

Syllabus: ESM 242 - Natural Resource Economics & Policy

Spring, 2009

Monday & Wednesday 9:30-10:45

Professor: Christopher Costello (893-5802, costello@bren.ucsb.edu)

Office Hours: Monday 10:45-12:00

0.1 Course Description

In *Natural Resource Economics and Policy* (ESM 242) we will study a wide range problems of natural resource use. The course introduces students to the principles, reasoning, and techniques required to set-up and solve allocation problems, under different social objectives. Policy will serve as both an input and an implicated output of this approach. The economic tools developed are applied to renewable resources, exhaustible resources, water, pollution, marine resources, conservation planning, and other contemporary problems. The first third of the course is devoted to learning the basic principles and tools required to analyze natural resource management problems. The second third of the course consists of several case studies of contemporary renewable and non-renewable natural resource problems, along the lines of “mini” Bren School group projects. The final third of the course will be lead by students, who will present their term projects (see below).

0.2 Prerequisites & Workload

The course presumes a solid understanding of calculus, statistics, and micro-economics. If your understanding of math and statistics is shaky, but still want to take the course, you can familiarize yourself with the concepts by reading the relevant introductory material on these topics in a mathematics text (such as Chiang. *Fundamental Methods of Mathematical Economics*). An intermediate microeconomics course (such as ESM 204) is also a prerequisite. It is assumed that you have a good understanding of how to manipulate Excel spreadsheets, particularly using *Solver*.

The workload will be about average for an elective course. There will be 3-4 assignments, a mid-term, a term paper, and an opportunity to present your research to the class. Depending on your familiarity with economic principles and computer use, you can expect approximately 5 hours of work outside of class per week.

0.3 Grading

Grading consists of the following elements: (1) Homework Assignments (30%), (2) In Class Midterm (20%), (3) Term Paper (35%), (4) Term Paper Presentation (15%).¹

The term paper should focus on a topic of your choice in the general area of natural resource economics and policy. The term paper should have the following features:

- It must be relevant to natural resource economics and policy
- It must identify and answer a specific research question of manageable scope
- It must involve the collection and analysis of data. The database you create will be part of your submitted final project.
- You must interview expert(s) in the area you are studying (e.g. if you are interested in water-use in agriculture, you could interview farmers, water managers, and/or city planners)

¹Note: The grading scheme is subject to change up to the end of the first week of class depending on class size, topical interest, etc.

- Your project may be related to your group project, but it must address a different dimension than does your group project.
- You may work in groups of up to four students.

The term paper grade is composed of four elements: (1) A brief proposal summarizing the question you will address (10%), (2) A mid-quarter progress report (20%), and (3) A final written report (70%). The Midterm exam is an in-class exam on the concepts from the first half of class. It will be held on **Thursday, May 10**.

You are fully expected to attend all class lectures including all presentations by your peers. If you have to miss a class, you must obtain permission from the professor ahead of time. **Plagiarism** will not be tolerated. Plagiarism is defined as “passing someone else’s work off as one’s own”, and is strictly forbidden, enforced, and punished at the University of California.

0.4 Readings

The primary (required) textbook is:

- Conrad, J. 1999. Resource Economics. Cambridge University Press.

It is available on Amazon.com for about \$30. We will also draw on:

- Sterner. 2002. Policy Instruments for Environmental and Natural Resource Management. RFF and World Bank.
- Baumann et al. 1998. Urban Water Demand Management and Planning. McGraw Hill.

Supplementary readings (for the second half of the course) will be made available at that time.

0.5 Course Topics

The course is broken into 3 sections: (1) Analytical techniques, modeling, and principles of natural resource economics and policy (2) Case studies and special topics², and (3) Term paper presentations. Subtopics within each section are listed below:

1. Modeling, definitions, and natural resource allocation (3 weeks)
 - Basic concepts (Conrad chapter 1, definitions handout)
 - Solving numerical allocation problems (Conrad chapter 2)
 - Fundamentals of renewable resource economics (Conrad chapter 3)
 - Fundamentals of non-renewable resource economics (Conrad chapter 5)
 - Handling risk, uncertainty, and sensitivity
2. Case studies and special topics (5 weeks)
 - Water allocation, markets, pricing, and conservation (Baumann, chapter 5)
 - Non-renewable resources and stock pollutants: dynamics and regulation (Conrad chapter 6)
 - Ecosystem services and *Ecosystem Based Management*
 - The economic/ecological frontier for Marine Protected Area design
 - Conserving biodiversity: allocating scarce resources toward protection

²The case studies will change from year to year - depending on current issues and on student interest.

- “Bioprospecting” for genetic resources: resource conservation from the private sector (journal articles)
 - The impact of climate change on forest resources
 - Decision making under uncertainty and option value (Conrad chapter 7)
3. Student Presentations (2 weeks)
- 15 minute presentation to rest of class (15% of class grade)

0.6 Some Examples of Paper Topics

1. Is water in Santa Barbara efficiently priced?
2. How much voluntary public participation is there in “environmental markets”?
3. Will the Channel Islands marine reserves lead to increased fishery profits?
4. What gasoline tax would internalize the externalities associated with GHG emissions?
5. Is the Serengeti large enough to protect Wildebeest?
6. As climate change shifts species ranges, how should protected areas adapt?
7. What is the optimal size limit for lobster in Santa Barbara?