

AREC 551: Natural Resource Economics
Course Syllabus

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Course Objective:

In this course we will learn how to apply principles of economics to identify the causes, consequences, and ways of dealing with natural resource problems. Specifically, we will focus on a) defining the efficiency concepts and other criteria for evaluating natural resource use and policies, b) identifying potential sources of inefficiency and policy options to reduce inefficiency, c) examining the choice of policy instruments under uncertainty and information asymmetry, and d) studying the classic models of fisheries, forests, and water resources.

Prerequisite: AREC/ECON 512: Microeconomic Theory.

Texts and Readings:

No textbook is required. Lecture notes, homework assignments and answer keys are available from the class website (Blackboard): <http://my.oregonstate.edu>. You should be able to login to the class website and print out these materials.

The materials covered in the course are synthesized from many sources (see the course outline and reading assignments). All of the reading materials have been reserved in the Castle Reading Room. You are required to read all materials with an asterisk before each lecture and are encouraged to read the rest as much as you can. The following books are available from OSU bookstore:

Conrad, Jon M. *Resource Economics*. Cambridge, UK: Cambridge University Press, 1999.

Hanley, N. J.F. Shogren, and B. White. *Environmental Economics: In Theory and Practice*. Second edition. New York: Oxford University Press, 2007.

Grading:

Midterm (Monday, May 7)	45%
Final (Monday, June 11)	55%

Homework:

There will be five homework assignments. These assignments are designed to help students better understand the course materials and prepare for the exams. The assignments will not be graded, but answer keys will be provided in the class website. I strongly urge you to finish all homework assignments before reviewing the answer keys.

Course Outline and Reading Assignments
(* indicates required readings)

I. Principles of Natural Resource Economics

A. Overview of the Course and the Field (1st Half of Lecture #1)

* Conrad, J. M. (**Ch. 1**). *Resource Economics*. Cambridge, UK: Cambridge University Press, 1999.

Heal, G.M. “Chapter 4. Economics and Resources.” In John A. Butlin (ed.), *The Economics of Environmental and Natural Resource Policy*, 1981.

B. Review of Mathematical Tools and Concepts

1. Static Optimization (2nd Half of Lecture #1)

*Chiang, A.C. (**Ch. 9**). *Fundamental Methods of Mathematical Economics*. 3rd Edition, New York: McGraw-Hill, 1984.

2. Dynamic Optimization (Lecture #2)

*Chiang A.C. (**Ch. 2&7**). *Dynamic Optimization*. New York: McGraw-Hill, 92.

C. Economic Perspectives of Natural Resource Allocations (Lectures 3 & 4)

1. Static vs. Dynamic Efficiency

*Tom Tietenberg. (**Ch. 2**) *Environmental and Natural Resource Economics*, 4th edition, HarperCollins Publisher Inc., 1996.

McInerney, J. “Chapter 3. Natural Resource Economics: the Basic Analytical Principle.” In John A. Butlin (ed.), *The Economics of Environmental and Natural Resource Policy*, 1981.

2. Sustainability, Rawlsian and Utilitarian Frameworks

*Solow, Robert M. “Sustainability: An Economist’s Perspective.” In *Economics of the Environment: Selected Readings*. 4th Edition. Ed. R. N. Stavins. New York: Norton & Company, 2000.

Perman, R., Y. Ma, and J. McGilvray (**Ch. 3**). *Natural Resource and Environmental Economics*. London: Longman, 1996.

Hartwick, J.M., and N.D. Olewiler (**Ch.2**). *The Economics of Natural Resource Use*. 2nd Edition, Massachusetts: Addison-Wesley, 1998.

D. Sources of Inefficiency in the Use of Natural Resources (Lectures 5&6)

1. Externalities
2. Improperly Defined Property Right Systems
3. Imperfect Market Structures

4. Divergence of Social and private Discount Rates
5. Government Failure

*Tietenberg. (Ch. 3, pp. 40-58.).

Baumol, W.J., and W.E. Oates (Ch. 4., pp. 36-42). *The Theory of Environmental Policy*. Cambridge, 1988.

Hartwick, J.M., and N.D. Olewiler (Ch.6, pp. 179-198).

- E. The Pursuit of Efficiency (Lectures 7 & 8)
1. Private Resolution Through Negotiation
 2. The Courts: Property Rules and Liability Rules
 3. Government Policies and Cost-Benefit Analysis

*Hartwick, J.M., and N.D. Olewiler (Ch.6, pp. 198 - 218).

*Tietenberg, (Ch. 3, pp. 58-65 & Ch. 4).

Baumol, W.J., and W.E. Oates (Ch. 4., pp. 42-56).

- F. Uncertainty, Information Asymmetry, and Instrument Choice (Lectures 9 & 10)

*Weitzman, M.L. "Prices vs. Quantities." *Rev. Econom. Studies* 41, 477-491 (1974).

Stavins, R.N. "Correlated Uncertainty and Policy Instrument Choice." *J. Environ. Econom. Management* 30, 218-32 (1996).

Wu, JunJie. "Input Substitution and Pollution Control under Uncertainty and Firm Heterogeneity." *Journal of Public Economic Theory* 2(April 2000): 273-28.

Wu, JunJie, and Bruce A. Babcock. "Spatial Heterogeneity and the Choice of Instruments to Control Nonpoint Pollution." *Environmental & Resource Economics* 18(2) (February 2001):173-192.

Midterm Examination

II. Application to Nonrenewable Resource Economics (Lectures 11 & 12)

- A. Modeling the Optimal Use of Nonrenewable Resources
- B. Market Structure and the Extraction of Nonrenewable Natural Resources
- C. Public Policy Toward the Use of Nonrenewable Resources

*Conrad, Jon M. (Ch. 5).

Hanley, N., J.F. Shogren, and B. White (Ch. 9). *Environmental Economics: In Theory and Practice*. New York: Oxford University Press, 1997.

Hartwick, J.M., and N.D. Olewiler (Ch. 8).

III. Application to Renewable Resource Economics

A. Forests (Lectures 13 & 14)

1. Special Attributes of the Timber Resource
2. Efficient Management of Forests
3. Source of Inefficiency
4. Implementing Efficient management

*Conrad, Jon M. (Ch. 4).

Hanley, N., J.F. Shogren, and B. White (Ch. 11).

Hartwick, J.M., and N.D. Olewiler (Ch. 10).

B. Fisheries (Lectures 15&16)

1. Special Attributes of the Fishery Resource
2. Fisheries as a Common-Property Resource
3. Efficient Extraction
4. Sources of Inefficiency
5. Public Policy Toward Fisheries

*Conrad, Jon M. (Ch. 3).

*Hartwick, J.M., and N.D. Olewiler (Ch. 4 & 5).

C. Water (Lecture 17)

1. A Global Perspective of Water Scarcity
2. Issues in Water Management
3. U.S. Water Rights and Source of Inefficiency
4. Potential Remedies

*Boggess, W., R. Lacewell, and D. Zilberman. "Economics of Water Use in Agriculture." In *Agricultural and Environmental Resource Economics*, G.A. Carlson, D. Zilberman, and J.A. Miranowski (Eds.), New York: Oxford University Press, 1993.

Rosegrant, M.W. "Water Resources in the Twenty-First Century: Challenges and Implications for Actions." Food, Agriculture, and the Environment Discussion Paper 20, IFPRI, March 1997.

Howitt, Richard. "Water Markets, Individual Incentives and Environmental Goals." *Choice* (First Quarter 1994):5-9.

D. Summary of the Course (Lecture 18)

Final Examination