If the weather is cool or cold, dress in layers and dress more warmly than you think will be necessary. You will need a small notebook and a pencil. Depending upon the weather, you may also want to bring rain gear or an umbrella. We will not go out in lightning, but may go if it is just raining lightly.

Other field trips will visit industrial sites. *Do not wear sandals or other open-toed shoes on these field trips.*

Field trips will depart campus promptly at 1:30 and will generally return by 4:20. However, field trips may occasionally run late. Because we have only 3 hours for field trips, we will not wait for latecomers. If you know ahead of time that you must miss a field trip or other lab session, please notify me in advance.

Attendance

If other activities will require you to miss a field trip or an exam please let me know ahead of time. I reserve the option to drop you from the course if you miss class more than very occasionally or disrupt class sessions.

LECTURE SCHEDULE

Date	Topic	Reading assignment
		* Available at bookstores #Book on reserve ^Book on permanent reserve §Electronic reserve
INTRODUCTION		
Mon 30 Jan	Case Study: Development in the Sahel	§Sinclair, A.R.E. & J.M. Fryxell. 1985. The Sahel of Africa: ecology of a disaster. <i>Canadian Journal of Zoology</i> 63:987-994.
Wed 1 Feb	Review of syllabus, schedule, assignments, & major environmental issues	*Miller Ch. 1-2 – Broad, sweeping overview of subject
Fri 3 Feb	Discussion	*McPhee, J., 1971. <i>Encounters with the Archdruid</i> , p. 1-75. Assignment: Be prepared to describe and defend Park's opinion, Brower's opinion, and your own opinion. What would your opponents say?
A FRAMEWORK FOR EVALUATING ENVIRONMENTAL ISSUES		
Mon 6 Feb	Thermodynamics, limits, & carrying capacity	*Miller, p. 38-54 – Nature of matter, laws of thermodynamics
Wed 8 Feb	Thermodynamics, limits, & carrying capacity	*Miller, Ch. 9 – Carrying capacity & related concepts
Fri 10 Feb	I = PBAT	*Miller, p. 14-15 – The traditional I = PAT (vs. PBAT)
Mon 13 Feb	Ecosystem services	* Miller, Ch. 4 - Ecosystems §Daily et al., 1997, Ecosystem services: Benefits supplied to human societies by natural ecosystems
Wed 15 Feb	Relationship between population size and environmental impact	*Miller, Ch. 10 – The human population
Fri 17 Feb	Relationship between affluence, behavior, technology and environmental impact	#1. Durning, A. 1992. The environmental costs of consumption, p.49-61 of <i>How much is enough?</i> §2. Durning, A. & E. Ayres. 1994. The history of a cup of coffee. <i>World Watch</i> . Sept/Oct. p. 20-22. §3. Gray, P.E., 1989. Excerpt from <i>The Paradox of Technological Development</i> (p. 192-195).
Mon 20 Feb	What is knowable? Risk & uncertainty	#Costanza et al. 1997, <i>An Introduction to Ecological Economics</i> p. 144-152, Miller p. 40-47, 228-237, 245-252
Wed 22 Feb	Discussion	#Ponting, C. 1991. <i>A Green History of the World: The Environment and the Collapse of Great Civilizations</i> . Excerpt – chapter 1 – Easter Island. Assignment (1) Be prepared to describe <u>in detail</u> the sequence of events on Easter Island. (2) Are the events of Easter Island relevant to the U. S. of the 21 st century? Why or why not? Prepare to make <u>precise, specific</u> arguments. What would your opponents say?
Fri 24 Feb	Exam	
KEY ENVIRONMENTAL ISSUES IN CONTEXT		
Resources		
Mon 27 Feb	Non-renewable energy	*Miller, Ch. 17
Wed 1 Mar	Renewable energy	*Miller, Ch. 18
Fri 3 Mar	Minerals	*Miller, Ch. 16

Mon 6 Mar	Food	*Miller, Ch. 14
Wed 8 Mar	Soil	*Miller, Ch. 14
Fri 10 Mar	Water supplies & management	*Miller, Ch. 15
Mon 13 Mar	Consequences of water cycle alterations	
Wed 15 Mar	Discussion	*McPhee, J., 1971, <i>Encounters with the Archdruid</i> , p. 151-245. ADD LEOPOLD ESSAY – THE GREEN LAGOONS
		Assignment Be prepared to describe and defend Dominy’s opinion, Brower’s opinion, and your opinion.
Fri 17 Mar	Land management	*Miller, Ch. 11 & 12
20-24 Mar	<i>Spring break</i>	
Wastes		
Mon 27 Mar	Toxicology	*Miller, Ch. 19
Wed 29 Mar	Water pollution	*Miller, Ch. 22
Fri 31 Mar	Water pollution	
Mon 3 Apr	Atmosphere, climate, and warming	*Miller, p. 101-110 & 461-484
Wed 5 Apr	Atmosphere, climate, and warming	
Fri 7 Apr	Discussion	*McKibben, B. 1999. <i>The End of Nature</i> , p. xv-xxv & 3-91.
	Assignment Be prepared to explain what, if anything, you think should be done about global warming, and why.	
Mon 10 Apr	Tropospheric air pollution	*Miller, Ch. 20
Wed 12 Apr	Stratospheric ozone depletion	*Miller, p. 484-490
		View images at http://jwocky.gsfc.nasa.gov/multi/monoct.gif
Fri 14 Apr	Solid & hazardous wastes	*Miller, Ch. 24
Mon 17 Apr	Solid & hazardous wastes	
Wed 19 Apr	Exam	

ECONOMIC, POLICY, AND ETHICAL PERSPECTIVES

Fri 21 Apr	Economics / Policy	*Miller, Ch. 26 §Daly, H.E. 1992. Allocation, distribution, and scale: towards an economics that is efficient, just, and sustainable. <i>Ecological Economics</i> 6:185-193.
Mon 24 Apr	Economics / Policy	*Miller, Ch. 27
Wed 26 Apr	Economics / Policy	
Fri 28 Apr	Ethics	*1. Miller, Ch. 28 ^2. Leopold, A. 1949. The Land Ethic, p. 201-228 in <i>Sand County Almanac</i> . Note: This book is on <u>permanent</u> reserve, filed in reserve stacks under Schulze.
Mon 1 May	Ethics	

CONCLUDING DISCUSSIONS

Wed 3 May	Discussion	*McKibben, B. 1989. <i>The End of Nature</i> . p. 95-217. Assignment Be prepared to summarize and critically evaluate (agree or disagree with and explain why) McKibben's arguments. Compare McKibben's conclusions to Leopold's <i>Land Ethic</i> .
Fri 5 May	Wrap-up discussion: Assignment: See the instructions to the right →	Think back through the lectures and readings and identify the 3 to 5 most important things you have learned. Write down and bring to class the items you identify and be prepared to explain why you think those are your most important insights from the course (more important than whatever anyone else lists).
Mon 8 May Thu 11 May	Review day Final Exam 9:00-11:00	

LAB SCHEDULE

30 Jan	Fisheries management computer simulation
6 Feb	Proposals to reduce the environmental impact of Austin College: discussion of potential topics and training for proposal development. Read before lab: 1. Handout titled <i>Proposals to Reduce the Environmental Impact of Austin College</i> 2. Box on p. 752-753 of *Miller text. 3. Proposals prepared by previous students. §Bollman, Floyd, & Spurrier (low flow showerheads) Come to lab prepared to be called upon to comment on these readings in detail, and to discuss potential proposal topics. I encourage you to identify a partner and make a preliminary proposal topic selection before this session.
13 Feb	Land use, precipitation, and flooding: are “natural disasters” natural? Meet in Abell Library Instructional Computer Classroom (Rm 208)
20 Feb	Land use, precipitation, and flooding: are “natural disasters” natural? Meet in Abell Library Instructional Computer Classroom (Rm 208)
27 Feb	Field trip: Sherman wastewater treatment plant Due Friday before 2:30 PM: Proposal progress report. 5% of course grade. Organize your progress report as follows: (1) names of authors; (2) proposal topic; (3) itemized list of information that you will need for your proposal; (4) a <u>step-by-step, precise, detailed</u> description of how that information will allow you to enable you to document your proposal; and (5) a detailed which information you already have and which information you do not yet have. (6) A detailed (point by point) description of how you propose to obtain the missing information. Making your best effort at this stage, relatively early in the semester, will be tremendously valuable to the eventual success of your proposal.
6 Mar	Field trip: Trinity – BFI materials recovery facility (recycling center) Due Friday before 2:30 PM: Land use, precipitation, and flooding report
13 Mar	Behavior of systems – positive and negative feedbacks in Daisy World (Abell Library rm 208) Read before lab: *Miller p. 32-38
20 Mar	<i>Spring break</i>
27 Mar	Daisy World continued (Abell Library rm 208) Due Friday before 2:30 PM: Written proposal
3 Apr	Field trip: Introduction to the tallgrass prairie biome and prairie restoration. (Wear long pants, a long sleeve shirt, boots or heavy shoes, and a hat. Bring water.)
10 Apr	Field trip: Prairie restoration data collection and analysis. Carefully study the handout for this lab, especially the data collection procedure, ahead of time. (Wear long pants, a long sleeve shirt, boots or heavy shoes, and a hat. Bring water.) Due Friday before 2:30 PM: Daisy World report
17 Apr	Field trip: Plano’s municipal composting operation
24 Apr	Term project – practice presentations (Each group presents their own talk and attends the preceding and following presentations.)
1 May	Term project - public presentations (All groups attend all presentations in their lab session.)

Tuesday lunches scheduled as of the beginning of spring semester

- Feb. 7 Study Abroad programs offered by The School for Field Studies
- Feb. 14 Land Use & Environmental Issues in Grayson County
- Grayson County Judge (and candidate) Tim McGraw
- Feb. 21 The EPA National Wastewater Pretreatment Program: 30 Years of Protecting the Environment
- Jacob Lowe, Austin College alumnus
- Feb. 28 Land Use & Environmental Issues in Grayson County
- Drue Bynum, Candidate for Grayson County judge
- March 7 Opportunities in Environmental Studies
- Dr. Peter Schulze
- Mar. 14 Plags, Koas & Akis: My Research in Hawaii
- Dr. Steve Goldsmith
- April 4 The Austin College Recycling Program
- Cresanda Allen, Env. Studies Major
- April 18 My Semester in Kenya with the School for Field Studies
- Lauren Ice, Austin College alumna
- April 25 Eco-Logical Restoration: My Experiences with Native American Seed Co. and Belden St. Montessori
- George Cates, Env. Studies Major

ENVIRONMENTAL STUDIES

Peter Schulze, Director

A major in environmental studies normally consists of 10 course credits including Environmental Studies 235 and 479, Economics 242, Philosophy 315, an approved project (see below), and one of the following: Biology 334, Biology 350, or Physics 240. A maximum of two courses numbered below 200 may be counted toward the major. The following courses are approved for the environmental studies major, with the exception that BIO 115, ECO 111, and PSY 101 may be counted only if taken to satisfy a prerequisite for another course on this list. The director must approve any other courses chosen as electives for the environmental studies major.

- BIOL 115 (Evolution, Behavior, and Ecology)
- BIOL 334 (Ecology) (prerequisite BIOL 115)
- BIOL 350 (Ecosystem Ecology) (prerequisites – see course description)
- CHEM 101 (Environmental Chemistry)
- ECO 111 (Principles of Economics)
- ECO 242 (Natural Resources and Environmental Economics) (prereq ECO 111)
- ENVS 100 (Hands-on Conservation: Restoration of a Native Prairie) (January term)
- ENVS 235 (Introduction to Environmental Studies)
- ENVS 479 (Environmental Policy)
- MATH 120 (Elementary Statistics) or PSY 120 or SSCI 120
- PHIL 315 (Environmental Ethics)
- PHY 101 (The Day After Tomorrow: Global Climate and Extreme Weather)
- PHY 240 (Atmospheric and Environmental Physics) (prerequisites – see course description)
- PSY 101 (General Psychology)
- PSY 120 (Statistics for Psychologists) or MATH 120 or SSCI 120
- PSY 250 (Environmental Psychology) (prerequisite – PSY 101)
- SSCI 120 (Social Science Statistics) or MATH 120 or PSY 120

Students who are interested in the environmental studies major are strongly encouraged to consult the program director at their earliest convenience, especially because eligibility for future opportunities may require that you have completed particular courses that are not required for the environmental studies major. Students are also encouraged to study the web page of the environmental studies program (<http://www.austincollege.edu/Category.asp?1450>).

Students who plan to major in environmental studies should select elective courses for the major that are best suited to their particular interests and should choose a minor (or second major) that best complements their interests in environmental studies.

The director must approve the experiential learning activity that serves as the required project for the major. Possible formats include a directed study, independent study, honors thesis, or one of the various non-credit formats such as an internship or summer research position. Junior status is a prerequisite for project approval. The director must approve written project plans 12 months before graduation. Upon completion students describe their projects in public presentations to the campus community. **Environmental studies majors whose approved project will not result in course credit (e.g. a summer internship, service work, or summer research job) should register for Environmental Studies 480 during the semester that they will give the public presentation on their project.**

A minor in environmental studies normally consists of five course credits, including Environmental Studies 235 and 479, and three other approved courses from at least two of the college's divisions (humanities, natural sciences, social sciences). The minor must include at least two courses from the following list. Pre-approval from the director is required to substitute any course not listed.

- Biology 244 Biological Diversity
- Biology 334 Ecology
- Biology 350 Ecosystem Ecology
- Economics 242 Natural Resources and Environmental Economics
- Philosophy 315 Environmental Ethics
- Physics 240 Atmospheric and

Environmental
Physics

Appropriate topics courses (consult the director for approval)

Suitable off-campus courses may be substituted for Austin College courses.

Austin College
Department of Biology &
Center for Environmental Studies
Field Trip Safety Contract

Field excursions entail certain potentially hazardous activities. The purpose of this document is to inform participants in field trips of potential risks, and of procedures to minimize these risks. Please read this document carefully and sign below.

Potential hazards associated with fieldwork include:

- Abrasions
- Allergy attacks
- Boating accidents
- Broken bones
- Dehydration
- Drowning
- Exposure to hazardous animals, plants, microbes, or viruses.
- Falls
- Fire
- Gunshot wounds due to hunters on adjacent properties or trespassing hunters
- Lightning
- Motion sickness
- Sprains
- Sunburn

In order to minimize exposure to potential hazards, the Biology Department has established the following procedures. Adherence to these procedures will make our field trips reasonably safe and positive learning experiences.

Always wear appropriate attire:

- Sturdy shoes or boots
- Long pants not shorts
- Long sleeve shirt
- Hat with a brim

Drink plenty of water and carry a bottle of water with you.

Use sunscreen

Wear a life jacket anytime you are in a boat

Always shower after a field trip and check yourself for ticks

- if you find a tick that is imbedded into your skin, grasp it gently with your fingers (never forceps or tweezers) and squeeze gently or twist slightly until the tick backs out and the whole animal can be removed.

Do not reach under objects with your hands. For example, roll a log or move it with a hoe or other implement before picking it up.

Always look carefully before you grasp an object in the field.

Lift carefully when carrying heavy or awkward objects.

Make your instructor aware of any special medical problems or needs before a field trip, so that appropriate precautions can be taken.

Do you have any special medical needs? _____ If so, please identify them: _____

I have read and understand the above precautions and procedures. I agree to follow the safety procedures, and to behave in a safe and cautious manner while in the field.

Student's signature

Date