

**UNIVERSITY OF WATERLOO**  
**Department of Economics**  
**Economics 357 – Environmental Economics**  
**Winter 2020**

**Instructor:** Alain-Désiré Nimubona  
**Office:** HH 212, ext. 33949  
**E-Mail:** [animubona@uwaterloo.ca](mailto:animubona@uwaterloo.ca)

**Office Hours:** 3:00-4:30 pm, T&Th  
**Class Schedule:** 10:30-11:20 pm, MW&F  
**Location of Lecture:** AL 208

**Communication with the instructor:**

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

---

## **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 (or Econ 290) 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) at 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, which can be done

either individually or in a group consisting of at most two students, 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 14 and 16 pages long (excluding the bibliography, figures and tables). The essay will be graded in two parts. The first part consists of an outline of the essay topic (description of the main issues and annotated bibliography), which is to be handed in during class on February 5<sup>th</sup>. The second part consists of the final draft, and it is to be handed in during class on April 1<sup>st</sup>. Late submissions of the outline and/or final draft will be given a 5% penalty per each calendar 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 Friday February 28<sup>th</sup> during class time. The midterm will cover all material discussed in class up to the midterm date as well as all required readings. 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	Wednesday, February 5 <sup>th</sup>	5%
Midterm	Friday, February 28 <sup>th</sup>	25%
Essay - Final Draft	Wednesday, April 1 <sup>st</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. However, a student who misses the midterm test without justification will receive a mark of zero, which will be accounted for in the calculation of his/her final mark. If you miss the midterm and can provide appropriate documentation (the UW verification of illness form is required), the weighting of the missed midterm will automatically be 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

## Readings

**\*\*Important note:** Readings marked with an asterisk (\*) are required. \*\*

Topics	Readings
The environment and economics	*Kolstad (2011), Ch 1 *Solow et al. (2003) *Fullerton and Stavins (1998)
Normative and positive economic analysis	*Kolstad (2011), Ch 2
How much environmental protection?	*Kolstad (2011), Ch 3 Kneese & Schulze (1985)
Efficiency and markets	*Kolstad (2011), Ch 4
Market failure: public bads and externalities	*Kolstad (2011), Ch 5 Dasgupta, P. (1990)
Measuring the demand for environmental quality	Perman et al. (2003), Ch 12
Environmental valuation techniques	Perman et al. (2003), Ch 12
Overview of regulation issues and basic regulatory instruments	*Kolstad (2011), Ch 11 *Stavins (1996)
Emission prices and fees	*Kolstad (2011), Ch 12
Property rights	*Kolstad (2011), Ch 13 Coase (1960)
Comparison of regulation instruments	Perman et al. (2003), Ch 7
Regulation with unknown control costs	Perman et al. (2003), Ch 8 *Hahn and Stavins (2011)

### **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 or in the required readings. Please note that I will not share my notes with anyone for any reasons. 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 electronic devices:**

The use of electronic devices is prohibited during class time. Laptop computers may only be used for the purpose of class activities. Photographing people or course materials, and audio or video recordings by all means and devices are also prohibited.

### **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, which will be accounted

for in the calculation of their final marks. Should you miss the midterm and can provide an appropriate justification to the instructor (the UW verification of illness form is required), the weighting 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 uses for deferred final examinations, please follow and read carefully the policy for deferred final examinations at: <http://economics.uwaterloo.ca/policies-and-resources>

### **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 would 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 they have been marked. Papers that are not picked up in class on the day they are returned will be available for pickup at my office during my 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).

### **Cross-Listed Course:**

Please note that a cross-listed course will count in all respective averages no matter under which rubric it has been taken. For example, a PHIL/PSCI cross-list will count in a Philosophy major average, even if the course was taken under the Political Science rubric.

### **Academic Integrity:**

**Academic Integrity:** In order to maintain a culture of academic integrity, members of the University of Waterloo are expected to promote honesty, trust, fairness, respect and responsibility.

**Discipline:** A student is expected to know what constitutes academic integrity, to avoid committing academic offences, 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 offenses and types of penalties, students should refer to Policy 71 - Student Discipline, <http://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-71> .

**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://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-70> . In addition, consult <http://arts.uwaterloo.ca/student-grievances-faculty-arts-processes> for the Faculty of Arts' grievance processes.

**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://uwaterloo.ca/secretariat/policies-procedures-guidelines/policy-72> .

**Academic Integrity website (Arts):**

[http://arts.uwaterloo.ca/arts/ugrad/academic\\_responsibility.html](http://arts.uwaterloo.ca/arts/ugrad/academic_responsibility.html)

**Academic Integrity Office (uWaterloo):** <http://uwaterloo.ca/academic-integrity/>

### **Accommodation for Students with Disabilities:**

**Note for students with disabilities:** The AccessAbility Services (AS) Office, located in Needles Hall, Room 1401, 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 AS Office at the beginning of each academic term.

### **Mental Health Services**

Mental Health Services aim is to provide holistic programming and services to help you lead a healthy and balanced life. We strive to provide a secure, supportive environment for students of all orientations and backgrounds.

Students suffering from problems with anxiety, depression, problems with sleep, attention, obsessions or compulsions, relationship difficulties, severe winter blues, etc., may make an appointment by phone or in person. Appointments are usually available within two days of initial contact with one of our medical doctors. All contacts are completely confidential.