

## University of Maryland - Master of Science in Applied Economics

### ECON 675 (Winter 2020/2021) Environmental Economics November 30, 2020 – Feb 22, 2021

Office hours: Online by appointment  
Class time: Monday 6:45-9:30 PM

1400 16th Street, NW (Suite 140)  
Washington, DC 20036

***Please note that there will be one class that does not fall on a Monday. Our 7<sup>th</sup> class will be held on Thursday, January 21 at the usual time (6:45 pm). This is necessary in order for us to meet 12 times during the semester.***

Online discussion:

Tuesday 9:00 AM to Friday 8:00 PM

Friday 9:00 AM to Tuesday 8:00 PM (for Thursday 1/21/21 class session)

#### Instructors

Chris Dockins

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Phone: 571-212-1992

Charles Griffiths

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Phone: 202-566-0156

Instructor office hours: We plan to hold regular office hours on Wednesdays from 5:30 to 6:15, but we can adjust this as needed. These hours will be online through Zoom. We will add more details as we start the semester.

#### Teaching Assistant

Scott Abramson is our TA for this class.

[jscottabramson@gmail.com](mailto:jscottabramson@gmail.com)

TA Office Hours: Meetings with you teaching assistant will be online and regular office hours are on Saturdays from 11:00 – 11:45 am.

#### Texts – Required and Supplemental

Required: *A Course in Environmental Economics: Theory, Policy, and Practice* (Dan Phaneuf & Till Requate). 2017. Cambridge University Press. Cambridge, United Kingdom.

Additional required and supplementary readings will be provided.

#### Course Description

This course examines the problems of earth, air, and water pollution from an economic perspective and the nature of environmental regulation, U.S. environmental policies, and environmental policy debates. Students will use welfare economics to evaluate the inefficiencies of market failures and examine market-based policy responses to environmental problems. Students will be asked to undertake practical exercises commonly done by environmental economists, including estimating the willingness to pay for an environmental amenity and reviewing Regulatory Impact Analyses.

#### Objectives

Our program has 7 general learning outcomes for students:

1. Ability to understand, evaluate and analyze economic data

## University of Maryland - Master of Science in Applied Economics

- 2: Ability to understand and interpret statistical evidence from economic data
- 3: Ability to apply empirical evidence to assessing economic arguments
- 4: Ability to apply macroeconomic theories to policy discussions
- 5: Ability to apply microeconomic theories to policy discussions
- 6: Ability to communicate economic ideas to a broader audience
- 7: Ability to evaluate the effectiveness of policy programs using sound economic techniques

The learning outcomes that pertain to this course are: 1, 2, 3, 5, 6, and 7

Somewhat more specifically, at the end of the course, students should be able to:

- Statistically estimate and interpret the willingness to pay for an environmental good.
- Apply empirical evidence to assessing environmental economic arguments using benefit-cost analysis, discounting, and uncertainty analysis.
- Apply the microeconomic theories of market failure and externalities to policy discussions.
- Communicate environmental economic concepts and ideas to a broader audience.
- Evaluate the effectiveness of U.S. government pollution control policies using sound economic techniques.

### Prerequisites

To enroll this course, students must have completed ECON 641 (Microeconomic Analysis), and they must have completed or be currently enrolled in ECON 645 (Empirical Analysis III: Econometric Modeling and Forecasting).

### Structure of the Course

- The course will be taught in a lecture/seminar format meeting once per week on Monday, 6:45-9:30 PM. Each week will consist of two separate Zoom meetings, one from 6:45 – 7:45, and a second from 8:00 – 9:00.
- Please note that we may adjust the exact timing of these sessions after discussing the structure with the class. For example, it might be desirable to have a longer break between the two sessions. However, the sessions will not extend beyond the 6:45-9:30 overall time window and once adjusted the times will be consistent through the duration of the course.
- NOTE: The class will also meet on Thursday, January 21 from 6:45-9:30 pm, following the same format as the regular Monday classes.
- An online discussion will be held each week on the ELMS/Canvas Discussion page from the day after the class (usually Tuesday) at 9AM for four days (ending usually Friday at 8:00 pm). *Please note that there is one exception for the class held on Thursday.* Students are expected to make two (but no more than three) substantive contributions to this discussion each week. The instructor will monitor this discussion (twice on 2<sup>nd</sup> discussion day and twice on 3<sup>rd</sup> or 4<sup>th</sup> discussion day) to respond to students and re-direct the discussion as necessary.
- Students will be given periodic quizzes at the end of class, three longer term assignments throughout the semester, and a final exam at the end of the semester. See class schedule below for due dates.

### Grading

Grades will be determined based on students' performance on quizzes, homework, exam, and class participation:

## University of Maryland - Master of Science in Applied Economics

- 15% Quizzes  
Students periodically will be given questions at the end of class to test their understanding of the concepts discussed and to provide examples of the types of questions that will be used in the final exam.
- 15% Assignment 1 – *Example: Estimating the Efficient Level of Pollution Control*  
*Students will be asked develop a simple conceptual model of the economic benefits of an environmental externality. They will then be asked to collect data, populate the model, and estimate the efficient level of pollution control.*
- 15% Assignment 2 – *Example: Estimating Willingness to Pay*  
*Students will be given a problem and data and will be asked to econometrically estimate the willingness to pay for an environmental amenity.*
- 15% Assignment 3 – Policy Memorandum  
Student will assume the role of a policy adviser and will be given a current environmental economic topic. They will be asked to write a short policy memo describing the problem and offering a set of recommendations for a decision-maker to consider.
- 30% Final Exam  
Students will be given an in-class, open book exam.
- 10% Participation  
Participation will be based on the student's attendance record and his or her participation in class discussion as well as his or her substantive participation in the weekly online discussion.

At the end of the term, every student will have a numerical course grade between 0 and 100. We will decide upon the numerical cutoffs between various letter grades based on my professional judgment. We will consider students' performance relative to the class. We will also consider absolute standards of professional competence. Highly competent students will get A's. Barely competent students will get B's. Incompetent students will get B-'s or worse. The cutoffs that I use will respect the ordinal ranking of numerical course grades. No student with a given numerical course grade will receive a lower letter grade than someone else with a lower numerical course grade.

### Required Technology

Students are expected to have access to a word processing package (e.g. Microsoft Word), a spreadsheet package (e.g., Microsoft Excel), and a statistical software package (Stata). Students should bring a calculator with them to class.

### Purchasing Stata

The program's curriculum is designed to use Stata as the statistical software. Other leading statistical software packages include SAS and R. We have decided to focus on one package to enhance the continuity across courses in our program. A more superficial familiarity with multiple packages might be just as good as a deep understanding of a single package. But working with multiple packages would also result in less time to learn econometrics.

If you have not done so, students in the program should purchase Stata. Stata offers different "flavors" and different lengths of license. Price varies according to these two factors. A description of the flavors is given here: <http://www.stata.com/products/which-stata-is-right-for-me/> Stata offers student discounts via the "Gradplan": <http://www.stata.com/order/new/edu/gradplans/>. A one-year license for

## University of Maryland - Master of Science in Applied Economics

Stata/IC is \$125, and a perpetual license (which never expires) is \$198. We do not recommend "Small Stata". Small Stata is too limited for the course work our program. Under the Gradplan, you may install Stata on up to three different computers. You may also eventually upgrade your version of Stata and your license, at a discount, if you wish.

### Assignments

Assignments are due at the beginning of class. Assignments 1, 2, and 3 should be submitted via ELMS. You may also email both instructors ([pdockins@umd.edu](mailto:pdockins@umd.edu) and [cgriff16@umd.edu](mailto:cgriff16@umd.edu)) as a backup.

### Copyright Notice

Class lectures and other materials are copyrighted and may not be reproduced for anything other than personal use without written permission from the instructor.

**Course Website:** Copies of the course syllabus, your grades, and other relevant links and documents will be posted on the course's ELMS/Canvas website. You can access the site via [www.elms.umd.edu](http://www.elms.umd.edu). You will need to use your University of Maryland "directory ID" and password.

**Email:** The University has adopted email as the primary means of communication outside the classroom, and I will use it to inform you of important announcements. Students are responsible for updating their current email address via <http://www.registrar.umd.edu/current/> (Under the first major heading of "Online Transactions" there is a link to "Update Contact Information".)

**Contact Hours:** Three credit master's-level courses at the University of Maryland require a minimum amount of contact between instructors and students. Our courses' 12 weekly meetings only satisfy 80% of the university's contact requirement. The other 20% is satisfied by weekly mandatory and graded online contact. In principle, the contact hours requirement could be satisfied by scheduling 3 additional 150-minute meetings per term, or 6 additional 75-minute meetings, or 10 additional 45-minute meetings. But in practice the contact hours requirement is satisfied by the weekly online discussions. The weekly online discussions are a more flexible way to ensure that our program's courses in DC provide the same level of student-instructor contact as the traditional 15-week face-to-face version of the same course when it is taught on campus in College Park.

**Work Load:** Mastering the material covered in this course requires a significant amount of work outside of class. Students should expect to spend more time outside of class than in class – typically at least twice as much time. The courses in our DC program are 12-week courses that cover all the same material as a traditional semester-long 3-credit course (15 weeks). The compressed schedule makes it possible to complete our degree in just 15 months if you take 2 courses each term. But the compressed schedule also implies an accelerated pace with an average of 25% more work per week in a given course ( $15/12 = 1.25$ ). The normal full-time load in a master's program is 3 courses per semester, or 6 courses per year. The weekly work load when taking 2 of our DC courses per term is equivalent to the load from 2.5 "normal" 15-week courses - so  $2.5/3.0=83\%$  of a full-time load. Students who take 2 courses per quarter in our program complete 8 courses per year. So over the course of a year, taking 2 courses per quarter in our DC program is equivalent to 133% of a full-time load ( $8/6 = 1.33$ ).

**Academic Integrity:** The University of Maryland, College Park has a nationally recognized Code of Academic Integrity. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It

## University of Maryland - Master of Science in Applied Economics

is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit <http://www.studentconduct.umd.edu>

**Student Conduct:** Students are expected to treat each other with respect. Disruptive behavior of any kind will not be tolerated. Students who are unable to show civility to one another or myself will be referred to the Office of Student Conduct. You are expected to adhere to the Code of Student Conduct.

**Excused Absences:** The University of Maryland's policy on excused absences is posted here: <http://www.president.umd.edu/administration/policies/section-v-student-affairs/v-100g>

Please note:

- If you miss any class meetings for any reason, you are still responsible for all material covered during the meeting you missed. It is your responsibility – not the instructor's – to get yourself caught up in the course. Instructors routinely facilitate things by posting lecture notes, etc.
- If you need to miss an exam or other graded course requirement because of illness, injury, or some other emergency: Follow doctor's orders and get documentation. Get in touch with the instructor as soon as you're able – preferably prior to missing the exam or deadline. Communicate with the instructor to make up the course requirement as soon as possible. You are entitled to recover before you make up the course requirement, but you are not entitled to extra days to study beyond the time the doctor's note says you're incapacitated. If you are incapacitated for more than a week or so beyond the end of the term, your grade in the course will be an "Incomplete". In such cases you must negotiate a plan with your instructor for completing the course requirements. Once you make up the course requirement the instructor will change your "I" to the appropriate letter grade.

**School Closings and Delays:** Information regarding official University closing and delays can be found on the campus website and the snow phone line: (301) 405-SNOW (405-7669). Since our program is an evening program in downtown Washington, DC, rather than a day program in College Park, we do not always cancel classes on the same days as the College Park campus. The program director will always announce cancellation information to the program as an announcement on the program's ELMS/Canvas site. This will generally be done by 1:00 p.m. on days when weather or other factors are an issue.

**UMD Counseling Center:** Sometimes students experience academic, personal and/or emotional distress. The UMD Counseling Center in Shoemaker Hall provides comprehensive support services that promote personal, social, and academic success. The cost of these services is covered by the fees you already paid when you registered for classes, and there is no additional charge if you use the services. Proactively explore the range of services available, including the Counseling Service, Accessibility and Disability Service, Learning Assistance Service, and the Testing Office, all described at <http://www.counseling.umd.edu/>

**Students with Disabilities:** The University of Maryland does not discriminate based on differences in age, race, ethnicity, sex, religion, disability, sexual orientation, class, political affiliation, or national origin. Reasonable accommodations will be arranged for students with documented disabilities. Students who have an accommodations letter from the Accessibility and Disability Service (ADS) should meet with me during the first week of the term to discuss and plan for the implementation of your accommodations. If you require reasonable accommodations but have not yet registered with ADS, please contact the Accessibility and Disability Service at 301-314-7682 or [adsfrontdesk@umd.edu](mailto:adsfrontdesk@umd.edu).

## University of Maryland - Master of Science in Applied Economics

**Academic Progress:** The UMD Graduate School requires that students maintain a GPA of at least 3.0. Students whose cumulative GPA falls below 3.0 will be placed on academic probation by the graduate school. Students on academic probation must ask the program's director to petition the graduate school if they want to remain enrolled in the program. The petition must include a plan for getting the student's GPA up to at least 3.0. Students who do not live up to their plan can have their enrollment in the program terminated without having earned the degree. Note: a grade of "B" corresponds to a GPA of 3.0. A grade of "B-" corresponds to a GPA of 2.7.

**Building Access:** The door to the building at 1400 16th Street is unlocked on weekdays until 7:00 PM. Students who arrive after 7:00 PM or on weekends will find the door locked. The building's concierge station has been moved in the recent lobby renovation, so the concierge can no longer easily see when someone is at the door. You can call the phone on the security guard's desk by dialing (202) 328-5158. If the security guard is off duty or happens to be away from his or her desk when you arrive, you can always also go around to the other door at 1616 P Street and pick up the black phone to the right of that door. You will be connected to the company that handles security for our building. If you tell them you're with the University of Maryland (suite 140 in 1400 16th Street), they should ask you for a password. When you tell them the password, they will buzz you in. You can get the password from the program coordinator, the TAs, or the program director. Please note: the building security staff are not able to buzz you in at the 1400 16th Street door. You have to go around to the 1616 P Street door to be buzzed in.

University of Maryland - Master of Science in Applied Economics

Class Schedule:

Week Date	Topics	Additional Readings
Week 1 Nov 30 2020 CD	<ul style="list-style-type: none"> <li>• Class Introduction</li> <li>• Environmental Problems and Policy Issues</li> </ul>	<b>Phaneuf and Requate (P&amp;R) – Chap. 2</b> <u>Readings:</u> <ul style="list-style-type: none"> <li>- Environmental Economics vs. Ecological Economics</li> <li>- The Early History of Environmental Economics (Sandmo)</li> <li>- Environmental Economics: Basic Concepts and Debates (Goffman)</li> </ul>
Week 2 Dec. 7 2020 CG	<ul style="list-style-type: none"> <li>• Environmental economics and theory of externalities</li> </ul>	<b>P&amp;R – Chap. 1</b> <u>Readings:</u> <ul style="list-style-type: none"> <li>- The West Needs a Water Market to Fight Drought (Glennon and Libecap)</li> <li>- Moving Pollution Trading from Air to Water (Fisher-Vanden and Olmstead)</li> <li>- The Role of Economics in Climate Change Policy (Mckibbin and Wilcoxon)</li> </ul>
Week 3 Dec. 14 CD	<ul style="list-style-type: none"> <li>• Theory of Environmental Policy</li> </ul>	<b>P&amp;R – Chap. 3</b> <u>Reading:</u> <ul style="list-style-type: none"> <li>- It's Immoral to Buy the Right to Pollute (with replies) (Sandel et al.)</li> </ul>
Assignment 1 – Topic TBD Due Date – Jan. 4 (Week 5)		
Week 4 Dec. 21 CG	<ul style="list-style-type: none"> <li>• Imperfect Information</li> </ul>	<b>P&amp;R – Chap. 4</b> <u>Readings:</u> <ul style="list-style-type: none"> <li>- Markets for Pollution Allowances, What are the (New) Lessons (Goulder)</li> <li>- The SO2 Allowance Trading System, The Ironic History of a Grand Policy Experiment (Schmalensee and Stavins)</li> <li>- Carbon Markets 15 Years after Kyoto (Newell, Pizer, and Raimi)</li> </ul>
Week 5 Jan. 4 2021 CD	<ul style="list-style-type: none"> <li>• Competitive Output Markets</li> </ul> <p><i>Assignment 1 Due</i></p>	<b>P&amp;R – Ch. 5</b> <u>Readings:</u> <ul style="list-style-type: none"> <li>- Who Will Run the EPA (Heinzerling)</li> <li>- The Evolving Regulatory Role of the U.S. OMB / (Graham)</li> <li>- Thirty Years of Economics at the EPA (McGartland)</li> <li>- Instrument Choice in Environmental Policy (Goulder and Parry)</li> </ul>
Week 6	<ul style="list-style-type: none"> <li>• Institutional Topics in Cap and Trade Programs</li> </ul>	<b>P&amp;R – Ch. 8</b> <u>Readings:</u>

University of Maryland - Master of Science in Applied Economics

Jan. 11 2021 CG		<ul style="list-style-type: none"> <li>- On Marketable Air-Pollution Permits: The Case for a System of Pollution Offsets (Krupnick, Oates, and Van de Verg)</li> <li>- The Effect of Allowance Allocations on Cap-and-Trade System Performance (Hahn and Stavins)</li> </ul>
Assignment 2 – Topic TBD Due Date – Feb. 1 (Week 9)		
Week 7 Jan. 21 <u>THURSDAY</u>	<ul style="list-style-type: none"> <li>• Theory of Applied Welfare Analysis</li> </ul>	<b>P&amp;R – Chap. 14</b> <u>Readings:</u> <ul style="list-style-type: none"> <li>- How economists see the environment (Fullerton and Stavins)</li> </ul>
Week 8 Jan. 25	<ul style="list-style-type: none"> <li>• Benefit-Cost Analysis: Introduction</li> </ul>	<b>P&amp;R – Chap. 21/22 (portions)</b> <ul style="list-style-type: none"> <li>- Is There a Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulation? (Arrow, et al.)</li> <li>- An Eye on the Future (Goulder and Stavins)</li> <li>- Cost-Benefit Analysis: An Ethical Critique (with replies) (Kelman, et al.)</li> </ul>
Week 9 Feb. 1	<ul style="list-style-type: none"> <li>• Revealed Preference Methods for benefits analysis</li> </ul> <p><i>Assignment 2 Due</i></p>	<b>P&amp;R – Chap. 15/17/18 (portions)</b> <u>Readings:</u> <ul style="list-style-type: none"> <li>- The Value of a Statistical Life (Ferreria)</li> <li>- Deterring Oil Spills, Who Should Pay and How Much (Cohen)</li> </ul>
Assignment 3 – Policy Memo Due Date – Feb. 15 (Week 11)		
Week 10 Feb. 8	<ul style="list-style-type: none"> <li>• Stated Preference Methods for benefits analysis</li> </ul>	<b>P&amp;R – Chap. 19</b> <u>Readings:</u> <ul style="list-style-type: none"> <li>- Economic Values without Prices (Loomis)</li> <li>- From Exxon to BP, Has Some Number Become Better than No Number (Kling, Phaneuf, and Zhao)</li> <li>- Contingent Valuation, From Dubious to Hopeless (Hausman)<u>Discussion</u></li> </ul>
Week 11 Feb. 15	<ul style="list-style-type: none"> <li>• Applied Benefit-Cost analysis for environmental policy</li> </ul> <p><i>Assignment 3 Due</i></p>	<b>P&amp;R – Chap. 20</b> <u>Readings:</u> <ul style="list-style-type: none"> <li>- Benefits and Costs of the Clean Air Act 1990-2020, the Second Prospective Study (US EPA, 2011)</li> </ul>
Week 12 Feb. 22	<ul style="list-style-type: none"> <li>• Final exam</li> </ul>	The final exam will be due at the end of class time on February 22nd.