ECON 222 – 01
ENVIRONMENTAL ECONOMICS
DICKINSON COLLEGE

FALL 2018

Professor: Tony Underwood

Office: Althouse 216
Office Hours: Tuesday & Thursday, 11am – 12pm; Wednesday, 1:30-2:30pm; or by appointment.

Email: underwoa@dickinson.edu
I check my email very frequently. If you are unable to meet with me during my scheduled office hours, please email me to schedule an alternative time to meet. My door is (almost) always open!

Class Meets: MWF, 9:30 – 10:20 am, Althouse 110

Prerequisites: ECON 111 (Intro to Microeconomics)

COURSE DESCRIPTION

Environmental economics is the study of human activity and its relationship with the natural environment, in particular, pollution of the natural environment. In this course we will develop conceptual frameworks for explaining and evaluating the impact of human activity on the environment. In addition to the mainstream neoclassical approach, we will discuss ecological approaches to pollution assessment. We will apply these tools of economic analysis to a variety of pollution problems at the local, national, and global levels. External costs and benefits, technological impacts, climate change, and limits to economic growth are examined. We will also discuss the varied roles of economics in environmental policy decisions and potential policy measures will be discussed and compared in an open and critical way. A special emphasis will be placed on the economics of climate change and mitigation policy options.

COURSE OBJECTIVES

- Learn the basic concepts and tools of environmental and ecological economics.
- Think critically about current environmental problems, such as climate change, and environmental policy through the lens of both an environmental economist and an ecological economist.
- Develop the skills to discuss and assess the appropriate level and effectiveness of environmental policy in both economic and societal terms through classroom discussion, problem sets, and writing assignments.

COURSE STRUCTURE

Required Textbooks & Websites:

Jonathan M. Harris and Brian Roach. *Environmental and Natural Resource Economics: A Contemporary Approach*. 4th Edition. Routledge. 2018. ISBN: 9781138659476. (HR)

Moodle (via Gateway)
Most materials for this course—syllabus, reading and writing assignments, problem sets and solutions to problem sets—will be available via *Moodle*. You should check *Moodle* regularly as I will post any additional supplemental readings and resources here.

Class Meetings:
You are responsible for the material covered in class. It is very important that you attend class every day. You will receive the largest benefit from class time if you read the required material prior to class. Attendance is therefore necessary, and while I will not take attendance every meeting, class attendance and participation will ultimately account for 10% of your final grade.

Your attendance and participation grade will be calculated based on the following criteria:

- You come to class having done the day's reading.
- You bring the readings (and course work, if any) to class with you.
- You come to class on time.
- You initiate discussion and/or respond to your peers.
- You enter the conversation in a way that is respectful of others.
- While personal opinions, anecdotes, and reflections are welcome, you must offer more than just personal opinion or anecdote – that is, you are expected to root your comments in the course material we are discussing. In other words, you must demonstrate you have read the assigned material.
- You work collaboratively with people to achieve learning goals.
- You are present and engaged in every class and you do not make a regular habit of excusing yourself in the middle of class to take a phone call, etc.

Problem Sets:
You will be required to complete three (3) problem sets. Problem set assignments will be posted to *Moodle*, and will focus on applications of the tools and concepts we cover in class. Many of these problem sets will include both an analytical and writing components. These assignments are *due at the beginning of class* on the date specified on the course schedule. For successful completion of the course, all problem sets must be submitted; however, *no problem set will be accepted for grading after 4pm on its due date*. You may work on these assignments with fellow classmates, but all final work MUST be your own. These assignments are a great opportunity to deepen your understanding of the material and prepare yourself for exams. Your average grade on these three problem sets will account for 25% of your final course grade. If you object to the way one of your problem sets was graded, you may attach a written description of your objection and submit the item to me for re-grading. I will re-grade the entire item, and your score may go up or down.

Writing Assignments:
For some of the readings (discussion days), you will be asked to write a brief (1-2 page) reflection and analysis of the readings. The main goals of these writing assignments are to help you understand and think critically about an issue and to prepare for class discussion. Your average grade on these assignments will account for 30% of your final course grade. These are *due at the beginning of class and will only be accepted until 4pm* on the due date.

In general, I will evaluate your writing by considering how well you have achieved the following goals (adapted from the Writing Program):

- The author crafts an introduction that identifies a question, frames the question, and states a thesis.
- The author organizes the writing, demonstrates a progression of ideas, and maintains a consistent focus or thread.
- The author contextualizes the question and supports it with evidence.
- The author sustains analytical inquiry throughout the assignment.
- The author effectively incorporates relevant outside information, if applicable.
- The author adheres to appropriate standards for language and grammar use.
- The author conforms to appropriate formats for citation of source material, if necessary.

The most important aspect of these are assignments is for you to demonstrate that you have read and critically analyzed the readings – that means more than just "summary" or "response."

Exams:
There will be one midterm exam to confirm and evaluate your understanding; as well as a *cumulative* final exam.

Midterm Exam: Monday, November 5
Final Exam: Tuesday, December 18, 9am

Extra credit:
To encourage you to attend campus activities **outside** your major, you may gain up to 2 percentage points of extra credit by attending campus events and submitting a clearly written 1-2 page reflection and analysis of the event *within one week of its occurrence*. Two types of events count (you may use each *only once*):

- An environment/sustainability lecture or event.
- A social science/economics lecture or event.

The style of your summary is fairly open, but should allow someone who was not at the event to understand the key points.

COURSE POLICIES

Grading System: Your final course grade will be calculated as follows:

Assignment	Percentage
Problem sets	25%
Writing assignments	30%
Midterm exam	15%
Final exam	20%
Class attendance and participation	10%

The grading scale will be as follows:

A: 92.5 – 100%
A-: 89.5 – 92.4%
B+: 86.5 – 89.4%
B: 82.5 – 86.4%
B-: 79.5 – 82.4%
C+: 76.5 – 79.4%
C: 72.5 – 76.4%
C-: 69.5 – 72.4%
D+: 66.5 – 69.5%
D: 62.5 – 66.4%
D-: 59.5 – 62.4%
F: 59.4% or below

No "extra credit" will be offered beyond that already described above. The way to improve your grade beyond what it otherwise would be is to work hard to understand the material and seek additional help when necessary.

Classroom Environment:
In the classroom, during lectures and discussions, the goal is to develop and maintain an environment of mutual respect: respect for me, respect for your fellow classmates, and my respect for you. What this means is that I will do all I can to teach effectively and listen to your questions, comments, jokes, or complaints; and respond as best I can. While at the same time you listen while I am talking, avoid talking amongst yourselves, keep your cell phones away, and keep laptop usage to in-class topics.

Academic Integrity:
Students have an obligation to integrity in all academic work. In this course, submission of exam, homework, or writing assignments to be counted toward your course grade automatically implies a personal pledge that you have neither given nor received unapproved information about the assignment, whether by copying answers, exchanging unauthorized prior information, sending or receiving answers via text message, etc. Violation of this pledge in even the slightest degree is a violation of the Student Code of Conduct and may result in a failing grade for the assignment in

question, an F for the course, suspension, expulsion, or other consequences. In other words, no cheating, it's just not worth it!

Test Administration:
There will be NO make-up exams. If you must unexpectedly miss an exam you must present evidence of a medical or family emergency. If you know in advance that you will be unable to take an exam, contact me as soon as possible to make other arrangements. In general, with an acceptable reason, you may arrange to take an exam early, but never late.

Accommodations for Disabilities:
Dickinson values diverse types of learners and is committed to ensuring that each student is afforded an equal opportunity to participate in all learning experiences. If you have (or think you may have) a learning difference or a disability – including a mental health, medical, or physical impairment – that would impact your educational experience in this class, please contact the Office of Disability Services (ODS) to schedule a meeting with Director Marni Jones. She will confidentially discuss your needs, review your documentation, and determine your eligibility for reasonable accommodations. To learn more about available supports, go to www.dickinson.edu/ODS, email DisabilityServices@dickinson.edu, call (717) 245-1734, or go to ODS in 106 Dana Hall.

If you've already been granted accommodations at Dickinson, please let me know as soon as possible so that we can meet to review your Accommodation Letter and complete your Access Plan. If you will need test proctoring from ODS, remember that you will need to provide them with at least one week's notice.

Classroom Recording:
This class, including lectures, classroom discussions and laboratory sessions, may be audio recorded as an accommodation granted by the Office of Disability Services (ODS). If this is the case, the course instructor will inform all members of the class. The course instructor may, for pedagogical and/or assessment purposes, require that you be audio or video recorded during specific course activities. If such activities are a part of this course, this syllabus will indicate the purposes for recording, when recording will occur, how recordings will be used and how long they will be retained. In addition, the instructor will clearly announce to all participants when the recording is starting and when it ends. Audio or video recording of any lecture, classroom discussion, or laboratory session in this course other than for the above purposes is strictly prohibited and may be a violation of Pennsylvania's Wiretapping and Electronic Surveillance law (18 Pa. C.S. Section 5701 et seq).

COURSE SCHEDULE (SUBJECT TO CHANGE)

WEEK 1: ENVIRONMENTAL & ECOLOGICAL ECONOMICS DEFINED

9/3: Introductions & Discussion of Syllabus

9/5: Changing Perspectives on the Environment

- HR, Chapter 1
- Fullerton, D., & Stavins, R. (1998). How economists see the environment. *Nature, 395*(6701), 433-434.

9/7: Supply, Demand, and Welfare Analysis (Micro Review)

- HR, Chapter 3, Appendix 3.1, p. 68-76

WEEK 2: ENVIRONMENTAL EXTERNALITIES

9/10: Supply, Demand, and Welfare Analysis (Micro Review)

- HR, Chapter 3, Appendix 3.1, p. 68-76

9/12: Negative Externalities and Pigovian Taxes

- HR, Chapter 3, p. 43-50,
- HR, Chapter 3, Appendix 3.2, p. 76-79

9/14: The Environment and Economic Development (**Discussion Day**)

- HR, Chapter 2
- Meadows, D., Randers, J. and Meadows, D. (2004). Chapter 1: Overshoot. In *Limits to Growth: The 30-Year Update.* London: Earthscan.
- Making Summary and Response more Analytical. Helpful tips from Rosenwasser & Stephen. (2012). *Writing Analytically*. 6th edition.

Writing Assignment #1 DUE

WEEK 3: ENVIRONMENTAL EXTERNALITIES (cont'd)

9/17: Positive Externalities and Subsidies

- HR, Chapter 3, p. 50-52
- HR, Chapter 3, Appendix 3.2, p. 83-85

9/19: Positive Externalities and Subsidies

- HR, Chapter 3, p. 50-52
- HR, Chapter 3, Appendix 3.2, p. 83-85

9/21: The Coase Theorem

- HR, Chapter 3, p. 55-64
- Coase, Ronald. (1960). The Problem of Social Cost. *Journal of Legal Studies, 3*, 1-44. [there is a lot here – it's worth reading – but skim for now]

WEEK 4: PROPERTY RIGHTS AND THE ENVIRONMENT

9/24: Property Rights and the Environment: Rivalry and Excludability

- no readings - this is micro review for most of you.

9/26: Common Property and Open Access

- HR, Chapter 4, p. 88-100
- Hardin, Garrett. (1968). The Tragedy of the Commons. *Science, 162*(3859), 1243-1248.

9/28: The Environment as a Public Good

- HR, Chapter 4, p. 100-104

WEEK 5: VALUATION OF THE ENVIRONMENT

10/1: Total Economic Value and Valuation Techniques

- HR, Chapter 6, p. 126-132

10/3: Revealed Preference Methods

- HR, Chapter 6, p. 133-137
- Cameron, Trudy Ann. (2010). Euthanizing the Value of a Statistical Life. *Review of Environmental Economics and Policy, 4*, 161-178.

10/5: **NO CLASS**

WEEK 6: COST-BENEFIT ANALYSIS (CBA) & DISCOUNTING

10/8: Stated Preference Methods

- HR, Chapter 6, p. 137-143

10/10: Overview of CBA

- HR, Chapter 7, 151-153

Problem Set #1 DUE

10/12: Discounting, Risk, and Uncertainty in CBA

- HR, Chapter 7, p. 153-168

WEEK 7

10/15: Climate Change, CBA, & Discounting (**Discussion Day**)

- Kelman, Steven. (1981). Cost-Benefit Analysis: An Ethical Critique. *Regulation, 33*, 33-40.
- Defending Cost-Benefit Analysis: Replies to Steven Kelman. *Regulation, 39*, 39-42.
- Ackerman, Frank. (2008). Climate Economics in Four Easy Pieces. *Development, 51*, 325-331.
- Pindyck, Robert S. (2013). The Climate Policy Dilemma. *Review of Environmental Economics and Policy, 7*(2), 219-237.

Writing Assignment #2 DUE

10/17: The Economics of Pollution Control

- HR, Chapter 8, p. 177-179

10/19: Policies for Pollution Control: Theory

- HR, Chapter 8, p. 179-192

WEEK 8: POLLUTION: ANALYSIS & POLICY

10/22: **FALL PAUSE – NO CLASS**

10/24: Policies for Pollution Control: Theory

- HR, Chapter 8, p. 179-192
- Goulder, Lawrence H. (2013). Markets for Pollution Allowances: What Are the (New) Lessons. *Journal of Economic Perspectives*, *27*(1), 87-102.
- Schmalensee, Richard, and Robert N. Stavins. (2013). The SO_2 Allowance Trading System: The Ironic History of a Grand Policy Experiment. *Journal of Economic Perspectives*, *27*(1), 103-22.

10/26: Policy Making Under Uncertainty

- HR, Chapter 8, p. 193-203
- Pindyck, Robert S. (2007). Uncertainty in Environmental Economics. *Review of Environmental Economics and Policy*, *1*, 45-65.

Problem Set #2 DUE

WEEK 9: ISSUES IN ECOLGICAL ECONOMICS AND GREEN ACCOUNTING

10/29: **NO CLASS**

10/31: Natural Capital, Sustainability, and National Income Accounting

- HR, Chapters 9 & 10
- Zimmer, Carl. (2014, June 5). Putting a Price Tag on Nature's Defenses. *The New York Times.* http://www.nytimes.com/2014/06/05/science/earth/putting-a-price-tag-on-natures-defenses.html

11/2: Weak vs Strong Sustainability **(Discussion Day)**

- Costanza, Robert, and Herman Daly. (1992). Natural Capital and Sustainable Development. *Conservation Biology*, *6*(1), 37-46.
- Solow, Robert M. (1992). Sustainability: An Economist's Perspective. *National Geographic Research and Exploration*, *8*, 10-21.

Writing Assignment #3 DUE

WEEK 10: ENERGY

11/5: **MIDTERM EXAM**

11/7: Energy Supply and Demand

- HR, Chapter 11, p. 269-285

11/9: Economics of Alternative Energy

- HR, Chapter 11, p. 286-300
- Timmons, D., Harris, J., & Roach, B. (2015). *The Economics of Renewable Energy*. Tufts University Global Development and Environment Institute.

WEEK 11: CLIMATE CHANGE

11/12: Climate Change: Science and Economics

- HR, Chapter 12
- Climate Change is Simple, TEDx Talk, David Roberts. https://youtu.be/pznsPkJy2x8. An annotated version is here: http://grist.org/climate-change/climate-change-is-simple-we-do-something-or-were-screwed/.

11/14: Mitigation Policy Options

- HR, Chapter 13, p. 336-353
- Metcalf, Gilbert E. (2009). Market-based Policy Options to Control U.S. Greenhouse Gas Emissions. *Journal of Economic Perspectives, 23*(2), 5-27.
- Roberts, David. (2016, April 22). Putting a price on carbon is a fine idea. It's not the end all be all: Three reasons to temper your enthusiasm. *Vox*. http://www.vox.com/2016/4/22/11446232/price-on-carbon-fine.

11/16: Climate Policy in Practice (**Discussion Day**)

- HR, Chapter 13, 353-368
- Aldy, Joseph E., and Robert N. Stavins. (2012). The Problems and Promise of Pricing Carbon: Theory and Experience. *The Journal of Environment and Development, 21*(2), 152-180.
- Hayes, Christopher. (2014, April 22). The New Abolitionism. *The Nation*. http://www.thenation.com/article/179461/new-abolitionism#
- Roberts, David. (2016, April 26). The political hurdles facing a carbon tax — and how to overcome them. *Vox.* http://www.vox.com/2016/4/26/11470804/carbon-tax-political-constraints.

Writing Assignment #4 DUE

WEEK 12: THANKSGIVING

11/19: NO CLASS (Prof. Underwood out of town)

11/21: THANKSGIVING – NO CLASS
11/23: THANKSGIVING – NO CLASS

WEEK 13: GREENING THE ECONOMY

11/26: Environmental Kuznets Curve, Porter Hypothesis, and Decoupling

- HR, Chapter 14, p. 375-388

11/28: Environmental Protection and Economic Growth

- HR, Chapter 14, 388-399

11/30: Creating a Green Economy: A Just Transition? (**Discussion Day**)

- OECD (2017). Towards an inclusive transition. Chapter 6 in *Investing in Climate, Investing in Growth*, OECD Publishing, Paris.
- Pollin, R. and Callaci, B. (2016, July 6). A Just Transition for U.S. Fossil Fuel Industry Workers. *The American Prospect*. http://prospect.org/article/just-transition-us-fossil-fuel-industry-workers.

Writing Assignment #5 DUE

WEEK 14: POPULATION AND THE ENVIRONMENT

12/3: Dynamics of Population Growth

- HR, Chapter 15, p. 409-418
- NY Times (2015): The Unrealized Horrors of the Population Bomb (video: 12:56)

12/5: The Demographic Transition, Population, and Economic Growth

- HR, Chapter 15, p. 419-427

Problem Set #3 DUE

12/7: Impacts of Population, Affluence, and Technology (IPAT)

- HR, Chapter 15, 427-434
- Underwood, A. (2017, October 3). Sharing impacts the environment – just not quite how you think. *Earth and Society*. http://earthandsociety.dickinson.edu/sharing-impacts-the-environment-just-not-quite-how-you-think/.

WEEK 15: INSTITUTIONS AND POLICIES FOR SUSTAINABLE DEVELOPMENT

12/10: The Three Dimensions of Sustainable Development

- HR, Chapter 22, p. 591-596

12/12: Sustainable Development in Practice

- HR, Chapter 22, p. 596-610

12/14: The Environment and Economic Development Redux (**Discussion Day**)

- OECD. (2011). *Towards Green Growth*, Summary.
- Van den Bergh, J. C., & Kallis, G. (2012). Growth, a-growth or degrowth to stay within planetary boundaries?. *Journal of Economic Issues*, *46*(4), 909-920.

Writing Assignment #6 DUE

FINAL EXAM: Tuesday, December 18, 9 am