

Syllabus: AEB 3450, Introduction to Natural Resources and Environmental Economics, Fall 2023

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Office Hours: Tuesday/Thursday 2-4:30 pm

Location: Physically at my office (MCCA 1181) and virtually via Zoom <https://ufl.zoom.us/j/95271142790>

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Teaching Mode

This class is taught completely online. Lectures are available asynchronously with some discussion sessions running synchronously online.

Course Description

Introduces natural and environmental resource economics. Emphasizes understanding economic concepts such as resource scarcity, market failure, externality, property rights and common property resources and their application to studies of forest, land, water, energy and coastal resources. Prerequisite: AEB 3103 or ECO 2023. Credit cannot be received for both AEB 3450 and ECP 3302.

Overview

How much is an endangered species worth? Are we going to run out of fuel in the next 50 years? How damaging is air pollution to our health, and how should we deal with it? Why are so many fisheries over-exploited, forests cut down, aquifers depleted, and are there ways to prevent that?

Human society is intrinsically connected with nature. This course aims to provide an introduction to the economics regarding natural resources and the environment. In the first part of the course, we will talk about how economists think about environmental and resource problems from philosophical, methodological, and analytical perspectives. Topics include market failures and policy instruments to correct them, property rights, and ways to evaluate the benefits and costs of protecting the environment. In the second part of the course, we will dive into specific real-world environmental problems and analyze them using economic methods and tools. Topics will include non-renewable resources, air, water, climate, and others.

Student Learning Goals

After successful completion of the course, you should be able to:

1. Distinguish between facts and rhetoric in public policy debates related to natural resources and the environment

¹Disclaimer: part of this syllabus is generated by Microsoft CoPilot, v1.104.341.

2. Know the concepts of which economists think about natural resource and environmental problems
3. Develop skills to critically evaluate natural resource and environmental policies and alternatives using economic tools
4. Develop an economic mindset that can be applied to analyze real-world environmental problems

Prerequisites

Students are expected to have the knowledge of microeconomics at the level of AEB 3103 (Principles of Food and Resource Economics) or ECO 2023 (Principles of Microeconomics). I will assume that you have basic knowledge regarding supply and demand, consumer and producer surplus, opportunity cost, etc. Please schedule a meeting with me if you are not sure you meet the prerequisites of the course.

Textbook

Required

Markets and the Environment (2nd Edition), by Nathaniel Keohane and Sheila Olmstead, Island Press (2016)

Optional Environmental and Natural Resource Economics (11th Edition), by Tom Tietenberg and Lynne Lewis, Prentice Hall (2018)

Economics and the Environment (7th Edition), by Eban Goodstein and Stephen Polasky, Wiley (2013)

Readings Additional readings will be posted on Perusall.

Grading

You will be evaluated with a total of 500 points, which consist of the following:

1. **Reading and reflection (via Perusall) (75 points, 15% of your grade)**
 - You will be reading a number of documents for each module and reflect on them via Perusall.
 - For these assignments, login to eLearning and go to the Perusall tool. Here is a help page and a getting started guide should you need it.
 - Your grade will be automatically determined by Perusall. Grading criteria include careful reading, writing constructive comments and/or questions, and interacting with your peers through upvoting and responses.
 - The two lowest scores from Perusall assignments will be dropped.
2. **Synchronous Discussion (75 points, 15% of your grade)**
 - 9 synchronous sessions will be held throughout the semester. Five of those sessions will be discussing a particular topic. Four of those sessions will help you review class materials.
 - Active participation in each session earns 3 points (i.e., you need to attend a minimum of 5 sessions within the semester to receive full grade).
 - You should inform the instructor before September 20th if you have consistent conflicts during the time of the synchronous discussion sessions so that alternative arrangements can be made.
3. **Assignments (150 points, 30% of your grade)**
 - There will be 10 assignments throughout the semester, one for each module.
 - All assignments are individual unless otherwise stated.
 - The lowest grade will be dropped.
4. **Exams (200 points, 40% of your grade)**
 - Two mid-term exams will be issued. Midterm 1 on the week of 10/9. Midterm 2 on the week of 11/27.
 - You can attempt to take the exam during any time of that week. Once you started the attempt, you have two hours to finish the exam. You are only permitted with one attempt. Make sure you have stable internet connection before you start the attempt.

- The exams are open book and open notes. Additionally, you are permitted to use any internet resources, including class resources, search engines, and generative AI, that may help you answer the questions.
 - Receive assistance from another human being during the exam is considered cheating. You will receive an automatic 0 plus be referred to the Dean of Students Office for further disciplinary actions.
5. **(Optional) Three-minute video project (100 points, 20% of your grade)**
- You may choose to complete a three-minute video project on a topic of your choice to replace one of your exam grade.
 - If you completed both exams and the video project, the lowest grade amongst the three will be dropped.
 - The video project is due on December 6th.

Points will be translated into grades according to the following table. For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

Grade	Points	Grade Points
A	>465 (93%)	4.00
A-	450-464 (90%-92.9%)	3.67
B+	430-449(86%-89.9%)	3.33
B	415-429(83%-85.9%)	3.00
B-	400-414(80%-82.9%)	2.67
C+	380-399(76%-79.9%)	2.33
C	365-379(73%-75.9%)	2.00
C-	350-364(70%-72.9%)	1.67
D+	330-349(66%-69.9%)	1.33
D	315-329(63%-65.9%)	1.00
D-	300-314(60%-62.9%)	0.67
E	<300(<60%)	0.00

Class Policies

Academic Honesty: As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.” You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: “*On my honor, I have neither given nor received unauthorized aid in doing this assignment.*”

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

Plagiarism: The Student Honor Code and Student Conduct Code states that: “A Student must not represent as the Student’s own work all or any portion of the work of another.” Plagiarism includes but is not limited to:

- Stealing, misquoting, insufficiently paraphrasing, or patch-writing.

- Self-plagiarism, which is the reuse of the Student’s own submitted work, or the simultaneous submission of the Student’s own work, without the full and clear acknowledgment and permission of the Faculty to whom it is submitted.
- Submitting materials from any source without proper attribution.
- Submitting a document, assignment, or material that, in whole or in part, is identical or substantially identical to a document or assignment the Student did not author.”

Use of Generative AI and Large Language Models I view AI as a foundational tool in this post-AI world, just like calculators and search engines. Ways to generative AI effectively is an emerging skill that could, and should, be learned, just like you learned how to use a calculator in middle school. Hence, unless otherwise stated, you are welcome to complete work with the help of artificial intelligence tools and large language models (LLMs) unless otherwise stated (ChatGPT, GPT, DALL-E, Stable Diffusion, Midjourney, GitHub Copilot, and anything after) in an unrestricted fashion, for any purpose, at no penalty.

You should note that all large language models still have a tendency to make up incorrect facts and fake citations, code generation models have a tendency to produce inaccurate outputs, and solve mathematical problems with incorrect intermediate steps and final solutions.² You will be responsible for any inaccurate, biased, offensive, or otherwise unethical content you submit regardless of whether it originally comes from you or a generative AI. If you use a generative AI, its contribution must be acknowledged in your submitted work; you will be penalized for using a generative AI without acknowledgement.

The university’s policy on plagiarism still applies to any uncited or improperly cited use of work by other human beings, or submission of work by other human beings as your own.

Here are some best practices on understanding and using generative AI (Gagnon 2023)³:

- AI can be a valuable tool for augmenting human decision-making and critical thinking, but it is not a replacement.
- If you provide minimum effort prompts, you will get low quality results. You will need to refine your prompts to get better outcomes. This will take time and practice.
- Don’t trust anything the systems says. Assume it is wrong, unless you already know the answer and can verify with trusted sources. It works best for topics you deeply understand.
- Use your best judgement to determine if/where/when to use these tools. They don’t always make products easier and/or better.
- Large language models and chatbots are ““look back”” machines. They don’t advance knowledge (yet). ChatGPT-3 uses data from 2021 and earlier (a lot has changed since 2021).

Attendance and Make-Up Work: Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies>.

Students Requiring Accommodations Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students are notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

²During the Spring 2023 semester, I asked chatGPT (version 3 to 3.5) to solve six Principles of Economics problems in class. ChatGPT got 4 out of the 6 problems wrong at the initial attempt, and 2 out of 6 wrong after iteration.

³The quoted texts are written by Dr. Ryan Gagnon (Clemson University): <https://twitter.com/theyrangagnon>

Software Use All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see the Notification to Students of FERPA Rights.

Campus Resources:

Health and Wellness U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.

University Police Department: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.

Academic Resources

- E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at helpdesk@ufl.edu.
- Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.
- Library Support: Various ways to receive assistance with respect to using the libraries or finding resources.
- Teaching Center: Broward Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring.
- Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.
- Student Complaints On-Campus: Visit the Student Honor Code and Student Conduct Code webpage for more information.
- On-Line Students Complaints: View the Distance Learning Student Complaint Process.

Lauren's Promise: I will listen and believe you if someone is threatening you. Lauren McCluskey, a 21-year old honors student athlete, was murdered on October 22, 2018, by a man she briefly dated on the University of Utah Campus. We must all take actions to ensure this never happens again. Any form of sexual harassment or violence will not be excused or tolerated at the University of Florida. If you are experiencing sexual assault, relationship violence, or stalking, you can take the following actions:

- If you are in immediate danger, call 911.
- Report it to me, and I will connect you to resources.
- Seek confidential sources of support and help:
- UFPD Office of Victim Services: 51 Museum Road, 352-392-5648

- Sexual Assault Recovery Services (SARS): Infirmery Building, 352-392-1161
- Alachua County Rape Crisis Center (confidential): 352-264-6760

Diversity, Equity, and Inclusion: The University of Florida's College of Agricultural and Life Sciences (CALs) supports the University of Florida's commitment to diversity, equity, and inclusion. By fostering a sense of belonging for students, staff, and faculty, while leveraging the uniqueness of the people who study and work at the university, we believe our campus community is enriched and enhanced by diversity, including but not limited to, race, ethnicity, national origin, gender, gender identity, sexuality, class, and religion. This course will support an understanding of the diversity of our distance and campus communities as well as our agricultural and natural resource communities, locally and globally. This course will strive to create a learning environment for students that supports a diversity of thoughts, perspectives, and experiences while honoring your identities. In this class we will take the following approaches to help achieve this: * All course participants will use the names and pronouns provided by students for use in class. If these differ from those that appear in official university records, you can change your Display Name at One.UF (see Student Help FAQs - eLearning - University of Florida (ufl.edu)). * If your performance in this course is being impacted by your experiences inside and/or outside the classroom, do not hesitate to contact the instructor and/or teaching assistant (TA). Instructors in CALs are a great resource for you and you may provide feedback anonymously. Feedback may result in general announcements to the class, if necessary, or reporting to appropriate UF personnel to address your concerns. * CALs instructors and TAs, like many people, are still in the process of learning about diverse perspectives and identities. If something was said in class (by anyone) that makes you feel uncomfortable, please discuss with your instructor or TA or contact the CALs Dean's Office (cals-dean@ufl.edu).

Important Dates

- 8/24 First day of class
- 10/9-10/15 **Midterm 1**
- 11/27-12/2 **Midterm 2**
- 12/6 **Optional Video Project Due**

Course Outline

1. Why Environmental Economics?
 - Why Adam Smith is not entirely correct
 - The need for environmental economics
 - The current state of business **Readings: Fullerton and Stavins (1998); Boyle and Kotchen (2018)**
2. The Efficiency Standard
 - The demand
 - The supply
 - The equi-marginal principle
 - Benefit-cost analysis and program evaluation **Readings: Keohane and Olmstead Chapter 2 (pp 11-30)**
3. When Do Markets Fail
 - Externality
 - Marginal social costs
 - The equi-marginal principle under externality **Readings: Keohane and Olmstead Chapter 5**
4. Property Rights and Environmental Implications
 - Features of Property Rights
 - The open-access problem
 - The public good problem **Readings: Hardin(1968); Ronald Coase and the Misuse of Economics (New Yorker)**
5. How to Correct Market Failures
 - Command and control regulation

- Pigovian taxes
- Subsidies
- Coase theorem, cap and trade
- Ostrom, common-pool resources Readings: Keohane and Olmstead Chapter 8

—Midterm 1 here—

6. Command-and-Control vs. Market-based Policy (Week 7)
 - Cost-effectiveness
 - Innovation
 - The US Sulfur Trading Scheme
 - Do we ever prefer command-and-control? Readings: Keohane and Olmstead Chapter pp 168-184; Keohane and Olmstead pp 200-207; The Invisible Green Hand (The Economist)
7. Measuring Benefits (Week 9)
 - Estimating causal effects
 - Estimating dollar values
 - stated preference
 - revealed preference Readings: Goodstein and Polasky Chapter 5; EPA Plans to Revisit a Touchy Topic (New York Times)
8. Measuring Costs (Week 10)
 - Engineering vs. opportunity cost
 - Measuring social welfare losses
 - Who bears the cost?
 - Employment
 - Innovation Readings: Keohane and Olmstead pp. 35-40, 43-44; Give me green, and jobs, but not green jobs (the Economist); Why Green Energy Can't Power a Job Engine (NYTimes)
9. Dynamic Efficiency (Week 11)
 - Discounting and present value
 - Dynamic decision-making
 - Decision under uncertainty Readings: Keohane and Olmstead pp. 55-62; Goodstein and Polasky pp 146-150
10. Non-renewable Resources (Week 12-13) - The two-period problem - The infinite horizon problem - Hotelling's rule - The Simon-Ehrlich bet Readings: Tietenberg and Lewis pp 107-116; Betting on the Planet (NYTimes)

—Midterm 2 here—