

**UNIVERSITY OF WATERLOO**  
**Department of Economics**  
**Economics 357 – Environmental Economics**  
**Spring 2012**

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**Office Hours:** 4:00-5:30 pm, TTh, or by appointment  
**Time of Lecture:** 2:30-3:50 pm, TTh  
**Location of Lecture:** PAS 1229

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## **Course Description**

This course is concerned with the application of microeconomic theory to environmental problems, such as air and water pollution. It also draws from other branches of economics such as industrial organization and public finance. The course is divided in three main sections. The first section defines the field of environmental economics in relation to general economics and to ecological and resource economics. The second section provides a quick review of the theory of efficiency of markets and market failure. The final section presents and evaluates different regulatory means to deal with pollution control.

## **Course Objectives**

At the end of the course, every student should be able to:

- Describe and explain the interactions between the economy and the environment;
- Explain the economic concepts of property rights and market failure, and how they relate to environmental problems;
- Discuss the relative comparability of regulatory tools used to internalize environmental damage.

## **Prerequisites**

ECON 201 is a prerequisite for the success in this course. Also required are basic algebra, such as solving two linear equations in two unknowns, and calculus.

## Textbooks

The students' main support for this course will be the following textbook:

Kolstad, C. D. (2011), *Environmental Economics*, Oxford University Press, 2<sup>nd</sup> edition.

This required textbook is available for purchase in the UW bookstore. Students who opt to use the first edition of the textbook will note that the chapter references differ from those listed in the tentative timetable provided in this syllabus. It is their own responsibility to make sure that they read the appropriate chapters.

In addition, we will draw some material from the following references:

- Coase, R. H. (1960), "The problem of Social Cost", *Journal of Law and Economics*, 3: 1-44.
- Dasgupta, P. (1990), "The Environment as a Commodity", *Oxford Review of Economic Policy*, 6(1): 51-67.
- Fullerton, D. and R.N. Stavins (1998), "How Economists See the Environment", *Nature*, 395(6701).
- Hahn, R.W. and R.N. Stavins (2010), "Why Cap-and-Trade Should (and Does) Have Appeal to Politicians", *Vox*, April 13.
- Kneese, A. V. and W. D. Schulze (1985), "Ethics and Environmental Economics", Chapter 5 in A.V. Kneese and J. L. Sweeney (eds), *Handbook of Natural Resource and Energy Economics*, vol I, North-Holland, Amsterdam: 191-220.
- Perman, R., Ma, Y., McGilvray, J., and M. Common (2003), *Natural Resource and Environmental Economics*, Third Edition, Pearson / Addison Wesley.
- Stavins, R. (1996), "Economic Thinking in Environmental Coverage: It's Not Accounting", *Quill*, 84(1): 31-34.
- Solow, R. M., Jodha, N.S. and H. Uzawa (2003), "Perspectives on Environmental Economics", in K-G. Mäler and J.R. Vincent (eds) *Handbook of Environmental Economics*, edition I, vol III, Elsevier: 1-6.

These additional references will be either put on reserve (3 hours) in the Dana Porter Library or posted on Waterloo-Learn.

## Evaluation

- Students will be evaluated based on the following activities:
  1. An essay on a topic to be chosen from a list that will be distributed early in the term. Alternatively, you may opt to write on any environmental related issue of your choice,

which must be approved in advanced by the instructor. This exercise is a chance for you to apply the theoretical skills you will gain from the course to analyze a real-world environmental problem. The essay should be typed, double-spaced, and between 7 and 8 pages long (excluding the bibliography, figures and tables). The essay will be graded in two parts. The first part consists in an outline of the essay topic (description of the main issues and annotated bibliography), which is due on June 7<sup>th</sup> by the end of class. The second part consists in the final draft and is due on July 19<sup>th</sup> by the end of class. Late submissions of the outline and/or final draft will be given a 5% penalty per each day or part of the day that they are late. More details about the essay will be provided in class.

2. A midterm test to be written on Thursday June 21<sup>st</sup> during class time and in the room classes are held. The midterm will cover all material discussed in class up to the midterm date as well as all required readings. The emphasis of the test will be on problem solving rather than discussion questions. More details about the content and the format of the test will be provided in class.
  3. A final exam to be scheduled by the registrar's office during the official examination period. The final exam will be cumulative, i.e. it will cover all material discussed in class and all required readings during the entire term. The format of the final exam will be similar to that of the midterm.
- Two sets of practice problems and exercises will be distributed throughout the term. Solutions to the problems will be reviewed in class in preparation for the midterm and the final exam. You are strongly encouraged to work on the practice problems and exercises in study groups. This constitutes a great way to help each other in your learning process. However, I expect every student to reflect personally on the questions prior to group discussions, and to make sure that he/she is able to write up as well as understands the solutions to the problems.
  - The overall mark for the course will be determined as follows:

<b>Evaluation Activity</b>	<b>Date</b>	<b>Weight</b>
Essay - Outline	Thursday, June 7 <sup>th</sup>	5%
Midterm	Thursday June 21 <sup>st</sup>	25%
Essay - Final Draft	Thursday, July 19 <sup>th</sup>	20%
Final Exam	TBA by the registrar	50%

- If it is to a student's benefit, the midterm mark will be dropped and the corresponding weighting shifted to the final exam.

# Topics to Be Covered

1. Introduction
  - 1.1. The environment and economics
  - 1.2. Normative and positive economic analysis
  
2. Efficiency, optimality, and market failure
  - 2.1. Social choice: how much environmental protection?
  - 2.2. Economic efficiency
  - 2.3. Market failure: public bads and externalities
  - 2.4. Measuring the demand for environmental quality
  - 2.5. Environmental valuation techniques
  
3. Regulation of pollution
  - 3.1. Overview of regulatory issues and basic regulatory instruments
  - 3.2. Emission prices and fees
  - 3.3. Property rights
  - 3.4. Comparison of environmental regulation instruments
  - 3.5. Regulation with unknown control costs

## Tentative Timetable and Readings\*\*

**\*\*Note:** Some topics may require more or less emphasis than planned below. As a consequence, this timetable will be adapted as needed as we move through the term. Readings marked with an asterisk (\*) are required to be read prior to the corresponding lecture. \*\*

Date	Topics	Readings
Tuesday, May 1	Course organization and introduction	
Thursday, May 3	Self Knowledge Test The environment and economics	*Kolstad (2011), Ch 1
Tuesday, May 8	The environment and economics	*Kolstad (2011), Ch 1
Thursday, May 10	The environment and economics Essay details	*Solow et al. (2005) *Fullerton and Stavins (1998)
Tuesday, May 15	Normative and positive economic analysis How much environmental protection?	*Kolstad (2011), Ch 2 *Kolstad (2011), Ch 3
Thursday, May 17	How much environmental protection?	*Kolstad (2011), Ch 3 Kneese & Schulze (1985)
Tuesday, May 22	<b>No Class (Monday Schedule)</b>	
Thursday, May 24	Efficiency and markets	*Kolstad (2011), Ch 4
Tuesday, May 29	Efficiency and markets	*Kolstad (2011), Ch 5
Thursday, May 31	Market failure: public bads and externalities	*Kolstad (2011), Ch 5
Tuesday, June 5	Market failure: public bads and externalities	*Kolstad (2011), Ch 5 Dasgupta, P. (1990)
Thursday, June 7	Measuring the demand for environmental quality; <b>Essay outline due</b>	Perman et al. (2003), Ch 12
Tuesday, June 12	Environmental valuation techniques	Perman et al. (2003), Ch 12
Thursday, June 14	Overview of regulation issues and basic regulatory instruments	*Kolstad (2011), Ch 11
Tuesday, June 19	Review for midterm test: practice problems and exercises	
Thursday, June 21	<b>Midterm</b>	
Tuesday, June 26	Overview of regulation issues and basic regulatory instruments	*Kolstad (2011), Ch 11 *Stavins (1996)
Thursday, June 28	Emission prices and fees	*Kolstad (2011), Ch 12
Tuesday, July 3	Emission prices and fees	*Kolstad (2011), Ch 12
Thursday, July 5	Property rights	*Kolstad (2011), Ch 13 Coase (1960)
Tuesday, July 10	Property rights	*Kolstad (2011), Ch 13
Thursday, July 12	Comparison of regulation instruments	Perman et al. (2003), Ch 7
Tuesday, July 17	Regulation with unknown control costs	Perman et al. (2003), Ch 8 *Hahn and Stavins (2011)
Thursday, July 19	Regulation with unknown control costs <b>Essay due</b>	Perman et al. (2003), Ch 8
Tuesday, July 24	Review for final exam: practice problems and exercises	

### **Important note on class attendance:**

Regular attendance of lectures is strongly recommended, and active class participation (questions and comments from students) is encouraged. Lecture notes and corresponding readings should not be considered as perfect substitutes for class attendance. Students are responsible for all material covered in class, whether or not they are in the lecture notes and required readings. If a student misses a class for whatever reason, it is his/her own responsibility to make sure that he/she gets access to all the material and information discussed in class.

### **Policy on missed exams:**

No make-up test will be provided for the midterm. Students who miss the midterm test and do not have a relevant medical certificate will receive a mark of zero. Should you miss the midterm test, and can provide appropriate justification to the instructor (the UW verification of illness form is required), the weight of the midterm will be transferred to the final exam.

The final exam will be scheduled by the Registrar's Office during the examination period. It is the student's responsibility to make him/her available for the entire examination period, and travel plans are not a sufficient reason to have a final exam deferred. [See the following webpage for details: <http://www.registrar.uwaterloo.ca/exams/finalexams.html>] You are very strongly encouraged to write your final exam at the scheduled time and place. A student who has compelling evidence that he/she is unable to write the final examination at the scheduled time **MUST** petition the economics department to write the deferred final examination. For more details about the procedure that the economics department for deferred final examinations, please follow and read carefully the message on the URL below: <http://economics.uwaterloo.ca/DeferredExams.html>

### **Policy on remarking of tests:**

If you feel that your test was not marked properly, you must advise the instructor **within 6 calendar days** of the date on which the test is handed back to the class. Any student that submits a test for remarking should understand that the entire test will be remarked and that their grade may improve, remain unchanged or perhaps even decrease as a result of the remarking process.

### **Pickup of marked assignments**

Midterm papers and essay's outlines will be returned in class after marking. Papers that are not picked up in class on the day they are returned will be available for pickup at the TA office during the TA office hours. Marked papers and outlines will be returned only to the students who wrote them (a valid student ID is required for your identification).

### **Communication with the instructor:**

When e-mailing the instructor, you should always use your university e-mail address. Please also write ECON 357 on the subject line of the e-mail, and include your name and student ID number in your message. Please only e-mail the instructor for administrative purposes. I will not answer any questions regarding the course material or the structure of assessment (content

and/or format of essay, midterm, and final) by e-mail or phone. However, I welcome as many questions as possible during class time and/or my office hours.

### **Academic Integrity:**

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check <http://www.uwaterloo.ca/academicintegrity/> for more information.]

### **Grievance:**

A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70 - Student Petitions and Grievances, Section 4, <http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm>. When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.

### **Discipline:**

A student is expected to know what constitutes academic integrity [check <http://www.uwaterloo.ca/academicintegrity/>] to avoid committing an academic offence, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offences and types of penalties, students should refer to Policy 71 - Student Discipline, <http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm>. For typical penalties check Guidelines for the Assessment of Penalties, <http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm>.

### **Appeals:**

A student may appeal the finding and/or penalty in a decision made under Policy 70 - Student Petitions and Grievances (other than regarding a petition) or Policy 71 - Student Discipline if a ground for an appeal can be established. Read Policy 72 - Student Appeals, <http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm>

### **Note for students with disabilities:**

The Office for Persons with Disabilities (OPD), located in NH1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the OPD at the beginning of each academic term.