

## Syllabus of Economics 436

Environmental Economics

Spring 2015

Hendrik Wolff

Emails<sup>1</sup>:

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**Course learning goals and course description:** The field of environmental economics examines how environmental resources (e.g. clean air, water, greenhouse gases) are developed and managed. This course aims at equipping students with economic methods and tools to analyze basic environmental issues. This is important because over the next years, policymakers will have to make crucial decisions that will define the future of the environment, transportation and energy. Here are some of the questions and issues that will guide this course: The way we commute, drive and which energy sources the society will use in 30 or 50 years will likely be fundamentally different from today. Will it be the electric car, public transportation, solar energy or natural gas? How will cities adapt to the challenges of increasing urbanization and air pollution? How do firms and households respond to incentives, policy instruments and new technologies? What are the consequences in terms of air quality, health and economic well-being? These are important questions that environmental economists try to answer. This course hence combines theoretical analysis with discussions on specific environmental policies as applied to water, air pollution, energy, climate change and human health issues. Within these examples, particular topics that will be covered are the concepts of sustainability, microeconomic analysis of environmental regulation, the problem of social cost, policy instrument choice, and estimating costs and benefits of environmental improvements via revealed preferences (hedonic analysis, travel cost method, household production) or stated preferences.

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<sup>1</sup> Feel free to email me any time at [hgwolff@u.washington.edu](mailto:hgwolff@u.washington.edu). Please note, however, that emails with questions regarding course material very shortly before problem set due dates or exams will NOT be answered. As a general rule: If I reply to an email, I may typically include into the cc of the email all other students of the class too via [econ436a\\_wi15@uw.edu](mailto:econ436a_wi15@uw.edu). If you don't want that I reply your email to all students, please let me know in your email, otherwise I assume that the email is "forwardable".

Also students can email to the entire class by sending an email to [econ436a\\_sp15@uw.edu](mailto:econ436a_sp15@uw.edu). Please note you have to use your UW email account to successfully email to [econ436a\\_sp15@uw.edu](mailto:econ436a_sp15@uw.edu). To avoid spams, all other email accounts (except your UW email account) will NOT arrive at [econ436a\\_sp15@uw.edu](mailto:econ436a_sp15@uw.edu) and will be DELETED.

## Class Sessions

There will be two meetings per week, each lasting one hour and fifty minutes, Mondays and Wednesdays from 12:30pm to 2:20pm in Savery Hall 264. Students are expected to do the suggested readings before the class. Since part of the exams, the in class quizzes are often “open book”, it is suggested that you bring the respective reading material to class. Active participation in the class is encouraged.

## Office Hours:

My weekly office hours are Tuesdays 15:40 to 17:00, Savery Hall Room 349. If this time window systematically conflicts with your time schedule, please let me know in class, so that we can find a different time. Also, feel free to email me at [hgwolff@u.washington.edu](mailto:hgwolff@u.washington.edu) for any research or urgent course related questions.

## Exams:

There will two 100 minute midterm exams. They are scheduled for:

- (a) **Exam 1:** April 29
- (b) **Exam 2:** June 1

A small portion (typically the last 15 minutes) of these exams may be “open book”. Hence feel free to bring the required Kolstad textbook that we have used during the quarter if you think it could help you.

## Assessment & Evaluation

Class Participation: 10%

Problem Sets: 20%

Midterm Test1: 35%

Midterm Test2: 35%

## Problem Sets:

- (a) During the quarter you or your study group of max. 3 students will go over several problem sets which will require you to apply the topics we discuss in class and in the readings. In order to solve the problem sets some amount of math (calculus and a limited amount of statistics) is required.
- (b) You are **encouraged** to work in your group on the problem sets. You should write all the names of the group members that participated in your study/problem set on each of the problem sets and your group name.
- (c) Grading of the problem sets: The total number of problems sets is not fixed yet. Let's say, we have in total  $M$  problem sets. For your final grade  $M-1$  problem sets will be taken into account only. The problem set that will be dropped from the evaluation is your problem set that received the least points during the quarter. So your study group can screw up once without regret.
- (d) Please write legibly or use a computer.
- (e) All questions on your HW solutions have to be answered in the same sequence as the questions are asked.
- (f) Generally, PSs are due 1:30pm on the due date. If you or your group misses the deadline, you'll obtain 0 points for the PS.

## Course outline

The outline of the course is as follows:

### 1. Introduction:

Note: This Introduction is based on Barry C. Field and Martha K. Field: Environmental Economics, An Introduction. Sixth Edition, McGraw-Hill Irwin. (prior Editions also work well)

What is “Environmental Economics”?

Why is it important?

A first simple model on the “Economy and the Environment”

→ Derivation of 4 Policy Options to reduce impact of Economy on the Environment

→ Quick overview of Implementation of Policy Option: Ch. 11 of Kolstad.

4 Categorizations of Environmental Pollutants according to Economic Criteria

### 3. Social Choice: How Much Environmental Protection? (Chapter 3 of Kolstad)

Individual Preferences Regarding Environmental Protection

Biocentrism

Anthropocentrism

Sustainability

Heal, Geoffrey (2012): Reflections—Defining and Measuring Sustainability. *Review of Environmental Economics and Policy*, pp. 1–17  
doi:10.1093/reep/rer023

Solow, R. M. (1991). Sustainability: An economist's perspective. *The Eighteenth J. Seward Johnson Lecture*. Woods Hole, MA: Woods Hole Oceanographic Institution.

EPA on Sustainability (Handout)

Social Choice from Individual Values

Social Choice Mechanisms

Pareto Criterion

Potential Pareto Improvement

Compensation Principle (Kaldor Hicks)

Social Welfare Functions

Arrows Impossibility Theorem

Criticism of Utilitarianism

### 4. Efficiency and Markets

Efficiency in the Exchange of Goods and Bads

Efficiency in Production

First Welfare Theorem

Second Welfare Theorem

Consumer and Producer Surplus

Cost Benefit Analysis

### 5. Market Failure: Public Bads and Externalities

Public Goods and Bads

Pricing of Private versus Public Goods and Bads

Lindahl Prices and free riding

Externalities

### 6. Methods to derive the Demand for Environmental Goods

Hedonic Price Method

Property Values  
Wage Regressions and Value of Statistical Life  
Household Production  
Defensive Expenditures  
Travel Cost Method  
Stated Preferences via Contingent Valuation  
Use versus Non-use values  
Willingness to Pay versus Willingness to Accept  
Discussion see  
Journal of Economic Perspectives: Vol. 26 No. 4 (Fall 2012) the articles:  
1) From Exxon to BP: Has Some Number Become Better Than No  
Number? (pp. 3-26) by Catherine L. Kling, Daniel J. Phaneuf and Jinhua  
Zhao,  
2) Contingent Valuation: A Practical Alternative When Prices Aren't  
Available (pp. 27-42) by Richard T. Carson and  
3) Contingent Valuation: From Dubious to Hopeless (pp. 43-56) by Jerry  
Hausman

### **7. Regulating Pollution: An Overview:**

Command and Control vs.  
Environmental Taxes vs.  
Cap and Trade vs.  
Liability

### **8. Pigouvian Fees**

Single Polluter single damage  
Single Polluter multiple damages  
Multiple Polluter and the Equimarginal Principle  
Fees Versus Subsidies  
Fees and Imperfect Competition

### **9. Regulation with Unknown Control Costs**

Prices versus Quantities (Environmental Taxes versus Cap and Trade)

### **10. Coase Theorem and Allocation of Property Rights**

## **Reading and Textbooks**

The following book is **required**:

Charles Kolstad: "Environmental Economics", Oxford University Press, Second Edition.

Please see also the continuously update website

<http://www.econ.ucsb.edu/~kolstad/EEBook/Errata.htm>

for errata.

Also, I will draw some of the material from:

Nick Hanley, Jason F. Shogren and Ben White: "Environmental Economics, In Theory and Practice", 1997

as well as from

Barry C. Field and Martha K. Field: Environmental Economics, An Introduction. Fourth Edition, McGraw-Hill Irwin.

If you would like to purchase textbooks, then—next to the book by Charles Kolstads, that is required—I'd like to recommend the textbook by Field & Field. Kolstads book is more formal than the latter and prepares you well for mastering the mathematical-conceptual part of environmental economics, the homework and the exams. The Fields & Field book is less technical but more intuitive and provides useful applications of the theory to typical environmental problems in practice.

Some other reading will consist of journal articles, which summarize key advances in the theoretical literature or provide recent empirical examples of evaluating environmental policies. These articles will be distributed in class.

### **Overload Policy / Add Codes:**

Thank you for your interest in ECON 436 – Environmental Economics. Please email the instructor if you like to have an add code. Add code will also be given the very first day, January 5 at our first meeting.

### **Missed Classes:**

If you miss a class, it is your responsibility to get a copy of the lecture notes from your class mates. Please note that I do not provide private one to one lectures or summaries via email of what has been covered in class. However, that being said, always feel free to come to my office hours with questions concerning the class material, homework, or your group work research ideas.

### **Help with Writing**

The Odegaard Writing & Research Center offers free, one-to-one help with all aspects of writing at any stage in the writing process -- even if all you have is the assignment sheet. To make an appointment and browse the center's online resources, please visit: <http://www.depts.washington.edu/owrc>. Located on the third floor of the Odegaard Library, in room 326, the OWRC is open Sunday from 1:30-6:00pm and Monday-Thursday from 12:00-9:00pm. To make the best use of your time at the OWRC, please bring a copy of your assignment with you, along with notes and course readings to help tutors better understand the writing context. We'll have lots of questions for you, but please know that the OWRC will not proofread papers or talk with you about grades. Instead we're here to support you long-term as a writer by helping you develop good habits and strategies suitable for a variety of writing situations.

### **And finally two important messages**

**a) by the UW Human Resources:**

Violence awareness and prevention remains an important issue. Please include the following information in the announcement section of your course syllabi:

**\*UW SafeCampus\***

Preventing violence is everyone's responsibility. If you're concerned, tell someone.

- \* Always call 911 if you or others may be in danger.
- \* Call 206-685-SAFE (7233) to report non-urgent threats of violence and for referrals to UW counseling and/or safety resources. TTY or VP callers, please call through your preferred relay service.
- \* Don't walk alone. Campus safety guards can walk with you on campus after dark. Call Husky NightWalk 206-685-WALK (9255).
- \* Stay connected in an emergency with UW Alert. Register your mobile number to receive instant notification of campus emergencies via text and voice messaging. Sign up online at [www.washington.edu/alert](http://www.washington.edu/alert)

For more information visit the SafeCampus website at

[\\*www.washington.edu/safecampus\\*](http://www.washington.edu/safecampus).

**b) By the department policy on Academic Conduct:**

Academic integrity is the cornerstone of the Department's rules for student conduct and evaluation of student learning. Students accused of academic misconduct will be referred directly to the Office of Community Standards and Student Conduct for disciplinary action pursuant to the Student Conduct Code and, if found guilty, will be subject to sanctions. Sanctions range from a disciplinary warning, to academic probation, to immediate dismissal for the Department and the University, depending on the seriousness of the misconduct. Dismissal can be, and has been, applied even for first offenses. Moreover, a grade of zero can be assigned by the instructor for the course.

Please see [http://econ.washington.edu/undergrad/academic\\_conduct/](http://econ.washington.edu/undergrad/academic_conduct/) for all details of the rules.