

Natural Resources and Environmental Economics
ECONOMICS EC3374B-001
Department of Economics
Western University

January 2021

General Information:

Instructor: *Meghdad Rahimian*
Office: 4021B SSC
Email: mrahim4@uwo.ca
Office hours: *Thursdays, 1:00-3:00 pm,*

- *Office hours will be held on Zoom.*
- *Students can sign up for online appointments.*

Delivery mode: *online asynchronous lectures and Three synchronous sessions:*
"Live Sessions with Experts": on Thursday, March 11; Friday, March 19; and Thursday, March 25; from 1-3:00 pm

Course website: <https://owl.uwo.ca/portal>

Undergraduate inquiries: 519-661-3507 or SSC Room 4075 or econugrd@uwo.ca

Registration:

Please, make sure that you are correctly registered in this course; the Department will not release any of your marks until your registration is corrected. You may check your timetable by using the Login on the Student Services website at <https://student.uwo.ca>. If you notice a problem, please contact your home Faculty Academic Counsellor immediately.

Prerequisite Note:

The prerequisites for this course are **Economics 2221A/B** and **Economics 2261A/B**. The antirequisite for this course is **Economics 2172A/B**.

Please, ensure that you have successfully completed all course prerequisites and have not taken any anti-requisite courses. Lack of prerequisites may not be used as a basis for appeal. If you are found to be ineligible for a course, you may be removed from it at any time, and you will receive no adjustment to your fees. This decision cannot be appealed.

If you find that you do not have the course prerequisites, it is in your best interest to drop the course well before the end of the add/drop period. Your prompt attention to this matter will not only help protect your academic record but will ensure that spaces become available for students who require the course in question for graduation.

Course Objectives:

This course aims to develop the "standard" economist's approach to environmental problems and natural resource use, including the property-rights basis of environmental problems, efficient pollution control, benefit estimation procedures, and incentive-based regulation. However, this course also incorporates broader topics, notably, the ethical foundation of environmental economics, a focus on ecological economics and strong sustainability, a safety-based approach to controlling pollution, and the promotion of "clean technology."

Course Learning Outcomes:

By the end of the course, students will be able to identify, describe, and analyze different economic approaches to answer the fundamental questions in environmental economics:

- How much pollution (or resource degradation) is too much?
- Is government up to do the job?
- How can we do better?

Textbook(s) and Course Materials:

Economics and the Environment, 9th Edition, by Eban S. Goodstein and Stephen Polasky.

<https://bookstore.uwo.ca/product/cebcodeid34466> Full download

<https://bookstore.uwo.ca/product/cebcodeid34463> 150-days use

Attendance Requirements for online synchronous classes: A session with experts

The series of "live sessions with experts" are live sessions with experts or authorities in the relevant field. These sessions are an excellent opportunity for you to observe the challenges in environmental policy and R&D through professionals' lens. Three online sessions are planned for this course. Our distinguished guests conduct these sessions. Students enrolled in the class are required to attend and participate in these sessions at the scheduled times above. These classes' recordings will not be provided during the semester, except for students with approved accommodations or unexpected certified illness.

Please note that you should not enroll in this course if you cannot attend the live sessions with experts.

Communication:

- Students should check the course OWL site every 24-48 hours.
- A weekly update will be provided on OWL announcements.
- Emails will be monitored daily; students will receive a response in 24 – 48 hours.
- This course will use the OWL forum for discussions. Check the forum on Mondays.
- The discussion forums will be monitored daily by the instructor or teaching assistant.

Assessments and Grading:

- There are no exams, including midterm and final exams for this course.

- Each chapter has a few real-world "applications," given as assignments. For any single assignment, you can choose to write individually or with a partner (preferred). Assignments will constitute 50% of your final grade.
- For each session of "A live session with experts," you need to read the designated papers. Participating in the live session discussions and submitting a minimum two-page reflection on the session will constitute 30% of your final grade.
- Recording one group presentation (10%) and contributing discussions on the OWL forum (10%) will constitute 20% of your final grade. Starting from the third week, every week, one group (two to three persons) is assigned to record a 20-minute presentation video of a paper and upload it on the OWL forum. I will provide a list of papers later.
- Presentations should end with one or two thought-provoking questions. Other students should watch the presentation and reflect on the questions in the forum.

Notes on Assessment and Grading:

- This course covers one chapter every week. The deadline for submitting each chapter assignment is on Saturday of the same week by midnight. Late submissions are not accepted.
- I will eliminate the lowest grade of your assignment in calculating your final grade.
- The deadline for submitting the reflections on the live sessions are on Sunday of the same week by midnight. Late submissions are not accepted.
- During the live session weeks, we will continue covering new chapters and uploading the students' presentations; however, there is no chapter assignment.
- Each group has a full week to prepare a presentation. Presentations should be uploaded on OWL by Sunday at midnight of the same week, so the forum discussions begin on Mondays. Late submission of presentation is not accepted.

Topics Covered (tentative):

We will cover 13 chapters of the textbook:

Chapter 2 – Ethics and Economics

This chapter provides an introductory discussion of welfare economics. The point is to get students to direct their thinking about environmental ethics to a utilitarian framework. Whether growth in material consumption, independent of fairness and rights, necessarily leads to an overall increase in *social* welfare depends on the form specified for the social welfare function. Three different social welfare functions are presented: efficient ("distribution blind"), sustainable (no increase in consumption today at the expense of future generations), and safe (heavyweights on victim's welfare).

Chapter 3 - Pollution and Resource Degradation as Externalities

In this chapter, we first define pollution as an externality. We then analyze two different aspects of communal property that contribute to the degradation of the environment. First, the free access problem explains why individuals would knowingly damage a resource upon which they depend. Second, the public goods problem explains, in part, why people cannot "buy" a clean environment, either by suing polluters or purchasing wilderness. The main point is that free-market forces do not

provide the right incentives to ensure that adequate care is taken to protect our environment from efficiency or safety perspective.

Chapter 4 - The Efficiency Standard

This chapter begins by defining Pareto efficiency and shows that society's net monetary benefits are maximized at an efficient outcome. We then employ the notion of marginal costs and marginal benefits associated with pollution reduction to illustrate how one might identify an efficient pollution level. (The problems involved in actually measuring benefits and costs will be explored in Chapters 5 & 6). Students are introduced to the Coase theorem, and the polluter pays principle. Finally, the distinction between total and marginal benefits and costs is made clear.

Chapter 5 - Measuring the benefits of environmental protection

This chapter discusses the methods that economists use for valuing the non-market benefits of environmental quality. Concepts of use, option, and existence value are introduced; consumer surplus from increased consumption is presented as the theoretically appropriate measure of value. The differences between WTA and WTP measures are discussed, as are risk assessment procedures and risk perceptions. Finally, contingent valuation, travel cost, and hedonic regression methods are presented, with value-of-life estimates being used to illustrate the latter. The focus in the chapter is on the real problems faced in measuring non-market benefits.

Chapter 6 - Measuring the cost of environmental protection

This chapter explores the costs of environmental protection. Engineering cost data is much easier to obtain than non-market benefit information. Engineering cost estimates are only as good as their predictions regarding, for example, compliance and control technologies. However, engineering estimates do not generally incorporate opportunity costs. We explore the impact on the real cost of environmental protection when we consider negative or positive productivity impacts and employment effects. The chapter also contains a discussion of general equilibrium impacts, focusing on the double-dividend debate.

Chapter 7 - The safety standard

The safety standard is defined in terms of cancer risks greater than 1 in ten thousand; for other health and ecosystem risks, safety is less well-defined. Safety is defended ethically on the grounds of personal liberty. By arguing, as will be done in more detail in Chapter 11, because the welfare derived from consumption is relative rather than absolute, the foregone consumption buys very little happiness. Safety standards are criticized as inefficient, cost-ineffective, and regressive. (This is an excellent place to make a clear distinction between efficiency and cost-effectiveness.) The chapter ends by comparing efficiency and safety standards via the siting of noxious facilities and trade in hazardous waste.

Chapter 8 – The sustainability standard

This chapter begins with a broad overview, contrasting "neoclassical" and "ecological" approaches to sustainability. Neoclassical economists share two underlying assumptions: (1) created capital can generally substitute for natural capital in production, and (2) technological progress will uncover these

substitutes as natural capital becomes scarce. These two assumptions imply that we are not "running out of resources." Ecological disagreement, and thus the stage is set.

Chapter 9 - Measuring Sustainability

This chapter begins with the historical roots of sustainability's ecological, economic view and continues with sustainability's neoclassical economic view. The basic theory resembles Malthus: geometric population growth bumping up against limited agricultural potential. However, as illustrated in the modern debates around Limits to Growth, and now Planetary Boundaries, ecologicals stress problems arising from population and consumption pressures on a much broader spectrum of natural capital-- from freshwater to planetary temperature, to biodiversity. By contrast, Neoclassical economists seek to evaluate weak sustainability by direct measurement at the national level, either of NNW or IW. Both of these measures require a means to calculate the depreciation of natural capital.

Chapter 10 – Natural resources and ecosystem services

This chapter provides a straightforward exposition of two models: Hotelling and Optimal Growth. These models provide a logical way to talk about the "Peak Oil" (and peak everything) debate, and as we frame it, a peak oil surprise would reflect a failure of the Hotelling Model's predictions. The optimal growth model yields, for high discount rates and slow growth, a prediction of "optimal extinction" for profit-maximizers: emphasize to students that this is a prediction of a model and is not endorsed as an outcome by economists.

Chapter 11 - Is more, really better?

This chapter examines the Easterlin Paradox: according to survey data, increases in wealth by little happiness. Two explanations are discussed. First, satisfaction from most consumption may depend upon relative rather than absolute consumption levels. Second, positional goods may be increasingly important in the economy, leading to rationing through high price or congestion. A social welfare function incorporating consumption externalities is illustrated.

Chapter 15 - Incentive-Based Regulation: Theory

This chapter focuses on the theoretical arguments in favor of shifting to an IB system of pollution regulation. The economic advantages are two-fold: first, a reduction in the short-run costs of complying with regulations, and second, and more importantly, more generous incentives for long-run cost savings and pollution reduction through technological progress. The mechanics of pollution taxes and marketable permit systems are laid out, and their advantages and disadvantages relative to one another are also discussed.

Chapter 17 – Promoting clean technology

This chapter introduces the second answer to the question, "how can we do better?" While the incentive-based approaches discussed in chapters 15 and 16 focus on lower-cost regulation, we now turn to the possibility of actually by-passing increasingly costly (and for non-point sources challenging to implement) "end-of-the-pipe" regulation through government promotion of clean technology. Government involvement in technology choice is justified using path dependence theory. "Lock-in" of environmentally inferior technology can occur due, not only to economies of

scale (the infant industry story), but also the focusing of infrastructure and R&D expenditure, as well as the growth of the complementary industry.

Chapter 18- Energy policy and the future

The chapter begins with a review of energy demand in the U.S. and its historical and international context. The heart of the chapter discusses possible U.S. energy futures, beginning with electricity and heat. First, the principle of competing technologies is reviewed. The potential clean technologies are then identified-- in this case, efficiency, wind, and solar electric power. Finally, government policy is evaluated to determine if the CT's are indeed being promoted. This section features a discussion of photovoltaics and utility DSM programs.

Professionalism, Privacy, and Copyright:

- Students are expected to follow the [Student Code of Conduct](#).
- All lectures and course materials, including slides, presentations, outlines, and similar materials, are protected by **copyright**. Students may take notes and make copies of course materials for their own educational purposes only.
- Students may not record lectures, reproduce (or allow others to reproduce), post or distribute lecture notes, assessments, or any other course materials publicly and/or for commercial purposes without the instructor's written consent.
- Recordings (audio or video) are not permitted without explicit, written permission of the instructor. Permitted recordings may not be distributed or shared.
- Students are expected to follow online etiquette expectations provided on OWL
- Students will be expected to take an academic integrity pledge before some assessments;
- Some sessions may be recorded by the instructor. Recorded sessions will remain within the course site or be unlisted if streamed.

Tips on How to Be Successful in this Class:

Students in this course should understand the level of autonomy and self-discipline required to be successful.

- Make it a daily habit to log onto OWL to ensure you have seen everything posted to help you succeed in this class.
- Follow weekly checklists created on OWL to help you stay on track.
- Connect with others. Try forming an online study group and meet every week for study and peer support.
- Do not be afraid to ask questions. If you have questions or are struggling with a topic, check the online discussion boards or contact the teaching assistant or me.

Please Note

Department & University Policies for 2020-2021

The University expects all students to take responsibility for their own Academic Programs. Students should check their registration to ensure they are enrolled in the correct courses.

Academic Rights and Responsibilities: Students should be familiar with their "Academic Rights and Responsibilities" as outlined [here](#) in the Western Academic Calendar. Claiming that "you didn't know what to do" is not an acceptable excuse for not following the stated procedures.

Guidelines and Policies for Students are posted online in the current Western Academic Calendar at <http://westerncalendar.uwo.ca>. Undergraduate information for the Faculty of Social Science can be found at: <https://www.ssc.uwo.ca/undergraduate/index.html> and for the Department of Economics at: <https://economics.uwo.ca/undergraduate/index.html>.

Rules of Conduct for Examinations: Students are expected to know the University's Rules of Conduct for Examinations, available [here](#).

Cheating and Academic Offences: Students are responsible for understanding what it means to "cheat." The Department of Economics treats cheating and other academic offences very seriously and will investigate any suspect behavior. Students found guilty will incur penalties that could include a failing grade or being barred from future registration in Economics courses or programs. The University may impose further penalties such as suspension or expulsion.

Plagiarism: Plagiarism is an academic offence. Students must write their essays and assignments in their own words. Ideas/passages taken from another author must be referenced with footnotes or citations and acknowledged with quotation marks where appropriate. Western University uses software to check for plagiarism and students may be required to electronically submit their work. Those found guilty will be penalized as noted in point 3. See Scholastic Discipline for Undergraduate Students [here](#) in the Western Academic Calendar.

Academic Appeals: Students should refer to the Student Academic Appeals section [here](#) in the Western Academic Calendar. Please note the relevant deadlines.

Department Appeals Procedures: The Department will not consider an appeal unless an attempt has been made to settle the matter with the instructor first. Students who remain dissatisfied with the outcome may submit a written appeal to the Undergraduate Director in Economics, stating the reasons for their appeal. Information on the Department of Economics' appeals procedure and the appeals form are available [here](#).

Systematic Adjustments: Systematic adjustments of class grade distributions (either up or down) can occur in Economics courses. The systematic adjustment of a class grade distribution is **not** grounds for an appeal.

Add/drop deadlines:

Deadline to add a second term half course:

Tuesday January 19, 2021

Deadline to drop a second term half course:

Sunday March 14, 2021

Oversleeping or Misreading the Exam Schedule: Faculty of Social Science policy states that oversleeping or misreading the exam schedule is NOT grounds for a makeup. This rule applies to all exams in the Department of Economics.

End of Term Travel: Students must book travel arrangements AFTER final exam dates have been posted; travel is not an acceptable excuse for absence from a final exam.

Rewriting Exams and Retroactive Reweighting are NOT Permitted: Students who proceed to write a test or examination must be prepared to accept the mark. Rewriting tests or examinations, or retroactive reweighting of marks, is **not** permitted.

Accommodation Policies: Students with disabilities should work with Accessible Education (formerly SSD), which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The accommodation policy can be found here: [Academic Accommodation for Students with Disabilities](#).

Academic Consideration for Missed Assessments/Exams due to Student Absence: Students will have up to two (2) opportunities during the regular academic year to receive academic consideration if they self-report a missed assessment using the online portal, provided the following conditions are met: the assessment is missed due to an absence of no more than 48 hours in duration, and the assessment for which consideration is being sought is worth 30% or less of the student's final grade. Students are expected to contact their instructors within 24 hours of the end of the period of the self-reported absence, unless noted otherwise on the syllabus. Students are not able to use the self-reporting option in the following circumstances:

- for exams scheduled by the Office of the Registrar (e.g., December and April exams)
- absence of a duration greater than 48 hours
- assessments worth more than 30% of the student's final grade
- if a student has already used the self-reporting portal twice during the academic year

If the conditions for a Self-Reported Absence are *not* met, students will need to provide a Student Medical Certificate (SMC) if the absence is medical or provide appropriate documentation if there are compassionate grounds for the absence in question. Students are encouraged to contact their Faculty academic counselling office for more information about the relevant documentation. It is strongly recommended that students notify the instructor as soon as possible, ideally before the assessment, when they become aware of an absence. University policy is that students must communicate with their instructors no later than 24 hours after the end of the period covered by the SMC or immediately upon their return from their documented absence. Failure to follow University policy and procedures may result in denial of academic accommodation and a grade of zero.

Individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds or for other reasons. **All required documentation for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

For Western University policy on Consideration for Student Absence, see:

[Policy on Academic Consideration for Student Absences - Undergraduate Students in First Entry Programs.](#)

For the Student Medical Certificate (SMC), see:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

Religious Accommodation: Students should consult the University's list of recognized religious holidays and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the [Western Multicultural Calendar](#).

Policy Regarding Class Attendance and Engagement: If the instructor deems a student's attendance or engagement in the class to be unsatisfactory, that student may be prohibited from writing the final examination. Examples of unsatisfactory class engagement include frequent absences from an in-person or synchronous online class, lack of assignment submissions, and inadequate use of online course materials. Instructors who intend to make use of this policy will notify the student in advance.

Statement on Mental Health and Support Services: Students under emotional/mental distress should visit http://uwo.ca/health/mental_wellbeing/ for more information and a complete list of resources on how to obtain help.