

Colgate University  
ECON 228: Environmental Economics<sup>†</sup>  
Spring 2021 (1/25 - 5/7)

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Professor:	Pierce Donovan	pdonovan@colgate.edu
Lectures:	Alumni 110	MWF 8:10 - 9:00 am (A) MWF 9:20 - 10:10 am (B)
Office Hours:	Remote via Zoom	By appointment

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## Course Description and Objectives

At its core, economics is a discipline focused on allocating scarce resources. And this extends to natural resources, naturally! In fact, we can't really understand how to properly manage the environment *without* economics. I'll use this class to back up that claim.

Economics provides a framework for making trade-offs between competing values. Freshwater can be used for irrigation or hydropower, or put in bottles—or it can be left alone in its natural state in rivers and aquifers. There are good reasons to allocate water to each “bin.” But without a complete understanding of the benefits and costs of each use, we create unnecessary waste.

These trade-offs help identify solutions for natural resource management. In this course we'll learn how others have tuned policy to yield an optimal mix of conservation and commerce.<sup>‡</sup> The aim is to understand how good policy can help protect our resources. We'll discuss issues in fisheries and forestry, oil and natural gas extraction, pollution control, and elsewhere. You'll learn about the history of natural resource management and an economic perspective for addressing common environmental problems, and become an informed critic of current environmental policy debates.<sup>††</sup>

## Expectations

This class is reading and writing-intensive (although it's easily manageable with good planning). I encourage you to read ahead of schedule and start assignments early (it will make the course much more enjoyable). I ultimately want you to be able to synthesize information from multiple sources; relying solely on my lectures, or the book, or the readings alone won't help you paint a full picture. I'll be looking for you to pull it all together.

There's only one prerequisite: ECON 151: *Introduction to Economics*, and you'll need that, as we'll be applying all of its concepts to something very new. Even though this is an economics elective, I think it complements the coursework of those studying lots of other fields really well.

This class is in-person. Lectures will be streamed (audio+slides) for those who end up momentarily remote due to quarantine, but if this does not describe you, you should be physically in-class.

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<sup>†</sup>As the semester goes on, I may change the contents of this syllabus regarding the schedule, grading, or other details.

<sup>‡</sup>And to a lesser extent, all of the political and moral caveats that push us away from this ideal.

<sup>††</sup>This course lays foundation for ECON 383: *Natural Resource Economics*—which extends what you'll learn here with rigorous mathematical modeling. After 228, you may appreciate the more detailed perspective that models can provide.

## Course Website, Textbook, and Readings

I'll be using Moodle to upload any resources (slides, readings, assignments, grades, etc.) we will be using throughout the course, and you'll submit assignments on Gradescope.

Most of my lecture material will follow the direction of this book:

*Markets and the Environment*, Second Edition, 2016  
- By Nathaniel O. Keohane and Sheila M. Olmstead

The book is required for the course, and it's a nice gift if you want to share it with a curious family member afterward. Additionally, certain lessons and assignments will require readings from other sources. Take a look at them *before* each lecture; the best way to follow along in class is to understand where we're heading in advance. For the reading schedule, see the course outline.

A "collective annotator"—*hypothes.is*—will be used for making notes on the assigned readings before each class. Your involvement here will give you credit toward your participation grade. This may be a good alternative for those who don't like speaking up at 8am. From past experience, it was an engaging way to go through the readings and fostered more dialogue during class.

## Grading

I don't *give* grades, you *earn* them. Further, I don't judge your performance relative to your peers (i.e. curve your grades) during the term in order for you to have the clearest signal about your performance. I look for a proven understanding of the material via the following:

15%	Class Participation
50%	Module Assignments (x4)
35%	Term Paper (broken in to several parts, see below)

Grading written work can sometimes feel subjective, so I'll formalize what I'm looking for here:

- A (90) You've demonstrated a strong understanding or interest in the subject at hand. Your answers provide an interesting/personal/insightful/detailed take beyond simply regurgitating material. I reserve an A<sup>+</sup> (100) for truly exemplary or passionate work.
- B (80) You've connected the dots and answered my questions satisfactorily. Information from lectures, the text, and readings were brought together to build a clear and coherent response.
- C (70) You've missed a bit of low-hanging fruit. Some of your responses didn't quite "get there," and some crucial/expected elements of a correct answer were missing.
- D (60) You didn't demonstrate a complete understanding of the material. There were erroneous/unsupported statements or incomplete answers in your work.
- F (0) You either didn't submit anything, or you *did* but that work didn't address the questions at hand or included plagiarized work.

## Module Assignments

There are four assignments due throughout the course, each due at the beginning of the next unit (which is always on a Monday). Each of them should take around three to six hours. I will upload each assignment at least two weeks in advance so you can plan ahead. Submissions will be graded within a week. I encourage you to discuss the assignments together or with me, although you must submit your own work. Late homework will be accepted for three days, with a 10% penalty per day. I don't plan to drop any assignments.

I use these early assignments to nudge you toward “thinking like an environmental economist,” which is a bit more focused than merely explaining that there are issues with how we manage our natural resources. As it turns out, the problem is usually self-evident. We want to write policy to fix it—which requires an understanding of the underlying [economic] incentives at work.

This will set you up for the term paper, which is meant to complete your transition from “student in an intro environmental economics class” to “person who can explain what environmental economics is to your extended family”—if that’s something you want to attempt, anyway.

## Term Paper

The term paper is meant to be a deeper exploration into a related question of your own interest. We'll build up to the final product in stages. As the course continues, I'll add details regarding the paper. Each step of the way will bring in new questions for you to tackle, specific to your case study. The goal of this assignment is to really understand the logic of the economist and ride it from “environmental problem” to “policy solution.”

1. Find a particular environmental issue and setting of interest and write a summary of the issue. Why is it important? Who/what is involved? How could a story about your issue make use of the content from my lectures?
2. Discuss the nature of the issue using what you've learned (so far) about environmental economics. Is there a behavioral problem? An issue with institutions/market failure? A lack of research or incomplete policy? What policy solutions might be available?
3. Think about a potential “homework problem” that would help another student understand your environmental issue—and how to address it—the way you think makes sense. A good question doesn't just cover the material, it delivers its own lesson. This part takes practice, but you'll have plenty of examples after my module assignments.
4. Present your thoughts in class. It's important to talk about unfinished work; expressing your thoughts to a captive audience is crucial for testing out ideas and finding future direction. You could use this presentation to walk through how you would answer the homework problem you've developed.
5. Bring the full paper/question together and reflect on your analysis. Think about how your thoughts regarding environmental management changed since taking this course. Use that to write something accessible to someone outside of this class (perhaps your parents).

## Conduct

These are just a few more things to keep in mind that I put in all my syllabi:

- Missing lecture isn't the end of the world. If you feel sick, please do not come to class. I don't need an excuse, but please be in touch if you will be out for multiple days.
- When asking for help outside of class, please be able to show how you have approached your problem. Simply asking for an answer is not a productive use of our time. I hope to facilitate critical thinking, and that takes effort on everyone's part.
- While I'll be accessible by email, I strongly prefer communicating during class/office hours. Regarding boundaries, I do not plan on answering emails late at night or on the weekend.
- I will not tolerate academic dishonesty. Colgate University's Academic Honor Code ([here](#)) requires instructors to report any suspected cheating, plagiarism, or other misconduct.
- You do not have permission to publish my course materials (online or otherwise). I don't want to see my work hosted somewhere like CourseHero (see the Academic Honor Code above).
- Please be respectful to your classmates. Refrain from talking during class if it is not relevant to lecture or discussion. Cell phone or tablet use should not detract from your ability to follow along with class. No activity on your part should undermine the efforts of other students.
- I can't recommend Colgate's Writing and Speaking Center ([link](#)) enough if you want to work on clear and coherent communication. Focused writing takes practice, and college is a great time to put in the hours.
- If you have any problems with this course or any other matters that may affect your work in this course, or you simply need someone to talk to, please contact me sooner rather than later. In cases where I'm not the appropriate resource, please seek support from Colgate's Counseling and Psychological Services ([link](#)). Reaching out to them is never a bad idea.
- If you have a learning disability or a physical disability that requires accommodation, please let me know as soon as possible.
- Colgate University is a diverse community of individuals with many perspectives and identities. In order to create an inclusive and intellectually vibrant community, we must understand individual differences and common ground. Colgate University's report on Academic Freedom and Freedom of Expression ([link](#)) reflects the ideals I seek to uphold in this class.

# Course Outline

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## Foundations for Environmental Economics

Introduction to 228 (and me) ..... Monday, 1/25

The role of economics in environmental management ..... Wednesday, 1/27

Book: Chapter 1, pp. 9-10

Reading: *An economic perspective on environmental and resource management*, Oates

Concepts: stewardship, constraints, scarcity, trade-offs

Economic efficiency and environmental policy ..... Friday, 1/29

Book: Chapter 2

Concepts: maximizing net benefits, equi-marginal rule

The benefits and costs of environmental protection ..... Monday, 2/1

Book: Chapter 3, pp. 35-55

Concepts: willingness-to-pay, revealed and stated preference methods, contingent valuation, hedonics, travel-cost methods, shadow values

Critiques of benefit-cost analysis ..... Wednesday, 2/3

Book: Chapter 3, pp. 55-68

Reading: *The value of a statistical life and coronavirus*, with Alan Krupnick, Raimi

Concepts: inputs to policy, efficiency vs equity, discounting, uncertainty, VSL

Markets—and market failure ..... Friday, 2/5

Book: Chapter 4, Chapter 5, pp. 80-91

Concepts: market completeness, unintended/uncompensated effects, social costs/benefits

Externalities and public goods ..... Monday, 2/8

Reading: *New York City steps up*, McConnell and Krupnick

Reading: *China limited the Mekong's flow. Other countries suffered a drought.*, Beech

Reading: *Shifting sands: Using taxes to build the best beaches*, with Megan Mullin, Raimi

Concepts: rivalry and excludability, competing values, free-riding, public amenities

The tragedy of the commons ..... Wednesday, 2/10

Book: Chapter 5, pp. 91-98

Reading: *Barbed wire entrepreneurship*, PERC

Reading: *Are unauthorized foreign vessels deterred from fishing inside EEZs?*, Englander

Concepts: selfishness, institutions, property rights, Coase theorem

Colgate break day (No class) ..... Friday, 2/12

## Non-Renewables and Energy

What is land worth? ..... Monday, 2/15

Reading: *L.A. country club pays ultra low property tax rate*, Romero

Reading: *We should raise taxes on these 3 things to pay for healthcare and parks*, Aron (just #1)

Concepts: scarcity, rents, land use, opportunity cost, asset value

**Homework #1 due.**

Pollution ..... Wednesday, 2/17

Book: Chapter 10, pp. 200-207, 208-210, 217-220

Reading: *Learning from thirty years of cap and trade*, Schmalensee and Stavins

Reading: *Pollution is killing Black Americans*, Villarosa

Concepts: cost-effective emissions reduction, distributional impacts

Command and control policies ..... Friday, 2/19

Book: *Skim* Chapters 8-10

Reading: *Economic incentives versus command and control*, Harrington and Morgenstern

Reading: *Cap and Trade-Offs*, Johnson

Concepts: deadweight loss, Pigou, marginal damage, cost-effectiveness, flexibility, validity

Electricity ..... Monday, 2/22

Reading: *The next energy battle*, Penn

Reading: *Subsidies for EVs*, McConnell and Linn

Concepts: utilities, energy generation, energy efficiency

Optimal extraction of a non-renewable resource ..... Wednesday, 2/24

Book: Chapter 6

Concepts: dynamic efficiency, intertemporal arbitrage, marginal user cost, Hotelling rule

Causes and consequences of sub-optimal extraction ..... Friday, 2/26

Reading: *Groundwater Markets*, Kuwayama

Reading: *The economic impacts of agricultural groundwater markets*, Bruno

Concepts: market power, non-excludability, protection/stability

## Renewables

A little bioeconomics ..... Monday, 3/1

Book: Chapter 7, pp. 128-138

Concepts: fisheries, open-access, logistic model, carrying capacity, steady-state

**Homework #2 due.**

Regulated open-access fisheries ..... Wednesday, 3/3

Reading: *The texture of rents*, Wilen, pp. 1-12

Concepts: rent-dissipation, derbies, over-capitalization

Individual fishing quotas ..... Friday, 3/5

Book: Chapter 10, pp. 207-214

Reading: *The texture of rents*, Wilen, pp. 12-29

Reading: *A famed fishing port shudders as its Codfather goes to jail*, Bidgood

Concepts: IFQ/ITQs, wealth creation, cost-minimization, new market generation

Introduction to forestry ..... Monday, 3/8

Book: Chapter 7, pp. 114-118

Concepts: quasi-renewable, mean/current annual increment, Wicksell rotation

Optimal forest rotation ..... Wednesday, 3/10

Book: Chapter 7, pp. 118-122

Reading: *Thousands of Southerners planted trees for retirement. It didn't work.*, Dezember

Concepts: Faustmann rotation, site value, dynamic efficiency

Colgate break day (No class) ..... Friday, 3/12

Non-timber values ..... Monday, 3/15

Book: Chapter 7, pp. 122-128

Concepts: ecosystem management, carbon sequestration, foraging

## Term Paper Idea Spitballing

Brainstorming Session I ..... Wednesday, 3/17

Brainstorming Session II ..... Friday, 3/19

## Conservation

Endangered species protection ..... Monday, 3/22

Book: Chapter 10, pp. 224-229

Reading: *Carving out some space*, Boyd, Caballero, and Simpson

Concepts: the ESA, tradable development rights, mitigation/conservation banking

**Homework #3 due.**

**Term paper prospectus due.**

Ecosystem services ..... Wednesday, 3/24

Reading: *Green growth that works: Discussing ecosystem services*, with Lisa Mandle, Raimi

Concepts: natural capital, green infrastructure, non-market valuation

Makeshift long weekend (no class) ..... Friday, 3/26

The effects of invasive species ..... Monday, 3/29

Reading: *Can genetic engineering bring back the American Chestnut?*, Popkin

Concepts: natural experiments, international trade, blights, "pest control"

Viability objectives and the value of preservation ..... Wednesday, 3/31

Concepts: ongoing species protection, pricing bycatch, valuing tipping points

Makeshift long weekend (no class) ..... Friday, 4/2

Makeshift long[er] weekend (no class) ..... Monday, 4/5

**Homework #4 due.**

Non-market valuation ..... Wednesday, 4/7

Reading: *Measurement of recreation benefits*, Trice and Wood

Concepts: travel cost method, hedonic pricing

Integrated assessment modeling ..... Friday, 4/9

Reading: *The strategic costs of carbon emissions*, Wichman

Reading: *The new social cost of carbon*, Auffhammer

Concepts: intergenerational utility, social damage, social cost of carbon

Western water ..... Monday, 4/12

Reading: *Wall Street eyes billions in the Colorado's water*, Howe

Reading: *The largest dam-removal in US history*, Matthews

Reading: *Cadillac Desert*, Marc Reisner (read this over the summer instead)

Concepts: CA water management, settlement, irrigation, theft

(No class rest of week) ..... Wednesday, 4/14



## Term Paper Presentations

Decentralized conservation banking ..... Monday, 4/19

Concepts: how to build models, land conservation, habitat de-fragmentation

**Term paper draft due.**

The Green New Deal—from an economics perspective ..... Wednesday, 4/21

Reading: *H. RES. 109*, Cortez et al.

Reading: *Economics in the age of environmental policy*, with Robert Stavins, Raimi

Concepts: climate change, social justice, power generation, sustainability

Early presentations ..... Saturday, 4/24

Week of more presentations ..... Monday, 4/26

“Final Exam” ..... Friday, 5/7

Book: Chapter 12

**Term paper problem due.**