Environmental Economic: ARE 176

Department of Agricultural and Resource Economics
University of California, Davis

Fall 2009

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***Lectures*: Tuesdays and Thursdays, 10:30 – 11:50** in **115 Hutchison**

Office Hours: **Tuesdays and Thursdays, 13:30-14:30** (Other times can be arranged by appointment).

Discussion Sections: **Tuesdays, 4:10-5:00** in **Wellman 101** and **Wednesdays, 4:10-5:00** in **Bainer 1130**
TA: **Kelly Grogan**, Office Hours: **Mondays, 11:00 am-12:00 p.m. & Wednesday, 1:00-2:00 p.m.**, Room SS&H 1177 grogan@primal.ucdavis.edu .

***Course Objectives*:** This is an advanced undergraduate course in environmental economics. The course focuses on environmental problems arising from the economy's interaction with the environment, and shows how tools of economic analysis can be used to provide potential solutions to them. As such, a core question throughout the course will be the determination of the socially optimal (efficient) level of environmental pollution control under various real-world conditions, and the design and enforcement of economic instruments to achieve that level in a cost-effective fashion. Accordingly, the emphasis of the course will be more on theoretical developments in the area of environmental economics and less on policy.

***Course Requirements*:** This course assumes that you are at ease with using elementary calculus (at the level of **Math 16B** or **16C)** and have a good understanding of microeconomic theory at the intermediate level: **ARE 100B** is a **prerequisite. If you have not already passed ARE 100B, you are advised to defer taking this course.**

***Course Policy*:**

Format: This course will be primarily a lecture/discussion course. We have nearly 19 lectures together. Although I do not take attendance, you are expected to attend *all* of them; *missing one will likely cost you understanding a key point on which the subsequent lectures rest: try not to miss any lecture.* Exams may include material not in the readings but covered in class or section.

Exams: There are two exams: a **Midterm** exam scheduled tentatively for **Thursday, October 29, 2009** and the **Final** exam scheduled for **Friday, December 11, 2009 at 13:00 in Hutchison 115.**
NOTE: NO retake of any exams, and this policy applies without exception.

Course Work: This course may be challenging but hopefully rewarding. On average, you should expect approximately **8 hours of work per week outside of the classroom**. The course will involve a good deal of reading and homeworks. You should read all of the material in the assigned chapter before the date scheduled for

class discussion. I have also prepared a Reader and a set of Lecture Notes to accompany the course textbook. Both of these may be obtained from Davis Copy Shop.

There are seven or eight homework assignments. You will be asked to do the assigned homeworks at appropriate times as the course progresses. You will deliver your work **on assigned time** and **place**. After grading, homework answers will be posted on the class webpage. Delaying your homework delivery costs you **10%** of total grade per day delay until the answers are posted on the web. **Your worst homework grade will be dropped**. Homework is graded on a 0-100 basis with extra credit problems allowing scores in excess of 100. You are expected to attend regularly the discussion sections, TA tutorial office hours, and see me during my office hours for your questions. To use these office hours efficiently requires that you **prepare your specific questions clearly beforehand**.

Grading Policy: Homework **30%**, Midterm **35%**, and Final exam (emphasis on post-midterm material) **35%**,

Letter Grade Assignments: Final grades will be assigned using the scale given below. You can calculate your expected final grade, simply by adding the grades from your midterm and homework with the grade you plan to get in on final and referring to the table below.

95+ (A+), 90+ (A), 85+ (B+), 75+ (C+), 70+ (C), 60+ (D), 60- (F)

University of California policies: All aspects of this course will be conducted according to the relevant University policies.

Textbook:

The principal required textbook for the course is **Environmental Economics**, by Charles D. Kolstad, 2000, Oxford University Press (available at UC Davis Bookstore and on reserve at Shields and ARE libraries).

Course Outline

Environmental Economics and Social Welfare (Week 1)

- Social Welfare
- Social Choice: How Much Environmental Protection?

Readings:
Kolstad, Ch. 3: 28-48.

2. **Efficiency and Markets** (Week 2)
   - Efficiency in Exchange: Goods
   - Efficiency in Exchange: Bads
   - Efficiency in Production
   - Demand, WTP, Consumer and Producer Surpluses
   - Efficiency of Competitive Markets
   - Supply and demand for Bads, Surplus Measures for Bads
   - Benefit-Cost Analysis

Readings:
Kolstad, Ch. 4.

3. **Market Failure: Public Bads and Externalities** (Weeks 3 and 4)
   - Imperfect Competition
   - Public Goods and Bads
   - Optimal Provision Public Goods and Bads
   - Externalities

Readings:
Kolstad, Ch. 5.

4. **Property Rights** (Week 5)
   - The Polluter and the Victim: Private Negotiation
   - The Coase Theorem
   - Problems with the Coase Theorem: Public Bads and Bargaining
   - Policy Significance of the Coase Theorem

Readings:
Kolstad, Ch. 6.

[Midterm Exam: Thursday, October 29]

5. **Public Policies to Control Pollution: Pollution Fees** (Week 6)
   - Pigovian Fees (Pollution Taxes): Single Polluter
   - Multiple Polluters: The Equimarginal Principle
   - Fees Versus Subsidies
   - Pigovian Fee and Imperfect Competition

Readings:
Kolstad, Ch. 7.

6. **Emission Fees and Marketable Permits** (Week 7)
   - Pollution Sources, Receptors, and Transfer Coefficients
   - How Much Pollution?
   - Emission Fees
   - Marketable Ambient Permits
   - Implementing Marketable Permits

Readings:

Kolstad, Ch. 9: 155-164.

7. **Regulation With Unknown Control Costs: Asymmetric Information** (Week 8)
   - A simple Model of Incentives in Environmental Regulation
   - Unobserved Control Costs: Fees or Permits? (Prices Versus Quantities)
   - Hybrid Price/Quantity Regulations

Readings:
Kolstad, Ch. 10.

8. **Audits, Enforcement, and Moral Hazard** (Week 9)
   - A Simple Model of Incentives in Environmental Regulation
   - Monitoring Emissions
   - Regulation with Unobserved Emissions
   - Midnight Dumping and Deposit-Refunds
   - Enforcement: Auditing an Emission Standard

Readings:
Kolstad, Ch. 11: 195-206.

9. **Evaluation of Benefits and Costs of Improving Environmental Quality** (Week 10)
   - Indirect market valuation (Weak Complementarity)
   - Hedonic method
   - Travel Cost Method
   - Direct Method (C.V.)

Readings:
Kolstad, Ch. 16: 323-331, Ch. 17: 334-336, Ch. 18: 355-364.

[Final Exam: Friday, December 11, 2009]