AREC/ECON 540: Natural Resource Economics
Department of Agricultural and Resource Economics
Colorado State University
MWF, 11:00-11:50, Eddy 119
Spring, 2016

Course Syllabus

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OH: Mon and Wed: 1-2 pm, or any time by appointment
Final Exam: take-home, due by 10 am Monday 5/12/2016

Course Description

This course is a second-year masters-level class that will make use of micro-economic theory and mathematical modeling tools to develop a rigorous understanding of the connection between human economic behavior and the natural environment. We will use mathematical techniques, including optimization tools, to examine problems related to pollution, environmental valuation, climate change, and the use of scarce natural resources over time. Concepts and mathematical tools introduced in AREC 540 will be further developed in AREC 740 (resource econ) and AREC 741 (environmental econ).

Course Objectives

My goal is to expose students to the major environmental and natural resource economics models while emphasizing the concepts and intuition of the models. Students should be able to extend these basic models to a wide variety of topics that we will not have time to cover in this class. Also, applying economic theory in the contexts that we see in class should provide practice that will help in developing ideas for a master's thesis.

Prerequisites

According to the website, prerequisites are AREC/ECON 340 (intro to natural resource economics) and math 141 (calculus). I will assume everyone has taken at least intermediate microeconomics (AREC/ECON 306) and is comfortable with differential calculus and the basics of static optimization.

Recommended Texts and Readings

For this class, I will use the Perman et al 4th edition textbook:

Perman, Roger, Yue Ma, Michael Common, David Maddison, and James McGilvray. *Natural Resource and Environmental Economics.* Prentice Hall; 4 edition (June 23, 2012)

This textbook provides a foundation but most of the reading in the class will come from journal articles posted online. The relevant references are listed in the topics below, using the same name as the online file.

Grading

Grades will come from a mid-term (15%), a final (20%), homework assignments (25%), a paper proposal (rough draft (10%) and final (10%), including presentation (5%)), and participation (5%). Finally, each student will lead a discussion of a paper that we cover in class (10%). The mid-term will be in class and the final, a take-home, will be due the morning of the scheduled exam day. There will be 5 homework assignments and I will provide approximately 2 weeks per homework. You can collaborate on homework and turn in one problem set per 3 people but exams must be done entirely independently. I encourage you to come to me for help on homework as well. I will not accept late work.

I will give grades based on a percentage score but use a curve to ensure that the average grade is approximately a B+.

Class Topic Outline (subject to change)

Topic	***Readings (in addition to Perman et al.)***	***Important Dates***	***Perman Chapter(s)***
I. Course Introduction			
Course overview			
Math review (production example)		HW1 Due 1/29	
Discounting			
2. Environmental Economics			
Introduction	Fullerton and Stavins 1998 Oates 2006		1-3
Externalities			
Public goods		HW2 due 2/12	
Policies to correct market failures	Coase 1960 Goulder and Parry 2008 Gillingham et al 2013 Schmalensee and Stavins 2013 Hornbeck 2010	No class on 2/26	5-7
General equilibrium considerations			4,8
Benefit-cost analysis			11
Environmental Valuation: revealed and stated preferences	Carson 2000 Muehlenbachs et al 2015	HW3 due 3/4	12
Environmental economics and trade			10
Climate change economics	Goulder and Pizer 2006	Midterm Exam	9

	Weitzman 1974	(in class) 3/11	
3. Resource Economics		Spring Break: No Class 3/14, 3/16, 3/18	
Land: rents, scarcity, and land use	Mendelsohn et al 1994		
Tragedy of the Commons: and institutions to correct	Hardin 1968 Homans and Wilen 1997	Proposal rough draft due 3/25	
Forestry: from maximizing biomass to maximizing net value	Hartwick McDermott 2015	4/1—no class	18
Nonrenewable Resources: sustainability and the optimal use over time	Hotelling 1931 Sinn Green Paradox Tierney Betting on the Planet	HW4 due 4/6	15
Renewable Resources—The Fishery: Maximum economic yield Population models	Gordon 1954 Bromley 2015		17
Development and the environment: ecosystem services	Ferraro et al 2012		
Development and the environment: resource management	Samuelson 1974 Ostrom 2002	HW 5 due 4/25	
Optimal Control Overview			
Student Presentations		May 2, 4, and 6: present (and hand in) thesis proposal	
Final Exam		Take-home, due May 12th by 10am	