

**Course Syllabus: GEOG524/EVPP524: Introduction to  
Environmental and Resource Economics**  
(Last updated August 30, 2006)

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**Meeting time and location:** Wednesdays 4:30-7:10 PM, Innovation 338

**Class Web Site:** [http://mason.gmu.edu/~dparker3/env\\_res/env\\_res](http://mason.gmu.edu/~dparker3/env_res/env_res)

**Course Description:**

The class is both an introduction to basic microeconomic theory and an introduction to environmental and resource economics. In general, the class will emphasize methods rather than application. The main themes discussed include:

**Externalities:** an economic impact that one economic actor has on another, where the first actor does not consider the impact on the second when making his/her decision. Examples: localized pollution.

**Public goods:** an economic activity that benefits many actors in the economy, and is not likely to be supplied at economically optimal levels, given private incentives. Examples: biodiversity, light rail system, public education. (Note that the externally concept and the public good concept are closely related).

**Intertemporal non-renewable and renewable resource extraction** (briefly): Examples: extraction of oil (non-renewable), fisheries management (renewable).

**Non-market valuation and cost-benefit analysis** (briefly): estimation of the value of resources that are not traded in the market, and use of these values to make decisions regarding public investments. Examples: assessment of the cost of damages to natural areas from an oil spill; decision to establish a new park.

We will also emphasize the concept of property rights and their theoretical role in all of the above phenomena. As well, some of the basic concepts of economics as a paradigm for allocating scarce resources, such as the idea of making tradeoffs at the margin, opportunity cost, and the shadow value of resources, will be emphasized. Potential policy responses will also be discussed.

**Goals of the Course:** The main goal of this class is for students to have a basic understanding of the theoretical tools used for economic analysis of environmental and natural resource issues. Having completed the class, students will be expected to be able to complete environmental and resource economic analysis at an intermediate microeconomic level. Students will also be expected to be able to verbally discuss solution methods and their implications. Finally, students will be expected to be able to verbally apply the concepts learned in class to analysis of real-world problems. The class will also prepare students for my "Economics of Human-Environment Interactions" class, taught in spring.

**Recommended Prerequisites:** This first semester class is specifically designed for graduate students with no economics background. The main prerequisite is basic mathematical skills, including graphing and solving simple equations. In general the mathematical examples will be illustrated using graphs and some basic algebra. Students who are proficient in calculus are also welcome to use those techniques.

**Required Texts:**

- Hackett, S. C. (2006) *Environmental and Natural Resource Economics: Theory, Policy, and the Sustainable Society*. M.E. Sharpe, Armonk, NY (3rd ed.)
- Stavins, R. N. (2005) *Economics of the Environment: Selected Readings*. W. W. Norton and Company, NY (5th ed.)
- Additional required readings will be placed on electronic reserve at the library.

**Recommended Supplementary Texts:**

- Nicholson, W. *Intermediate Microeconomics and its Application*. 2004 or later (A good basic microeconomics textbook with a graphical/basic algebra orientation. ***I strongly recommend that you have this text or another good microeconomics text. A wise student would check Amazon for used copies of this and earlier editions.***)
- Perman, R. et al, *Natural Resource and Environmental Economics*. 2003, Pearson Addiston Wesley (3rd ed.) (This is a more advanced text and will be required for the spring *Economics of Human-Environment Interactions* class. It is a great book to have if you plan to continue in this area.)
- Nicholson, W. *Microeconomic Theory, Basic Principles and Extensions* (This is a much more mathematically advanced text for the mathematically inclined.)

**Course Requirements and Grading:** Because this class emphasizes mastery of a set of analytical tools, we must unfortunately have a couple of in-class exams. The purpose of these exams is simply to confirm that you have mastered the analytical material on the problem sets. If you understand the problem sets and are able to complete and explain a similar set of problems, you should do fine on the exams. Note that the majority of your grade is based on problem sets and in-class participation.

- **Problem sets and short writing assignments: 40%.** Problem sets will consist of analytical problems similar to those in class lectures and the texts, written explanations of these problems, and short writing assignments that analyze real-world events using the concepts covered in the class. You are encouraged to work with your classmates on the problems sets, but each student should submit a separately authored set of answers. Two to three short problems will be due weekly. You will be asked to share your short writing assignments with the rest of the class by posting them on WebCT, and you are encouraged to read and comment on others' writing. Answers to analytical problems will be handed out in class on the day they are due. Therefore, late problem sets will not be accepted. This means that you must do the homework and hand it in on time in order to pass the class. You may, however, make up up to two missing short writing assignments by reporting on a news item of interest, a related talk that you attend during the semester, or another relevant activity that we mutually agree on.
- **Paper presentation and in-class participation: 20%.** Each student will present a brief overview of one of the supplementary articles for the class (Stavins chapters and other assigned journal articles) and will be responsible for leading class discussion for this paper. Students doing these presentations are advised to read at least one supplementary article on the same subject, from Stavins, the class bibliography, or other refereed economics literature. The list of article for you to choose from will be distributed separately.
- **Mid-term exam: 20%**
- **Final exam: 20%**

*Please check before class to ensure that cell phones and pagers are turned off. Note that George Mason is an [honor code](#) university.*

### **Weekly Schedule and Required Readings:**

*Required readings follow the course topic. "Additional readings" are articles for potential student presentation. See "student\_presentation\_choices" for more details. Once all students choose a reading to present, this syllabus will be updated to include as required readings all articles that students are presenting.*

#### **I. Introduction: Basic Principles of Microeconomics**

##### **Week 1 (Aug. 30): General introduction**

- Introduction to course, instructor, and fellow students
- Scarcity, opportunity cost, and economic rationality
- Pareto efficiency and the Kaldor/Hicks Criterion
- Positive and Normative Economics
- Myths about economists (Fullerton and Stavins)
- Introduction to optimization

*Required readings (You do not need to complete these before the first class):*

Hackett chapters 1 and 2 (Read chapter 1 carefully through page 9. You can give chapter 2 a lighter reading.); Stavins chapter 1 (Fullerton and Stavins)); Nicholson (2004) Chapter 1 and Appendix (if new to economics; electronic reserves)

**Week 2** (Sept. 6) Theory of consumer choice and the demand curve  
Required readings: Nicholson (2004) Chapters 2, 3, and 4 (selections), or equivalent.

**Week 3** (Sept. 13): Profit maximization and the supply curve  
Required readings: Nicholson (2004) Chapters 5-7 (selections), or equivalent.

**Week 4** (Sept. 20): The economics of market allocation  
Required Readings: Hackett, Chapter 3 and Nicholson (2004) Chapter 8.

## II. Externalities and Corrective Mechanisms

**Week 5** (Sept. 27): Positive and Negative Externalities  
Required Readings: Hackett Chapter 4, p. 66-79.

Additional reading: Ayres, R. U., and A. V. Kneese. 1969. Pages 282 - 288.

**Week 6** (Oct. 4) Pigovian Taxation, Quantity Standards, and Liability Rules  
Required Readings: Hackett pp. 79-83; Perman et. al sections 7.1-7.4.1.

Additional reading: Stavins 2001.

**Week 7** (Oct. 11) Coasean Bargaining  
Required Readings: Hackett p. 161-163; Harris pp. 48-56; [Stavins chapter 3 \(Coase\)](#).

**Week 8** (Oct. 18): Heterogeneous control costs and tradable Permits  
Required Readings: Hackett Chapter 10; Perman et. al section 7.4; [Tietenberg, 2002](#); [Voluntary Compliance \(Khanna, 2001\)](#).

Additional readings:

Harrison, D., Jr. 2002  
Stavins 1998 (Stavins chapter 5)  
Alberini, A., and K. Segerson. 2002.

## III. Public Goods

**Week 9** (Oct. 25):  
Required Readings: Harris p. 82-89; Perman et. al (p. 126-134) and Russell (p. 48-50).

**Week 10** (Nov. 1): Midterm Exam (through Week 9)

## IV. Natural Resource Management

**Week 11** (Nov.8): Non-Renewable Resources  
Required Readings: Hackett Chapter 5 pp. 88-102.

Additional readings:  
Hotelling, H. 1931.  
Miller and Upton, 1984

**Week 12** (Nov.15): Renewable and Common-Pool Resources  
Required Readings: Hackett Chapter 5 pp 103-152; Stavins [Chapter 2 \(Hardin\)](#); [Ostrom, 2000](#).

Additional readings:  
Gordon, H. S. 1954. Sections I-III  
Brander and Taylor, 1998 (stick to descriptive part)  
Grafton 2000

**Week 13** (Nov. 22) Thanksgiving holiday, no class

## V. Non-market Valuation and Benefit-Cost Analysis

**Week 14** (Nov. 29) Non-Market Valuation  
Required Readings: Hackett Chapter 7; [Stavins Chapter 7 \(Portney\)](#).

Additional readings:  
Krutilla, J. V. 1967.  
Diamond, P. A., and J. A. Hausman. 1994.  
Hanemann, M. 1994.  
Carson et al. (Stavins's chapter 10)

**Week 15** (Dec. 6) Benefit-Cost Analysis  
Required Readings: [Stavins chapter 12 \(Arrow et. al\)](#) and [14 \(Kelman\)](#).

Additional readings:  
Palmer, K., W. E. Oates, and P. R. Portney. 1995.

**Week 16** (Dec. 13) Final Exam