Georgia Institute of Technology
Ivan Allen College of Liberal Arts
School of Economics

ECON 4440*
Economics of Natural Resources & the Environment
Summer 2026

***This course is cross-listed with a graduate section of ECON 6380.

Meeting Time and Location: TBA
Instructor: Dr. Matthew E. Oliver, Associate Professor
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Office Hours: TBA
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Teaching Assistant: TBA

NOTE: All participants in this course—both students and instructor—are expected to abide by the values enumerated in the Statement of Diversity and Inclusion of the Ivan Allen College. Please take a moment to read and reflect upon this statement.

Course Description: Environmental issues are becoming increasingly central in our lives. As the world population and its associated consumption grows, there are more and more people taking natural resources such as fossil fuels, minerals, timber, and fishes from the environment. At the same time, they are adding to the environment wastes such as air and water pollution, acid rain, toxins, and gases that are altering the earth's climate. What will the future hold for us, and can anything be done? To answer these questions, we need a coherent framework of analysis, and economics provides one framework. Environmental economics, in particular, provides the framework for examining the interaction between economic systems and environmental systems. Similarly, natural resource economics analyzes the efficient allocation of natural resources both across users and over time. We will see that although market systems are well suited for producing and allocating many of the goods used in modern societies, these markets are not well suited for allocating 'non-market' goods such as clean air and water, pristine forests, or biodiversity, nor are they effective in limiting the 'bads', i.e. the harmful wastes flowing into the environment. Environmental and natural resource economics addresses how markets can be altered, regulated, or even created, usually through necessary government actions, so that a more socially optimal allocation of goods and bads can be achieved.

Course Prerequisites: ECON 2100, ECON 2101, or ECON 2106

Recommended Text: Tietenberg and Lewis, *Environmental and Natural Resource Economics*, 10th ed., 2014, Pearson.

Supplementary Texts: Other texts that I will use to help us explore different topics, but that you are *not* required to purchase:

- *Economics of the Environment: Selected Readings,* Edited by Robert N. Stavins (2012), 6th ed., W.W. Norton & Company, Inc., N.Y.
- *Environmental Economics in Theory and Practice,* by Nick Hanley, Jason F. Shogren, and Ben White, 2nd Ed., Palgrave MacMillan, N.Y.
- *The Economics of Natural Resource Use*, by John M. Hartwick and Nancy D. Olewiler (1998), 2nd ed., Harper Collins Publishers, Inc., N.Y.
- *Resource Economics,* by Jon M. Conrad (1999), Cambridge University Press, N.Y.

Grading and Course Requirements: As much of the course material will be exceedingly subjective, the manner in which I will grade your performance will be subjective as well. Be aware that effort, attentiveness, attendance, and communication will go a long way in terms of influencing that subjectivity. Because much of the material I teach this course is at a slightly-above-undergraduate level, I use a slightly different grading scale:

A	90%-100%
B	75%-89.99%
C	60%-74.99%
D	< 60%

Your grade for this course will comprise four components:

1. *Homeworks* (30%) – I anticipate 3-4 homework assignments, depending on the speed of our progress through the material. Homework assignments will be posted on the Canvas course site, in the *Homework Assignments* module.
2. *Exams* (50%) – We will have one mid-term (20%) and a final exam (30%). For each exam, I will give you several candidate questions roughly one week in advance. On exam day, a randomization device will determine which questions you will be required to answer. The mid-term exam will be on [date TBA]. The final exam will be [date TBA]. Both dates are non-negotiable. For those with GT-approved absences only, make-up exams will be scheduled as needed.
3. *Group Short Paper* (20%) – For more information, please see the **Group Short Paper Guidelines** document, which is available on the Canvas course site, in the *Course Materials* module.

So, for example, let's say at the end of the semester your homework average is a 85, you made an 80 on the mid-term exam and a 75 on the final exam, and you got a 95 on the group short paper. Your grade for the course would be:

$$0.3(85) + 0.2(80) + 0.3(75) + 0.2(95) = 83 \longrightarrow \text{B}$$

Late Homework Policy: Late homework submissions will be accepted for up to 3 working days (M-F) after the due date, for a penalty of 5 points per day. After 3 days, late submissions will not be accepted and will be counted as a zero.

Final Grade Policy: Final grades are final. Please do not contact me after the semester is over to ask if there is anything you can do to improve your grade. There isn't. This is not because I'm mean or I don't like you. It's simply a hard rule designed to maintain fairness. It would not be ethical to extend a special favor to any one person that I do not also extend to everyone. The only reason I would change your final grade after the fact is if you can provide incontrovertible proof that I made a mistake in calculating it, in which case I will be happy to correct the mistake.

Exam Schedule Policy: If you do not have a GT-approved excused absence (*e.g.*, for athletics or if you have a disability waiver), DO NOT ask me if you can take an exam at some other time for any reason. The answer is, preemptively, "no" (verifiable minority religious holidays are the *only* exception). Here also, this is a rule to maintain fairness. If I do it for one person, I have to do it for everyone, which would be way too much to deal with. If, on an exam date, you come down with a legitimate serious illness or have an automobile accident or something like that, we can negotiate, but you had better have indisputable evidence that you're telling the truth about it. For illness or injury, I will require you to get a note from **GT Stamps Health Services** (don't bring me some vague, shady-looking note from some random urgent care office and expect that to fly).

Attendance: You are expected to attend class, but this is fundamentally unenforceable. However, to make things more interesting, I will implement a class attendance game. For more information, please see the **Attendance Game** document, which is available on the Canvas course site.

Other Course Policies: Please make every effort *not* to arrive late or leave early. Please set cell phones to 'silent', and *do not* answer your phone while in class (do not get up and leave the classroom to answer your phone either). If it is a genuine emergency, you will be permitted to exit the classroom to address the issue. Texting during class is not permitted. Any other rude or disruptive behavior will be dealt with appropriately. You may bring your laptop computer or other device to class, but only if you are using it for course-related activities (not for playing games or looking at Facebook, among other things). *During exams, you **may not** use your cell phone calculator (so bring an actual calculator), and if you need to go to the restroom, you must leave your cell phone with me while you go.*

Academic Dishonesty: Cheating and plagiarism will not be tolerated. Any violation of the Institute's Honor Code will be reported to the Dean of Students.

Group Work Guidelines: You are encouraged to interact with other students outside the classroom to discuss the homework and candidate exam questions. For the formal Group Research Paper, see the **Group Short Paper Guidelines** document, available on our Canvas course site.

Disclaimer: If anything significant should change with respect to this syllabus, I will let you know immediately.

Tentative Course Outline & Schedule (subject to change)**:**

I. Introduction to Environmental Economics

Lecture 1 (date TBA, 1st half): *How Economists Think about the Environment*
- Introduction
- The Environment as an Asset
- The Malthusian Trap
- Core Environmental Issues

Lecture 2 (date TBA, 2nd half): *Markets & The Environment*
- Private Efficiency vs. Social Efficiency
- Efficiency vs. Equity

Lecture 3 (date TBA, 1st half): *Static Efficiency (Review of Microeconomics)*
- The supply-demand model
- Measuring economic efficiency

Lecture 4 (date TBA, 2nd half): *Market Failure & Inefficiency*
- Market power
- Public goods
- Externalities, Property Rights, & The Coase Theorem
- Competitive Markets & Externalities

II. Natural Resource Economics

Lecture 5 (date TBA, 1st half): *Dynamic Efficiency & The Economics of Non-Renewable Resources*
- Taxonomy of Non-Renewable Resources
- Marginal User Cost
- Backstop Resources
- Theory of the Mine

Lecture 6 (date TBA, 2nd half): *The Economics of Renewable Resources (Forests & Fisheries)*
- Forestry Economics & the Optimal Rotation Length
- The Economics of Fisheries & The Open Access Problem

Lecture 7 (date TBA, 1st half): *Energy Economics, Part 1*
- Energy Regulation
- Coal, Carbon, & Tradable Permits
- OPEC

Lecture 8 (date TBA, 2nd half): *Energy Economics, Part 2*
- Shale Oil & Gas
- Carbon-free energy resources: Nuclear, Wind, & Solar

Lecture 9 (date TBA, 1st half): *Water Economics*
- Key Issues
- The Hydrological Cycle vs. the Hydro-Social Cycle
- Efficient Allocation of Surface Water
- Efficient Allocation of Groundwater
- Water Demand & Water Pricing

***No lecture [**date TBA**], 2nd half:** Class ends early

***Midterm Exam** (date TBA)

III. Special Topics in Environmental Economics

Lecture 9 (date TBA, 1st half): *Valuing the Environment*
- Stated Preference vs. Revealed Preference
- Contingent Valuation Method
- Travel Cost Method
- Hedonic Pricing Method

Lecture 10 (date TBA, 2nd half): *Time Preference & Discounting*
- Standard (exponential) discounting
- Declining discount rates

Lecture 11 (date TBA, 1st half): *Risk and the Environment, Part 1*
- Defining Risk and Uncertainty
- Introduction to Expected Utility Theory

Lecture 12 (date TBA, 2nd half): *Risk and the Environment, Part 2*
- Valuing Risk Reduction
- The Precautionary Principle
- Expected Utility Theory, Revisited

Lecture 13 (date TBA, 1st half): *Sustainable Development*
- Dynamic Efficiency & Intergenerational Equity
- "Weak" Sustainability vs. "Strong" Sustainability
- The Hartwick Rules
- Common & Perrings Strong Sustainability Rules
- Inter-temporal Altruism

***No lecture [**date TBA**], 2nd half:** Class ends early

***Final Exam** (date TBA)