

**University of Waterloo  
Department of Economics  
ECON 457  
Environmental Economics  
Winter 2022**

***Instructor Information***

Instructor: Alain-Désiré Nimubona  
Office Hours: by appointment via Teams  
Email: [animubona@uwaterloo.ca](mailto:animubona@uwaterloo.ca)

***Class meeting times and Location***

In-person lectures: Mondays and Wednesdays, 4:00-5:20 pm  
Location: HH 1106

Important note: Classes will happen remotely until at least January 24. In-person classes will resume as of January 24, as public health conditions allow.

***Course Objectives and Learning Outcomes***

This course is concerned with the application of microeconomic theory to environmental problems - such as air, water, and land 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 control pollution.

**Learning Outcomes:**

By the end of the course, a 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.

## Course Materials

### Recommended Texts:

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

Perman, R., Ma, Y., Common, M., D. Maddison, and J. McGilvray (2011), *Natural Resource and Environmental Economics*, Fourth Edition, Pearson / Addison Wesley.

It is required that students complement lecture materials with the reading of relevant chapters from the textbook. Students who opt to use earlier versions of the textbook are responsible to make sure that they read the appropriate chapters. This textbook will be available for purchase at the UW BookStore, and there to the two digital options (subscription or lifetime access) as described in the link below

<https://uwaterloo-store.vitalsource.com/products/natural-resource-and-environmental-economics-roger-perman-yue-ma-michael-v9780273760375?term=9780273760375>

In addition, we will draw some materials from academic journals -such as the Journal of Association of Environmental and Resource Economists (JAERE), the Journal of Environmental Economics and Management (JEEM), and Environmental and Resource Economics (ERE)- as well as from the following references:

- Kolstad, C.D. (2000), *Environmental Economics*, Oxford University Press.
- Thomson, W. (2001), *A Guide for the Young Economist: Writing and Speaking Effectively about Economics*, The MIT Press.

These additional materials will be either put on eReserves or posted on Learn.

### Materials Available on LEARN:

The course materials (lecture slides, problem sets, readings not available online, etc.) for the topic scheduled for each week will be accessible on LEARN at the beginning of that week.

## Course Assessments

Assessment	Percent of final grade	Date
<i>Assignment 1-Research Proposal</i>	10%	Jan. 31
<i>Assignment 2-Literature review and outline</i>	10%	Feb. 28
<i>Assignment 3-Paper Review Report</i>	10%	Mar. 9
<i>Midterm Test</i>	40%	Mar. 23
<i>Research Paper Final Draft</i>	30%	Ap. 13

Your final grade will be calculated based on the following evaluation activities:

- **A research paper (50%):**
  - You may choose to do a case study, develop an economic model, or conduct an econometric analysis of any environmental related issue of your choice. Note that the instructor must approve in advance the topic of your research paper.
  - Percentages of the final grade and due dates for each step towards the writing of your research paper are as follows:
    1. A two-page description of the specific question(s) you intend to explore as well as a bibliography of at least 10 academic papers: due on Monday, January 31<sup>st</sup> (10%).
    2. A literature review and a detailed outline of your paper: due on Monday, February 28<sup>th</sup> (10%).
    3. A final draft of your research paper: due on Wednesday, April 13<sup>th</sup> (30%).
  - Assignments related to the research paper are to be submitted to the designated Dropbox on LEARN. A deduction of 5% per day will be applied to an assignment handed in late.
  - More details about the research paper will be provided during the term.
  - Students with a concern about the marking of any component of their research paper must consult with me within two weeks of the date that it is returned to the class. After two weeks, I will not make any adjustments to their mark.
- **A paper review report (10%):**
  - Students are to write a review report (between 1,000-1,500 words) about a paper of their choosing published in any of the following journals: Journal of Association of Environmental and Resource Economists (JAERE), Journal of Environmental Economics and Management (JEEM), or Environmental and Resource Economics (ERE). Note that the instructor must approve in advance your paper selection.
  - The due date for this review report is March 9. However, students are encouraged to start working on their reports as soon as possible after the beginning of the term.
  - Review reports are to be submitted to the designated Dropbox on LEARN. A deduction of 5% per day will be applied to a report handed in late.
  - More details about the review report will be provided during the term.
  - Students with a concern about the marking of their reports must consult with me within two weeks of the date that it is returned to the class. After two weeks, I will not make any adjustments to their mark.
- **A midterm exam (40%):**
  - If in-person classes have resumed, the midterm will be held in-person during class time on March 23. Otherwise, it will be online and administered through LEARN.

- Should the midterm be administered online, students will be able to start the midterm during a specified window of time. Once started, only one attempt will be permitted and the midterm must be completed within a specified time limit. More details about the midterm will be announced on LEARN.
- Students with a concern about the marking of the midterm must consult with me within two weeks of the date that it is returned to the class. After two weeks, I will not make any adjustments to their mark.

### ***Required Background***

- Prerequisites are ECON 102, ECON 391; One of ECON 322, STAT 221, STAT 231, STAT 241, or other equivalent courses as listed in the academic calendar.

### ***Policy on missed midterms***

- A student who misses the midterm due to illness or other extenuating circumstances may seek my approval to write a deferred midterm. Approval will be granted only if appropriate documentation is submitted. If the student does not receive my approval, then a mark of zero will be assigned for the missed midterm. **Students must submit their documentation within one week of the missed midterm.**

### ***Live sessions, office hours and contacting the instructor***

Until in-person classes can resume, I will hold a once a week live session during which I will go through lecture materials, answer student questions and/or go over a problem or other course material. Please note that for the live sessions, we will use the following scheduled class time: Wednesday from 4:00 to 5:20 pm EST.

When sending me email, please use your official UWaterloo account with ECON 457 in the subject line. Also, include a signature line with your full name. I am available for virtual office hours by appointment. Contact me via email for an appointment.

## **Weekly Course Schedule and Suggested Readings**

Important notes:

- Readings marked with a star (\*) must be done in advance of the class.
- Some topics may require more or less emphasis than planned initially. To reflect that need, this suggested schedule may be updated as we move through the term.

### **1. Introduction: The Environment and Economics**

**Week 1 (Jan. 5-7) and Week 2 (Jan. 10-14)**

Readings

- \*Perman et al. (Chapter 1)
- \*Kolstad (Chapters 1 & 2)
- Copeland, B. and M.S. Taylor (2015), “Environmental and Resource Economics: A Canadian Retrospective”, *Canadian Journal of Economics*, 50(5): 1382-1413.

### **2. Intergenerational Equity and Sustainability**

**Week 3 (Jan. 17-21)**

Readings:

- \*Perman et al. (Chapters 2, & 3)
- Brander, J.A. (2007), “Viewpoint: Sustainability: Malthus Revisited?” *Canadian Journal of Economics*, 40(1): 1-38.
- 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.
- Pommeret, A. and K. Schubert (2018), “Intertemporal Emission Permits Trading Under Uncertainty and Irreversibility”, *Environmental and Resource Economics*, 71:73–97.

### **3. Efficiency, Optimality, and Market Failure**

**Week 4 (Jan. 24-28) and Week 5 (Jan. 31-Feb. 4)**

Readings:

- \*Perman et al. (Chapter 4)
- Kolstad (4, 5, 6)
- Coase, R.H. (1960), “The problem of Social Cost”, *Journal of Law and Economics*, 3: 1-44.
- Smith, G., Day, B., and A. Binner (2019), “Multiple-Purchaser Payments for Ecosystem Services: An Exploration Using Spatial Simulation Modelling”, *Environmental and Resource Economics*, 74: 421–447.

#### 4. Design and Implementation of Environmental Policy

##### 4.1. Goals, principles, and constraints

##### Week 6 (Feb. 7-11) and Week 7 (Feb. 14-18)

###### Readings:

- \*Perman et al. (Chapter 5)
- Segerson, K. and J. Wu (2006). “Nonpoint Pollution Control: Inducing First-Best Outcomes Through the Use of Threats”, *Journal of Environmental Economics and Management*, 51, 165–184.
- Segerson, K. (1988). “Uncertainty and Incentives for Nonpoint Pollution Control”, *Journal of Environmental Economics and Management*, 15, 87-98.

##### Reading Week (Feb. 21-25)

##### 4.2. Instrument Choice and Policy Implementation

##### Week 8 (Feb. 28-Mar. 4), Week 9 (Mar. 7-11), and Week 10 (Mar. 14-18)

###### Readings:

- \*Perman et al. (Chapters 6 and 7)
- Kolstad (Chapters 4, 5, 7, 8, 9, & 10)
- Blackman, A., Li, Z., and A.A. Liu (2018), “Efficacy of Command-and-Control and Market-Based Environmental Regulation in Developing Countries”, *Annual Review of Resource Economics*, 10: 381-404.
- Crépin, A-S. (2005), “Incentives for Wetland Creation”, *Journal of Environmental Economics and Management*, 50: 598–616.
- Fischer, C., Parry, I. and W. Pizer (2003), “Instrument Choice for Environmental Protection when Technological Innovation is Endogenous”, *Journal of Environmental Economics and Management*, 45: 523-45.
- MacKenzie, I.A. and M. Ohndorf (2012), “Cap-and-Trade, Taxes, and Distributional Conflict”, *Journal of Environmental Economics and Management*, 63(1): 51-65.

##### Midterm Week (Mar. 21-25)

#### 5. Economic Valuation of the Environment

##### Week 11 (Mar. 28-Apr. 1)

###### Readings:

- \*Perman et al. (Chapter 12)
- Kolstad (Chapters 15, 16, 17)

- Dickie, M. and S. Gerking (1991), “Willingness to Pay for Ozone Control: Inferences from the Demand for Medical Care”, *Journal of Environmental Economics and Management*, 21(1): 1-16.
- Hanneman, M. (1991), “Willingness to Pay versus Willingness to Accept: How Much Can They Differ?”, *American Economic Review*, 81(3): 635-47.

## 6. Environmental Policy and the Porter Hypothesis

### Week 12 (Ap. 4-5)

#### Readings:

- \*Palmer, K., Wallace, E.O., and P.R. Portney (1995), “Tightening Environmental Standards: The Benefit-Cost or the No-Cost Paradigm?”, *Journal of Economic Perspectives*, 9(4): 119-32.
- Porter, M. C., and C. van der Linde (1995), “Toward a New Conception of Environment-Competitiveness Relationship”, *Journal of Economic Perspectives*, 9(4): 97–118.

### **Statements from the University included on all course outlines:**

**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 [the Office of Academic Integrity](#) 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](#). 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 to avoid committing an academic offence, and to take responsibility for his/her actions. [Check [the Office of Academic Integrity](#) for more information.] 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 instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to [Policy 71, Student Discipline](#). For typical penalties, check [Guidelines for the Assessment of Penalties](#).

**Appeals:** A decision made or penalty imposed under [Policy 70, Student Petitions and Grievances](#) (other than a petition) or [Policy 71, Student Discipline](#) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to [Policy 72, Student Appeals](#).

**Note for students with disabilities:** AccessAbility Services, 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 AccessAbility Services at the beginning of each academic term.

## ***Territorial Acknowledgement***

We acknowledge that we are living and working on the traditional territory of the Attawandaron (also known as Neutral), Anishinaabe and Haudenosaunee peoples. The University of Waterloo is situated on the Haldimand Tract, the land promised to the Six Nations that includes ten kilometres on each side of the Grand River.

For more information about the purpose of territorial acknowledgements, please see the [CAUT Guide to Acknowledging Traditional Territory](#).

## ***Other Information***

### *Intellectual Property*

Students should be aware that this course contains the intellectual property of their instructor, TA, and/or the University of Waterloo.

Intellectual property includes items such as:

- Lecture content, spoken and written (and any audio/video recording thereof);
- Lecture handouts, presentations, and other materials prepared for the course (e.g., PowerPoint slides);
- Questions or solution sets from various types of assessments (e.g., assignments, quizzes, tests, final exams); and
- Work protected by copyright (e.g., any work authored by the instructor or TA or used by the instructor or TA with permission of the copyright owner).

Course materials and the intellectual property contained therein, are used to enhance a student's educational experience. However, sharing this intellectual property without the intellectual property owner's permission is a violation of intellectual property rights. For this reason, it is necessary to ask the instructor, TA and/or the University of Waterloo for permission before uploading and sharing the intellectual property of others online (e.g., to an online repository).

Permission from an instructor, TA or the University is also necessary before sharing the intellectual property of others from completed courses with students taking the same/similar courses in subsequent terms/years. In many cases, instructors might be happy to allow



distribution of certain materials. However, doing so without expressed permission is considered a violation of intellectual property rights.

Please alert the instructor if you become aware of intellectual property belonging to others (past or present) circulating, either through the student body or online. The intellectual property rights owner deserves to know (and may have already given their consent).

### *Chosen/Preferred First Name*

Do you want professors and interviewers to call you by a different first name? Take a minute now to verify or tell us your chosen/preferred first name by logging into [WatIAM](#).

Why? Starting in winter 2020, your chosen/preferred first name listed in WatIAM will be used broadly across campus (e.g., LEARN, Quest, WaterlooWorks, WatCard, etc.). Note: Your legal first name will always be used on certain official documents. For more details, visit [Updating Personal Information](#).

### **Important notes**

- If you included a preferred name on your OUAC application, it will be used as your chosen/preferred name unless you make a change now.
- If you don't provide a chosen/preferred name, your legal first name will continue to be used.

### *Mental Health Support*

All of us need a support system. The faculty and staff in Arts encourage students to seek out mental health support if they are needed.

### **On Campus**

***Due to COVID-19 and campus closures, services are available only online or by phone.***

- Counselling Services: [counselling.services@uwaterloo.ca](mailto:counselling.services@uwaterloo.ca) / 519-888-4567 ext. 32655
- [MATES](#): one-to-one peer support program offered by the Waterloo Undergraduate Student Association (WUSA) and Counselling Services

### **Off campus, 24/7**

- [Good2Talk](#): Free confidential help line for post-secondary students. Phone: 1-866-925-5454
- Grand River Hospital: Emergency care for mental health crisis. Phone: 519-749-4300 ext. 6880

- [Here 24/7](#): Mental Health and Crisis Service Team. Phone: 1-844-437-3247
- [OK2BME](#): set of support services for lesbian, gay, bisexual, transgender or questioning teens in Waterloo. Phone: 519-884-0000 extension 213

Full details can be found online on the Faculty of Arts [website](#)

Download [UWaterloo and regional mental health resources \(PDF\)](#)

Download the [WatSafe app](#) to your phone to quickly access mental health support information.

#### *Academic freedom at the University of Waterloo*

[Policy 33, Ethical Behaviour](#) states, as one of its general principles (Section 1), “The University supports academic freedom for all members of the University community. Academic freedom carries with it the duty to use that freedom in a manner consistent with the scholarly obligation to base teaching and research on an honest and ethical quest for knowledge. In the context of this policy, 'academic freedom' refers to academic activities, including teaching and scholarship, as is articulated in the principles set out in the Memorandum of Agreement between the FAUW and the University of Waterloo, 1998 (Article 6). The academic environment which fosters free debate may from time to time include the presentation or discussion of unpopular opinions or controversial material. Such material shall be dealt with as openly, respectfully and sensitively as possible.” This definition is repeated in Policies 70 and 71, and in the Memorandum of Agreement, Section 6