LINFIELD COLLEGE
PHY 107 ENERGY AND THE ENVIRONMENT

INSTRUCTOR: Thomas W. H. Backman

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REQUIRED TEXTS: Environmental Science: Working with the Earth 11 edition by G. Tyler Miller, Jr. bundle ISBN 0495632066. The bundle is a package made up specifically for this course that includes the text book (ISBN 049538742), Laboratory Manual for Miller's Environmental Science by Rockett and Van Dellen (ISBN = 05347809X) and Web Tutor Advantage (ISBN 0495109266).

COURSE DESCRIPTION: Introduction to the major causes leading to environmental degradation including the concept of energy (kinetic, potential, thermal) and the physical laws governing energy transformation. Forms of energy consumed by society (fossil fuels, nuclear waste, global warming). Chemical pollution, habitat destruction, human population growth and consumption issues will be presented through the reading assignments. From this analysis of human affects on the planet you will be introduced to the concept and ways to achieve sustainability.

This is a full semester course in five weeks requiring a commitment to daily reading, assessments and assignments. We will cover a lot of material so be prepared to make the commitment of reading and taking up to five quizzes a week. I selected the Miller text because it has several redeeming qualities. One it has fewer chapters than conventional environmental text reducing the amount of material you need to cover in this condensed period. Second, it comes with a lot of support materials to help you learn the material. Third, the text focuses on sustainability. The goal of environmental science is to understand the science behind the issues so that society can implement solutions. Fourth, has been producing great environmental text books for years. He has managed to organize a very complex topic into easy to understand.

PREREQUISITE: None Required

top

- COURSE OBJECTIVES
- INSTRUCTOR BIOGRAPHY
- METHODS OF EVALUATION
- COURSE POLICIES
- CLASS OUTLINE AND ASSIGNMENTS
  - I. Humans and Sustainability
  - II. Ecology and Sustainability
  - III Sustaining Biodiversity
  - IV Sustaining Resources and

Environmental Quality

- **V_Sustaining Human Societies**

COURSE OBJECTIVES:

Knowledge Cluster: The student will be able to explain current environmental science principles and terminology, including some historical context for the scientific process.
Goals:
1. The student will demonstrate an understanding of the basic concepts of environmental science, including:
the diversity of life,

- the interdependence of life,
- the flow of matter and energy,
- climate and habitat as processes that shape the earth,
- human health (environmental contributions to health and disease),
- agriculture and human food supplies.

Skills Cluster
Goals:
Critical thinking and problem solving
Effective written communication
Effective presentation communication

Values Cluster
Goals:
1. Recognize the value of biodiversity (medical, aesthetic, moral, cultural, ecological, commodity - e.g. food/clothing)
Appreciate contributions of individual species to community structure
Describe the harmful consequences of a lack of diversity
Understand the relationship between ecosystem function and human welfare
Understand and accept human diversity when placed in the context of genetic/environmental variation.

2. Understand relationship between science outcomes and resultant technology
Assess the impact of specific technologies on the environment
Expose students to the responsibilities inherent in perpetuating and applying knowledge
Understand that change in it does not imply progress.

3. Ethical reasoning and good judgment
Ability to recognize an ethical dilemma, creates potential solutions, and evaluates using a information and logical arguments. Assess the social and economic forces, which influence scientific research.

Community Cluster
Goals:
1. Learning to share responsibilities through group work
Appreciation for group dynamics

Ability to collaborate with other students in problem based learning
2. Reflect on learning so that it is personal and meaningful to the individual student

Top

INSTRUCTOR BIOGRAPHY: Hello, a bit about myself. I am life time ecologist, conservation scientist, and environmentalist. I have taught marine biology and environmental science at the University of Portland, Lewis Clark State College and Linfield since 2001. For Lewis Clark State University the course is a senior level environmental ethics interdisciplinary course.. Currently, I am a Biologist for the Nez Perce Tribe where I am conducing studies on reintroducing salmon back into their native habitat in the Clearwater sub-basin of the Snake River. I was a senior scientist for Columbia Basin Indian tribes during the 1990's. I also am a member of the NOAA-Fisheries Willamette and Lower Columbia Salmon Recovery Team.
I am a husband and father of two. My wife is a science and biology teacher in middle - high school. My son is a senior at Oregon State University majoring in Physics he and his wife met at a biodiesel club. My daughter at nineteen has been in the youth corps and will start with Americorps in February. She has a strong artistic side doing well in writing, drawing and music. She has won several awards for her drawings.

Top
METHODS OF EVALUATION:

Course grade The final course grade will be determined by the following:

Discussion participation	5%
Quizzes	75%
Two Research Papers	25%
Total	**100%**

Discussion: Each week you will be required to enter into a discussion. The discussion will be based on posted papers, and informed by reading from text, your background, or additional information you may seek out. The instructor will pose a question and the next person to enter the discussion will address that question, and then pose another. Subsequent students, will address the previous question. However, if you think a prior answer is inadequate or in error you may chose to answer that one. Also, if you think a question not good you may chose to elaborate on that and pose a new one. You will be evaluated by the number and quality of your participation in the discussions. If a topic is really interesting to you by all means do as many postings as you wish. A good question involves the student in a journey of discovery, driven by curiosity. Great questions themselves evolve, of course, because their answers spawn new and better questions in turn.. Questions that simply require a yes or no answer are not very interesting.

Exams: Each exam will only cover material prior to that exam which has not already been

covered on a previous exam. Exams will test your knowledge and critical thinking skills. Questions will be based on reading assignments supported by presentations.

No make-up quizzes will be given. Exceptions will be on a case-by-case basis where other school commitments (letter from professor) or emergency precludes taking an exam.

Mini-papers:
During this course you will write two papers.

> **Know your neighborhood.** The first assignment will be to learn about the watershed you live in, and to identify contamination in your neighborhood
> **Green Power.** The second assignment will be to evaluate the benefits and cost of switching your current source of energy to a green or greener source.
> .

Extra Credit: I want to encourage you to participate in an external process so that you may discovery how easy it is to become involved in learning and participating in environmental activities. I will give 15 points for any approved activity. You may seek out community activities that may interest you and propose them to me for approval. I will, also, provide ideas that will be posted the course web site. You must obtain my pre-approval to receive full credit.

A 94%-100%	C+ 76%-78%
A- 89%%-92%	C 73%-75%
B+ 86%-88%	C- 69%-74%
B 83%-85%	D+ 66%-68%
B- 79%-82%	D 63%-65%
C+ 76%-78%	D- 59%-62%
	F <58%

Top

COURSE POLICIES:

Late work late work will not be accepted unless you have discussed and received permission from me first.

Incompletes A grade of Incomplete (I) is given only in emergency situations. The student must request an Incomplete in writing and must obtain my permission. All uncompleted work must be completed within the time limits I set. If you simply don't turn in the final assignments or the final exam, your course grade will be calculated with the missed portion counting for 0 points.

Academic honesty Cheating and plagiarism will not be tolerated. Any student found to be engaging in either of these activities at any point in the course will receive a failing grade for

the assignment and/or entire course and may be subject to further college sanctions.

Return of course materials You keep the text

Rules of Discussion The on-line discussions should be a safe haven within which individuals can discuss the widest possible range of topics without fearing retribution, ridicule, or attack. In order for this to happen, we must assume that we are all persons of intelligence and good will who may ultimately disagree, sometimes to a profound degree, with one another but whose characters are not impugned or intelligence disparaged because of this disagreement. The on-line discussion area is not a forum for proselytizing, nor it is a soapbox for diatribes by either students or faculty. For the academic endeavor to succeed, we must treat each other with civility, courtesy, and respect. All perspectives and questions are welcome, as long as they are impelled by a genuine desire for knowledge, can be articulated thoughtfully, and supported by sound reasoning.

Difficulties Problems, questions please contact me

Students with disabilities Students with documented disabilities who may need accommodations, who have any emergency medical information the instructor should know of, or who need special arrangements in the event of evacuation,
should make an appointment with the instructor as early as possible, no later than the first week of the term.

Top

CLASS OUTLINE AND ASSIGNMENTS:
(This is subject to change).
The primary source of information will be the reading assignments from the textbook and supporting materials. Occasionally I will post additional sources of information. To receive and A, you will need to do well in all the assignments.

Reading Assignments:
I expect everyone to complete the reading assignments. Exam questions will come from the reading material. In addition to chapters from your texts, I may occasionally provide additional learning materials.
This survey course is organized around the test books structure. Each week there will be required reading and assignments with due dates. You may proceed at your own pace provided you meet the deadlines for assignments, discussions, and tests.
Occasionally, there will be current events relevant to the course materials. I may direct you read and discuss these events then use them as scenarios.

Week 1: Part I. Humans and Sustainability: an Overview; Part II. Ecology and Sustainability	
	Read: Chapter 1 Environmental Problems, Their Causes, and Solutions.

	Chapter 2 Science, Matter, and Energy Chapter 3 Ecosystems: What are they and How Do they Work? Chapter 4 Evolution and Biodiversity
	Assignment: Contact instructor via WebCT, review course materials, email the instructor with the following information: 1: Your contact information (off campus email, phone number) 2: What you hope to learn from this course **Assessments:** Take quizzes with each chapter and provide to instructor
	Turn in: By 10 January 2005 1 and 2 complete Quizzes by 12 January

Top

Week 2: Part II. Ecology and Sustainability	
	Read: Chapter 5 Climate and Biodiversity Chapter 6 Community Ecology, Population Ecology, and Sustainability Chapter 7 Applying Population Ecology: The Human Population
	Assignment: Complete and Post know your neighborhood **Assessments:** Take quizzes with each chapter and provide to instructor
	Turn in: KYN By 19 January 2005 and Quizzes by 26 January

Top

Week 3: Part III Sustaining Biodiversity; Sustaining Resources and Environmental Quality	
	Read: Chapter 8 Sustaining Biodiversity: The Ecosystem Approach Chapter 9 Sustaining Biodiversity: The Species Approach Chapter 10 Food, Soil, and Pest Management

	Chapter 11 Water and Water Pollution
	Assignment: Start Green Power report **Assessments:** Take quizzes with each chapter and provide to instructor

Top

Week 4: Part IV. Sustaining Resources and Environmental Quality	
	Read: Chapter 12 Geology and Nonrenewable Minerals Chapter 13 Energy Chapter 14 Risk, Human Health, and Toxicology
	Assignment: Complete Green Power Report 2 February
	Turn in: 2 February 2006

Top

Week 5: Part IV. Sustaining Resources and Environmental Quality; Part V Sustaining Human Societies	
	Read: Chapter 15 Air Pollution Chapter 16 Climate Change and Ozone Loss Chapter 17 Solid and Hazardous Waste Chapter 18 Environmental Economics, Politics, and Worldviews.
	Assignment: Reminder - complete the 2nd assignment. **Assessments:** Take quizzes with each chapter and provide to instructor
	Turn in: any missing Assignments by 4 February 2006

Top