Syllabus:
AREC541 - ENVIRONMENTAL ECONOMICS
Spring 2008

Class Meeting:
T & TH: 2:00 – 3:15 Engineering B1

Instructor: Gorm Kipperberg
Contact: gorm.kipperberg@colostate.edu
Location: Clark B-313
Office Hours: MWF: 11:00 – 12:00

1. COURSE DESCRIPTION

This is a graduate level course in environmental economics intended to give a rigorous introduction to economic theory and methods relevant to analyzing policies for use and protection of the environment. Broadly speaking, natural resource economics (AREC540) studies the flow of resources from nature to the economy, whereas environmental economics (AREC541) studies the flow of residuals from the economy into nature. Our natural environment provides many services (e.g., clean air and water, recreational activities, habitat, aesthetics) that are highly valued by all of us. Yet it also serves as a repository for residuals from both production of goods and services that society values, and from some consumption activities themselves. A fundamental problem is that many services provided by the environment are not valued explicitly (in markets or otherwise) resulting in externalities and public good provision problems. How do we model agent behavior and impacts on the environment? How do we value non-market goods and services? What policy instruments can achieve socially optimal environmental management? These are some key questions addressed in this course.

Learning Purpose and Objectives: The purpose of this course is to provide students with graduate-level training in environmental economics. The main objectives are for students to (1) get a rigorous exposure to the theory of environmental market failures (externalities and public goods) and their potential solutions, 2) learn about methods of non-market valuation and their underlying welfare theory, 3) become familiar with published research in environmental economics, and 4) gain experience in environmental economics analysis. It is expected that a student successfully completing the course will developed a broad understanding of the economic issues associated with use and protection of natural resources and the environment, and attained analytical skills useful for employment in environmental management sectors (private and public) or for pursuit of a PhD degree in environmental and resource economics.

Course Prerequisites: The formal requirement for this course is AREC/ECON306 (and all its pre-requisites). However, it is highly recommended that the students also have taken a graduate level microeconomics (e.g., AREC/ECON506), econometrics at least at the undergraduate level (AREC/ECON335), and generally have strong background in calculus and algebra.

Warning for the Unwary: This is a **graduate level** course that *assumes* solid understanding of mathematical, statistical, and economic concepts, as well as excellent study habits and work ethics. While technically this is a master's course, the nature of the theory, models, and methods that will be covered makes this course indistinguishable from a PhD course in environmental economics. If you do not keep up with the material and the assignments, you will suffer and possible fail the course. On the other hand, if you work hard and pay attention, you are likely to be positively engaged, do well, and come away with highly advanced skills useful for addressing contemporary environmental issues. You should anticipate that the average work load for success in this course is **10 hours a week** (including class attendance).

Course Material: There is no sufficiently comprehensive textbook in environmental economics at the graduate level. Instead, course material and lectures will be developed from a number of different sources, including graduate and undergraduate texts and journal articles. I have divided the course into **three modules** with the following primary references:

Module 1: Theory of Environmental Market Failures and Solutions

W.J. Baumol and W.E. Oates (1988). *The Theory of Environmental Policy.* Second Edition. Cambridge University Press.

Module 2: Non-Market Valuation Theory and Methods

A.M. Freeman III (2003). *The Measurement of Environmental and Resource Values.* Second Edition. Resources for the Future Press.

Module 3: Environmental Valuation in Practice

Champ P.A., Boyle, K.J., and T.C. Brown (Eds., 2004). *A Primer on Nonmarket Valuation.* Kluwer Academic Publishers.

Train, K. (2003). *Discrete Choice Methods with Simulation.* Cambridge University Press.

A couple of decent undergraduate-level environmental economics references are:

Callan S.J., and J.M. Thomas (2007). *Environmental Economics and Management: Theory, Policy, and Applications.* Fourth Edition. Thomson South-Western.

Hanley, N., Shogren, J.F., and B. White (1997). *Environmental Economics: In Theory and Practice.* Oxford University Press.

In addition to these textbooks, I will provide several **handouts** and **articles** from the environmental economics literature. Some of these articles will be covered in-depth in class, whereas others are supplementary or for future references. Whenever possible, this material will be posted on the course RAMCT.

2. COURSE EVALUATION

The grades are as assigned as follows: A = ≥ 90%; B = 80-89%; C = 70-79%; D = 60-69%; F = < 60%, with appropriate plus (+) and minus (-) differentiation. Depending on overall class performance, the instructor may use an upward adjustment scheme. Your course grade will be based on the following weights (out of 1.00):

Homework Exercises (3)	0.45
Discussion Briefs & Participation (3)	0.15
Research Paper	0.40

Homework Exercises: For each module (three in total) there will be one very substantial homework exercise (which you can think of as a take-home exam). You may discuss your preliminary work with fellow students and the instructor. However, final submission must be made on a uniquely individual basis.

Discussion Briefs and Participation: Throughout the class (both instructor and students) will be responsible for reading, presenting, and discussing articles from the environmental economics literature. *Each student will present one article to the class.* At the conclusion of each module (three in total), each student is expected to write a 2-4 page "discussion brief" that a) summarizes, b) critiques, and c) offers personal reflections on the literature covered.

Research Paper: Each student is expected to write a 15-25 page research paper due the last day of class for the semester. As part of the research paper grade, each student will be responsible for giving a 10-minute presentation to the class during the last week of the semester (or, possibly, during finals week).

The **nature of this paper** is to be a fully developed research proposal which sets out a clear line of inquiry into an interesting problem in environmental economics (without the ultimate analysis and conclusions necessarily presented). The paper can be either theoretical or empirical in nature. In either case, it should follow the structure and writing style of typically published work in the environmental economics literature. A short preliminary proposal (1-3 pages) clearly identifying a topic, research questions to be addressed, some relevant background literature, and methods to be employed, is due at the end of Week 5 of the semester. You are also encouraged to engage in a continuous dialogue with the instructor regarding your paper progress between then and your final submission.

Anyone who conducts a **complete analysis** (either theoretical or empirical), that is, produces a complete research paper, which could potentially be submitted to a professional conference or an academic journal, will be awarded **10% extra credit**.

3. General Course Policies and Exceptions

- **Homework exercises** are due at the BEGINNING of the lecture on the stated due date. Assignments handed in at the END of the lecture are considered LATE. Beyond that, no assignments will be accepted under any circumstances.

- You have one week after receiving a graded work to provide the instructor with a written **grade appeal**. The appeal should identify which part of the work is believed to be incorrectly scored. Note that the instructor reserves the right to re-grade the entire work, potentially resulting in a lower overall grade.

- If you have a **documented disability** that requires special arrangements, please let the instructor know immediately at the beginning of the course.

- **Academic integrity** is expected. No cheating will be accepted, period. See the Student Handbook and CSU Honor Code available at:
  http://www.studentaffairs.colostate.edu/resources/students/policies.asp

- Always show appropriate **respect** for your instructor and fellow students. This means among other things that **cell phones** should be turned off or on mute prior to class.

- **Attendance** is not required, but highly encouraged; it is critical to passing the course. If you arrive late or expect to leave early, please sit near the exit to avoid disrupting the lecture. If for any reason you anticipate missing lecture for more than two days, whether due to illness or an emergency, contact your advisor as soon as possible and have him/her contact the instructor.

- If you are finding that you have difficulties in this course, **ask for help** as soon as possible. The instructor wants you to do well and meet your academic goals. The sooner you ask for help, the sooner you can get back on track.

4. TENTATIVE COURSE OUTLINE AND SCHEDULE *

***Note:** *This outline is subject to change. Details of the material covered in the three modules (II-IV), will be provided in separate handouts.*

I. Course Introduction (1 Week)

Introductory/Overview Readings (posted to RAMCT):

Fullerton, D., and R. Stavins (1998). How Economists See the Environment. *Nature* 295(1 October): 433-434.

Harris, M. (1996). Environmental Economics. *Australian Economic Review* 4th Quarter: 449-465

Cropper, M., and W.E. Oates (1992). Environmental Economics: A Survey. *Journal of Economic Literature* 30(2): 675-740.

Hahn, R.W (2000). The Impact of Economics on Environmental Policy. *Journal of Environmental Economics and Management* 39: 375-399.

II. Theory of Environmental Market Failures and Solutions (≈ 5 Weeks)
This module covers the theory and models of environmental market failures (externalities and public goods), their potential (market-based) solutions, and real-world complications that can arise in formulating best policies. The last week of this module will be devoted to class presentations and discussions of some key articles from the literature.

General References:

W.J. Baumol and W.E. Oates (1988). *The Theory of Environmental Policy*. Second Edition. Cambridge University Press.

Cropper, M., and W.E. Oates (1992). Environmental Economics: A Survey. *Journal of Economic Literature* 30(2): 675-740.

Callan S.J., and J.M. Thomas (2007). *Environmental Economics and Management: Theory, Policy, and Applications.* Fourth Edition. Thomson South-Western.

Journal Articles:

To Be Announced…

Work Due: Homework 1; Discussion Brief 1; Short Research Paper Proposal

III. Theory and Methods of Non-Market Valuation (≈ 4 Weeks)
This module presents methods of non-market valuation and the underlying welfare theory. These methods include the hedonic pricing method, the travel cost method, contingent valuation, and stated choice experiments. The last week of this module will be devoted to class presentations and discussions of some key articles from the literature.

General References:

A.M. Freeman III (2003). *The Measurement of Environmental and Resource Values.* Second Edition. Resources for the Future Press.

Callan S.J., and J.M. Thomas (2007). *Environmental Economics and Management: Theory, Policy, and Applications.* Fourth Edition. Thomson South-Western.

Journal Articles:

To Be Announced…

Work Due: Homework 2; Discussion Brief 2

IV. Valuation in Practice (≈ 4 Weeks)
This module will focus on statistical methods (primarily discrete choice econometrics) that are commonly used in nonmarket valuation. The homework for this module will be an econometric exercise. Again, the last week is devoted to class presentations and discussions of some key articles from the literature.

General References:

Champ P.A., Boyle, K.J., and T.C. Brown (Eds., 2004). *A Primer on Nonmarket Valuation.* Kluwer Academic Publishers.

Train, K. (2003). *Discrete Choice Methods with Simulation.* Cambridge University Press.

Journal Articles:

To Be Announced…

Work Due: Homework 3; Discussion Brief 3

V. Research Paper Presentations (1 Week)

Work Due: Research Paper