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SENATE COUNCIL**1. General Information**

1a. Submitted by the College of: AGRICULTURE, FOOD AND ENVIRONMENT

Date Submitted: 5/3/2013

1b. Department/Division: Agr Economics

1c. Contact Person

Name: Jack Schieffer

Email: jack.schieffer@uky.edu

Phone: 859-257-7246

Responsible Faculty ID (if different from Contact)

Name: Jack Schieffer

Email: jack.schieffer@uky.edu

Phone: 859-257-7246

1d. Requested Effective Date: Semester following approval

1e. Should this course be a UK Core Course? No

2. Designation and Description of Proposed Course

2a. Will this course also be offered through Distance Learning?: No

2b. Prefix and Number: AEC 745

2c. Full Title: Environmental and Natural Resource Economics

2d. Transcript Title: Emvrioment/Resource Economics

2e. Cross-listing: ECO 726

2f. Meeting Patterns

LECTURE: 3

2g. Grading System: Letter (A, B, C, etc.)

2h. Number of credit hours: 3

2i. Is this course repeatable for additional credit? No

If Yes: Maximum number of credit hours:

If Yes: Will this course allow multiple registrations during the same semester?

2j. Course Description for Bulletin: This course is a graduate-level survey of environmental and natural resource economics. Students will use mathematical models and econometric analysis to address topics including externalities and other market failures, environmental policies, management of renewable and nonrenewable resources, and non-market valuation.

2k. Prerequisites, if any: ECO 701 and 703 (or equivalent courses), or consent of instructor.

2l. Supplementary Teaching Component:

3. Will this course taught off campus? No

If YES, enter the off campus address:

4. Frequency of Course Offering: Fall,

Will the course be offered every year?: Yes

If No, explain:

5. Are facilities and personnel necessary for the proposed new course available?: Yes

If No, explain:

6. What enrollment (per section per semester) may reasonably be expected?: 4-5

7. Anticipated Student Demand

Will this course serve students primarily within the degree program?: Yes

Will it be of interest to a significant number of students outside the degree pgm?: Yes

If Yes, explain: [var7InterestExplain]

8. Check the category most applicable to this course: Traditional – Offered in Corresponding Departments at Universities Elsewhere,

If No, explain:

9. Course Relationship to Program(s).

a. Is this course part of a proposed new program?: No

If YES, name the proposed new program:

b. Will this course be a new requirement for ANY program?: Yes

If YES, list affected programs: The course will serve as one possible selection for the Core Course requirement for Ph.D. students in Agricultural Economics.

10. Information to be Placed on Syllabus.

a. Is the course 400G or 500?: No

b. The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable, from 10.a above) are attached: Yes

Distance Learning Form

Instructor Name:

Instructor Email:

Internet/Web-based: No

Interactive Video: No

Hybrid: No

1. How does this course provide for timely and appropriate interaction between students and faculty and among students? Does the course syllabus conform to University Senate Syllabus Guidelines, specifically the Distance Learning Considerations?

2. How do you ensure that the experience for a DL student is comparable to that of a classroom-based student's experience? Aspects to explore: textbooks, course goals, assessment of student learning outcomes, etc.

3. How is the integrity of student work ensured? Please speak to aspects such as password-protected course portals, proctors for exams at interactive video sites; academic offense policy; etc.

4. Will offering this course via DL result in at least 25% or at least 50% (based on total credit hours required for completion) of a degree program being offered via any form of DL, as defined above?

If yes, which percentage, and which program(s)?

5. How are students taking the course via DL assured of equivalent access to student services, similar to that of a student taking the class in a traditional classroom setting?

6. How do course requirements ensure that students make appropriate use of learning resources?

7. Please explain specifically how access is provided to laboratories, facilities, and equipment appropriate to the course or program.

8. How are students informed of procedures for resolving technical complaints? Does the syllabus list the entities available to offer technical help with the delivery and/or receipt of the course, such as the Information Technology Customer Service Center (<http://www.uky.edu/UKIT/>)?

9. Will the course be delivered via services available through the Distance Learning Program (DLP) and the Academic Technology Group (ATL)? NO

If no, explain how student enrolled in DL courses are able to use the technology employed, as well as how students will be provided with assistance in using said technology.

10. Does the syllabus contain all the required components? NO

11. I, the instructor of record, have read and understood all of the university-level statements regarding DL.

Instructor Name:

SIGNATURE|LGRABAU|Larry J Grabau|AEC 745 NEW College Review|20130510

SIGNATURE|LMAYNARD|Leigh J Maynard|AEC 745 NEW Dept Review|20130503

SIGNATURE|ZNNIKOQ|Roshan N Nikou|AEC 745 NEW Graduate Council Review|20131010

Courses	Request Tracking
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New Course Form

<https://myuk.uky.edu/sap/bc/soap/rfc?services=>

[Open in full window to print or save](#)

Generate R

Attachments:

Upload File

	ID	Attachment
Delete	1160	AEC 745 Reading Proposed.doc
Delete	1161	AEC 745 Syllabus Proposed.doc

Select saved project to retrieve...

Get New

(*denotes required fields)

1. General Information

- a. * Submitted by the College of: Submission Date:
- b. * Department/Division:
- c.
 - * Contact Person Name: Email: Phone:
 - * Responsible Faculty ID (if different from Contact): Email: Phone:
- d. * Requested Effective Date: Semester following approval OR Specific Term/Year ¹
- e. Should this course be a UK Core Course? Yes No
 If YES, check the areas that apply:
 - Inquiry - Arts & Creativity Composition & Communications - II
 - Inquiry - Humanities Quantitative Foundations
 - Inquiry - Nat/Math/Phys Sci Statistical Inferential Reasoning
 - Inquiry - Social Sciences U.S. Citizenship, Community, Diversity
 - Composition & Communications - I Global Dynamics

2. Designation and Description of Proposed Course.

- a. * Will this course also be offered through Distance Learning? Yes No
- b. * Prefix and Number:
- c. * Full Title:
- d. Transcript Title (if full title is more than 40 characters):
- e. To be Cross-Listed ² with (Prefix and Number):
- f. * Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours³ for each meeting pattern type.

<input type="text" value="3"/> Lecture	<input type="text"/> Laboratory ¹	<input type="text"/> Recitation	<input type="text"/> Discussion
<input type="text"/> Indep. Study	<input type="text"/> Clinical	<input type="text"/> Colloquium	<input type="text"/> Practicum
<input type="text"/> Research	<input type="text"/> Residency	<input type="text"/> Seminar	<input type="text"/> Studio
<input type="text"/> Other	If Other, Please explain:		
- g. * Identify a grading system: Letter (A, B, C, etc.) Pass/Fail Graduate School Grade Scale
- h. * Number of credits:
- i. * Is this course repeatable for additional credit? Yes No
 If YES: Maximum number of credit hours:
 If YES: Will this course allow multiple registrations during the same semester? Yes No

j. * Course Description for Bulletin:

This course is a graduate-level survey of environmental and natural resource economics. Students will use mathematical models and econometric analysis to address topics including externalities and other market failures, environmental policies, management of renewable and nonrenewable resources, and non-market valuation.

k. Prerequisites, if any:

ECO 701 and 703 (or equivalent courses), or consent of instructor.

l. Supplementary teaching component, if any: Community-Based Experience Service Learning Both3. * Will this course be taught off campus? Yes No

If YES, enter the off campus address:

4. Frequency of Course Offering.

a. * Course will be offered (check all that apply): Fall Spring Summer Winter

b. * Will the course be offered every year? Yes No

If No, explain:

5. * Are facilities and personnel necessary for the proposed new course available? Yes No

If No, explain:

6. * What enrollment (per section per semester) may reasonably be expected? 4-5

7. Anticipated Student Demand.

a. * Will this course serve students primarily within the degree program? Yes No

b. * Will it be of interest to a significant number of students outside the degree pgm? Yes No

If YES, explain:

This course would also be a good fit for interested graduate students in Economics, Public Policy, and Diplomacy. In particular, we propose that it be cross-listed with the Economics (ECO) department, where it would be of

8. * Check the category most applicable to this course:

Traditional – Offered in Corresponding Departments at Universities Elsewhere

Relatively New – Now Being Widely Established

Not Yet Found in Many (or Any) Other Universities

9. Course Relationship to Program(s).

a. * Is this course part of a proposed new program? Yes No

If YES, name the proposed new program:

b. * Will this course be a new requirement⁵ for ANY program? Yes No

If YES⁵, list affected programs:

The course will serve as one possible selection for the Core Course requirement for Ph.D. students in Agricultural Economics.

10. Information to be Placed on Syllabus.

a. * Is the course 400G or 500? Yes No

If YES, the differentiation for undergraduate and graduate students must be included in the information required in 10.b. You must include: (i) Ident additional assignments by the graduate students; and/or (ii) establishment of different grading criteria in the course for graduate students. (See SR

b. * The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if appl 10.a above) are attached.

- ¹²³ Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.
- ¹²⁴ The chair of the cross-listing department must sign off on the Signature Routing Log.
- ¹²⁵ In general, undergraduate courses are developed on the principle that one semester hour of credit represents one hour of classroom meeting per week for a semester, exclusive of any laboratory meeting. Laboratory meeting, generally, is two hours per week for a semester for one credit hour. (from SR 5.2.1)
- ¹²⁶ You must also submit the Distance Learning Form in order for the proposed course to be considered for DL delivery.
- ¹²⁷ In order to change a program, a program change form must also be submitted.

Rev 8/09

Submit as New Proposal Save Current Changes

Reading/Assignment List

Part I of the reading/assignment list is broken down by topics in the order that we will cover them. There are two broad categories in this list.

- **Required material** – Read these chapters and articles, and prepare to discuss them in class. You should also work through the problem-based assignments (available in Blackboard). This material will provide the basis for our lectures (and exam questions).
- **Further reading** – You are not required* to read these items. However, if you want to pursue a topic in more detail (e.g., for your research paper), these lists provide some guidance.

* Note: Some of the required reading and lecture material draws from these “optional” sources. In these cases, I don’t expect you to read the original articles, but I do expect you to know what was said about them in class or in other assignments.

Preparing for Class Discussion

One of the main reasons for you to read the assigned chapters and papers is that we can discuss them as a class. Please prepare the material before the lecture.

Here are a few suggestions on how best to prepare for class discussions:

- **Know the main points** – Most papers contain just a few key points, so focus on understanding them. Look for the most important results from the analysis. Also, read the introductory and concluding sections closely.
- **Don’t let the math confuse you** – Focus first on the main concepts and intuition of each paper/chapter/assignment. Although, I do expect you to work through the problem sets related to the lectures, I won’t ask you to perform any major derivations or calculations on the exam. However, I may ask you to relate the intuitive results to the equations that formally express them.
- **Read critically** – The authors are making an argument, not stating iron-clad facts. Think about the assumptions they make, whether they are reasonable, and how the results might change if those assumptions turn out to be invalid.
- **See “the forest,” not just “the tree”** – The literature on a topic can be seen as a discussion. Try to identify how an article responds to what others have said: extending, clarifying, or questioning prior results. Similarly, think about how each piece of the reading for a topic relates to the other pieces.

You will need a copy of the primary textbook (or at least access to one). The journal articles that form much of the reading list are mostly available through the UK library’s E-journals system. Links are provided for others available primarily via the Internet.

Textbooks

Primary Textbook

Hanley, Nick, Jason F. Shogren, and Ben White, 2007. *Environmental Economics in Theory and Practice*, 2nd edition, New York: Palgrave Macmillan.

Hanley, Shogren, and White (HSW) is our primary textbook, and you will have specific reading assignments from it. Note: Don't confuse the graduate-level text with the undergraduate text, *Introduction to Environmental Economics*, by the same authors.

Additional References

In addition to HSW, there are several other books that you may occasionally find helpful as references, for this course or in the future.

Freeman, A. Myrick, 2003. *The Measurement of Environmental and Resource Values*, 2nd edition, Washington, DC: Resources for the Future.

Freeman focuses on the theory underlying welfare change and non-market valuation.

Haab, Timothy C. and Kenneth E. McConnell, 2002. *Valuing Environmental and Natural Resources: The Econometrics of Non-Market Valuation*, Cheltenham, UK: Edward Elgar.

Haab and McConnell (HM) focuses on econometrics and applications for valuation of the sort commonly used for environmental topics.

Champ, Patricia A., Kevin J. Boyle, and Thomas C. Brown (eds.), 2003. *A Primer on Nonmarket Valuation*, Cheltenham, UK: Edward Elgar.

Champ et al. (CBC) provide good overviews of the most common methods for non-market valuation. We'll also look at some of the data behind the examples in this book.

Simon, Carl P. and Lawrence Blume, 1994. *Mathematics for Economists*, New York: W.W. Norton & Company.

Simon and Blume (SB) is a good background/reference text for the mathematical basis of many formal economics models. In particular, Ch. 18 and 19 on constrained optimization may be useful for this course.

Mas-Colell, Andreu, Michael D. Winston, and Jerry R. Green, 1995. *Microeconomic Theory*, Oxford: Oxford University Press.

Mas-Colell et al. (MWG) is a standard textbook for graduate-level microeconomic theory, used in the first year of many Ph.D. programs. If you don't have MWG, any similar textbook (e.g., Varian; Jehle and Reny) will serve this function.

Part I – Fundamentals

Overview

We will take a broad survey of environmental and resource economics. We will touch lightly on many issues, providing a framework for understanding the specific topics that we investigate in more detail later.

Required Material

Fullerton, Don and Robert Stavins, 1998. "How Economists See the Environment," *Nature* 395: 433-434.

Stavins, Robert, 2004. "Environmental Economics," KSG Faculty Research Working Paper Series RWP04-051.

Harris, Michael, 1996. "Environmental Economics," *Australian Economic Review* 116: 449-465.

Stavins (2004) is available at:

<http://web.hks.harvard.edu/publications/workingpapers/citation.aspx?PubId=2279>

Further Reading

Stavins, Robert and Alexander Pfaff, 1999. "Readings in the Field of Natural Resource and Environmental Economics," KSG Faculty Research Working Paper Series.

Cropper, Maureen L. and Wallace E. Oates, (1992). "Environmental Economics: A Survey," *Journal of Economic Literature* 30: 675-740.

Freeman, A. Myrick III, 2002. "Environmental Policy Since Earth Day I: What Have We Gained?" *Journal of Economic Perspectives* 16(1): 125-146.

Hahn, Robert W., 2000. "The Impact of Economics on Environmental Policy" *Journal of Environmental Economics and Management* 39(3): 375-399.

Portney, Paul, 2000. "Environmental Problems and Policy: 2000-2050," *Journal of Economic Perspectives* 14(1): 199-207.

Stavins and Pfaff (1999) is available at:

http://papers.ssrn.com/paper.taf?abstract_id=168969

Markets and Market Failures

We will examine the market failures (externalities, common property, and public goods) that underlie many environmental problems. We will take an initial look at when intervention (i.e., environmental policy) may be justified to correct market failures.

Required Material

HSW Ch. 3 (pp. 42-65, 75-79)

Assignment 1 – Externalities

Friedman, David, 1992. “The World According to Coase,” *The Record* (University of Chicago School of Law).

Turvey, Ralph, 1963. “On Divergences Between Social and Private Costs,” *Economica* 30: 309-313.

Assignment 2 – Tragedy of the Commons

Ostrom, Elinor, James Walker, and Roy Gardner, 1992. “Covenants With and Without a Sword: Self-Governance is Possible,” *American Political Science Review* 86(2): 404-417.

Assignment 3 – Public Goods

A version of Friedman (1992) is available at:

http://www.daviddfriedman.com/Academic/Coase_World.html

Further Reading

Baumol, William J. and Wallace E. Oates, 1988. *The Theory of Environmental Policy*, 2nd edition, Cambridge: Cambridge University Press. (See Ch. 3-4)

Coase, Ronald, 1960. “The Problem of Social Cost,” *Journal of Law and Economics* 3(1): 1-44.

Hardin, Garrett, 1968. “The Tragedy of the Commons,” *Science* 162: 1243-1248.

Ostrom, Elinor, 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press.

Environmental Policy

We will compare and contrast some of the forms that environmental policy may take, such as command-and-control regulation and various types of market-based incentives.

Required Material

HSW, Ch. 4 (pp. 82-90, 96-105, 112-116, 122-127) and Ch. 5

Assignment 4 – Policy Instruments

Arrow, Kenneth J., Maureen L. Cropper, George C. Eads, Robert W. Hahn, Lester B. Lave, Roger G. Noll, Paul R. Portney, Milton Russell, Richard Schmalensee, V. Kerry Smith, and Robert N. Stavins, 1996. "Is there a Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulation?" *Science* 272: 221-222.

Goulder, Lawrence H. and Robert N. Stavins, 2002. "An Eye on the Future," *Nature* 419: 673-674.

Weitzman, Martin L., 1974. "Prices vs. Quantities," *Review of Economic Studies* 41(4): 477-491.

Parry, Ian W.H., Robertson C. Williams, and Lawrence H. Goulder, 1999. "When Can Carbon Abatement Policies Increase Welfare? The Fundamental Role of Distorted Factor Markets," *Journal of Environmental Economics and Management* 37(1): 52-84.

Further Reading

Stavins, Robert N., 1998. "What Can We Learn from the Grand Policy Experiment? Lessons from SO₂ Allowance Trading," *Journal of Economic Perspectives* 12(3): 69-88.

Lewis, Tracy R., 1996. "Protecting the Environment When Costs and Benefits Are Privately Known," *RAND Journal of Economics* 27(4): 819-847.

Goulder, Lawrence H. and Ian W.H. Parry, 2008. "Instrument Choice in Environmental Policy," *Review of Environmental Economics and Policy* 2(2): 152-174.

Keohane, Nathaniel O., Richard L. Revesz, and Robert N. Stavins, 1998. "The Choice of Regulatory Instruments in Environmental Policy," *Harvard Environmental Law Review* 22: 313-367.

Newell, Richard G. and Robert N. Stavins, 2003. "Cost Heterogeneity and the Potential Savings from Market-Based Policies," *Journal of Regulatory Economics* 23(1): 43-59.

Natural Resource Management

In this section, we look at the economics of managing stocks of natural resources. A key issue is *time*: how should we manage stocks that change intertemporally? The models distinguish between renewable and non-renewable resources.

Required Material

HSW, Ch. 7 (pp. 214-232), Ch. 9 (pp. 266-272, 291-296), Ch. 10 (pp. 303-309)

Assignment 5 – The Fisherman’s Dilemma

Solow, Robert M., 1974. “The Economics of Resources or the Resources of Economics,” *American Economic Review* 64(2): 1-14.

Newell, Richard G., James N. Sanchirico, and Suzi Kerr, 2005. “Fishing Quota Markets,” *Journal of Environmental Economics and Management* 49: 437-462.

Homan, Frances R. and James E. Wilen, 1997. “A Model of Regulated Open Access Resource Use,” *Journal of Environmental Economics and Management* 32(1): 1-21.

Assignment 6 – Nonrenewable Resources

Further Reading

Krutilla, John V., 1967. “Conservation Reconsidered,” *American Economic Review* 57(4): 777-786

Heal, Geoffrey, 2007. “A Celebration of Environmental and Resource Economics,” *Review of Environmental Economics and Policy* 1(1): 7-25.

Krautkraemer, Jeffrey A., 1998. “Nonrenewable Resource Scarcity,” *Journal of Economic Literature* 36(4): 2065-2107.

Solow, Robert M., 1974. “Intergenerational Equity and Exhaustible Resources,” *Review of Economic Studies* 42(1): 29-46.

Dasgupta, Partha and Geoffrey Heal, 1974. “The Optimal Depletion of Exhaustible Resources,” *Review of Economic Studies* 42(1): 3-28.

Brander, James A. and M. Scott Taylor, 1998. “The Simple Economics of Easter Island: A Ricardo-Malthus Model of Renewable Resource Use,” *American Economic Review* 88(1): 119-138.

Non-Market Valuation

We will investigate how economists measure changes in environmental quality, providing the values to be used in policy decisions. We will sketch out the underlying theory of welfare economics, as well as examining two broad categories of valuation techniques: stated preference and revealed preference methods.

Required Material

HSW, Ch. 11

Cropper, Maureen L., 2000. "Has Economic Research Answered the Needs of Environmental Policy?" *Journal of Environmental Economics and Management* 39(3): 328-350.

Willig, R., 1976. "Consumer Surplus Without Apology," *American Economic Review* 66(4): 589-597.

Hanemann, W. Michael, 1991. "Willingness to Pay and Willingness to Accept: How Much Can They Differ?" *American Economic Review* 81(3): 635-647.

Adamowicz, Wiktor L., 2004. "What It's Worth? An Examination of Historical Trends and Future Directions in Environmental Valuation," *Australian Journal of Agricultural and Resource Economics* 48(3): 419-443.

Portney, Paul R., 1994. "The Contingent Valuation Debate: Why Economists Should Care," *Journal of Economic Perspectives* 8(4): 3-17.

Assignment 7 – Choice Experiments

Carson, Richard T., Robert C. Mitchell, Michael Hanemann, Raymond J. Kopp, Stanley Presser, and Paul A. Rudd, 2003. "Contingent Valuation and Lost Passive Use: Damages from the Exxon Valdez Oil Spill," *Environmental and Resource Economics* 25(3): 257-286.

Assignment 8 – Travel Cost Methods

Leggett, Christopher G. and Nancy E. Bockstael, 2000. "Evidence of the Effects of Water Quality on Residential Land Prices," *Journal of Environmental Economics and Management* 39(2): 121-144.

Further Reading

Freeman, Ch. 3-6, 11-13

HM, Ch. 2-9

Costanza, Robert, Ralph d'Arge, Rudolf de Groot, Stephen Farber, Monica Grasso, Bruce Hannon, Karin Limburg, Shahid Naeem, Robert V. O'Neill, Jose Paruelo, Robert G. Raksin, Paul Sutton, and Marjan van den Belt, 1997. "The Value of the World's Ecosystem Services and Natural Capital," *Nature* 387: 253-260.

- Bockstael, Nancy E., A. Myrick Freeman III, Raymond J. Kopp, Paul R. Portney, and V. Kerry Smith, 2000. "On Measuring Economic Values for Nature," *Environmental Science & Technology* 34(8): 1384-1389.
- Mitchell, Robert C., and Richard T. Carson, 1989. *Using Surveys to Value Public Goods: The Contingent Valuation Method*, Washington, D.C.: Resources for the Future.
- Haneman, W. Michael, 1994. "Valuing the Environment Through Contingent Valuation," *Journal of Economic Perspectives* 8(4): 19-43.
- Diamond, Peter A. and Jerry A. Hausman, 1994. "Contingent Valuation: Is Some Number Better Than No Number?" *Journal of Economic Perspectives* 8(4): 45-64.
- Kahneman, Daniel and Jack L. Knetsch, 1992. "Valuing Public Goods: The Purchase of Moral Satisfaction," *Journal of Environmental Economics and Management* 22(1): 57-70. (Not available electronically via UK library)
- Arrow, Kenneth, Robert Solow, Paul R. Portney, Edward E. Leamer, Roy Radner, and Howard Shuman, 1993. "Report of the NOAA Panel on Contingent Valuation," 58 Federal Register 4601-4614.
- Rosen S., 1974. "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition," *Journal of Political Economy* 82(1): 34-55.
- Adamowicz, W., J. Louviere, and M. Williams, 1994. "Combining Revealed and Stated Preference Methods for Valuing Environmental Amenities," *Journal of Environmental Economics and Management* 26(3): 271-292.

Arrow et al (1993) is available at:

<http://www.darrp.noaa.gov/library/pdf/cvblue.pdf>

Part II – Applications

In Part II of the course, we will apply the concepts from Part I to specific topics, which will be determined during the semester. The topics listed below are possible selections; however, students' suggestions for other issues of interest are welcome.

- **Water resource management** – Policy regarding the pollution of rivers, lakes, and other surface water is dominated by command-and-control measures, although economic incentives have made some inroads. Tracing the transport of pollutants through a watershed is difficult, especially for non-point sources, such as run-off of agricultural chemicals. In some areas, water is very scarce and the depletion of surface and ground water is an important issue.
- **Land use policy** – Urban sprawl, preservation of agricultural lands, and zoning are key issues in the topic of land use change. As cities centers grow, they create conflict on the rural-urban fringe, including tradeoffs between economic growth and preservation of environmental amenities, the loss of small farm culture and traditions, and divisions among different elements of the community.
- **Global climate change** – This topic concerns a particular form of air pollution: the emission of greenhouse gases that (likely) lead to climate change on a global scale. Implementing policy is particularly tricky due to issues with international cooperation and possible free-riding.
- **Sustainability** – The topic of sustainability is concerned with intergenerational tradeoffs: How should society allocate resources between present-day consumption and conservation for the future?
- **Biofuels** – Bioenergy (e.g., ethanol and biodiesel for automobiles, biomass for electricity generation) represents one possibility for replacing non-renewable energy sources with renewables. The use of bioenergy also has implications for food prices, agricultural policy, and greenhouse gas emissions.
- **Endangered species** – Biodiversity represents a public good with hard-to-quantify benefits, and many people are concerned by current rates of extinction far exceeding background rates. Policy measures are controversial because the costs are often borne by relatively few private landowners.
- **Invasive species** – Invasive species disrupt local ecosystems and economies. Developing sound prevention and management policies requires a combination of biological and economic models to understand the problem.
- **Markets for ecosystem services** – The emerging paradigm of ecosystem services attempts to understand and place value on the functions that are provided by natural resources. The resources that make up an ecosystem, and interactions among them, provide a number of important benefits to mankind, including water supply, nutrient cycling, and biodiversity.
- **Growth and the environment** – One area of importance is the relationship between environmental protection and economic growth, particularly in developing nations. The environmental Kuznets curve is the term for an observed inverted-U pattern, in which environmental degradation first rises then falls as economic growth increases.

Environmental and Natural Resource Economics

AEC 745-001, Fall 2013

Course Information

Class meets **Tuesdays and Thursdays, 2:00-3:15 pm**, in **227 Barnhart (CEBA)**.

Instructor Information

Dr. Jack Schieffer

Email: jack.schieffer@uky.edu

Phone: 859-257-7246

Office: 405 Barnhart

Office hours: Mon. and Wed. 3-5 pm

Email is generally better than telephone for reaching me. In addition to scheduled office hours (above), you're welcome to drop by my office whenever I'm there. This syllabus and other material can be found on the Blackboard site for the course.

Course Description

This course is a graduate-level survey of environmental and natural resource economics. Students will use mathematical models and econometric analysis to address topics including externalities and other market failures, environmental policies, management of renewable and nonrenewable resources, and non-market valuation.

The course is intended for second-year or later Ph.D. students Agricultural Economics, economics, and similar fields. However, other graduate students with a strong interest in the topic are welcome. Familiarity with constrained optimization techniques (e.g., AEC/ECO 590), graduate-level microeconomics (e.g., ECO 601 or 701), and econometrics (e.g., AEC 624 or ECO 703) is needed.

Course Goals

The broad objectives of this course are:

- To develop a foundation in the key concepts of environmental and natural resource economics
- To apply that foundation in understanding a variety of environmental problems and potential solutions
- To improve skills for conducting and presenting scholarly research in economics

Learning Outcomes

By the end of the course, student will be able to:

- Read, discuss, and critique current scholarship in the field
- Use mathematical models to develop and explain economic concepts related to environmental and natural resource issues
- Conduct economic analysis of data
- Plan a research project addressing an important environmental or resource issue

Textbook and Other Reading Materials

The primary textbook (required) for the course is Hanley, Shogren, and White, 2007 *Environmental Economics in Theory and Practice, 2nd edition* (HSW). In addition, we will rely heavily on articles from academic journals (available electronically via the UK library). Reading assignments (see separate Reading List) should be completed before class and will provide the basis for class discussion.

Exams, Assignments, and Grading

Grades for this class will be determined by:

- Article presentation 15%
- Mid-term exam 30%
- Review/critique paper 15%
- Research paper 30%
- Class participation 10%

Grades will be combined in the above weights into an overall 0-100 score, which then determines your letter grade for the course, according to the following scale:

$90 \leq \text{score} \leq 100$	A
$80 \leq \text{score} < 90$	B
$70 \leq \text{score} < 80$	C
$0 \leq \text{score} < 70$	E

Article Presentation

In class, you will give a 20-minute conference-style presentation of an article from Part I of the reading list, after which you will lead discussion of the article. This assignment provides experience with an activity common for professional economists: presenting research. You will sign up for an article within the first two weeks of the semester, and presentations will take place after that. A separate handout provides more guidance for preparing your presentation.

Mid-Term Exam

The mid-term exam will be given during our usual class time, when we finish the Part I topics. The exam will consist of several essay questions that cover the reading, homework, and lecture material from Part I. The questions will emphasize comprehension of key concepts and arguments from the literature. Some mathematics and/or graphing may be essential in demonstrating such comprehension. The exam format is closed-book/notes, and the previous year's exam will be provided as an example of format and expectations.

Review/Critique Paper

You will choose a recent journal article or working paper (no more than 5 years old and not on the class reading list) and write a short paper (approx. 3-4 pages) that reviews and

critiques it. This assignment provides experience with another typical activity for economists: reviewing others' research. Although it is not required, I strongly suggest that you review a paper related to your research project. A separate handout provides more guidance regarding this assignment.

Research Paper

The goal of this assignment is to start a research project that could lead to a conference paper or poster, be developed further for your second-year paper or a part of your dissertation/thesis, and/or be submitted to a journal. You should be working on this assignment throughout the semester. To help you stay on track, there are several intermediate deadlines leading up to the final paper:

- A short proposal describing your topic and research question(s)
- An initial list of references
- First draft
- Final version (due on the last day of class)

After each intermediate deadline, we will meet to discuss your progress. The final paper should be a well-developed research plan identifying your research questions, reviewing the literature, discussing data collection and analysis, and possibly providing preliminary results. I don't expect a conference- or journal-ready paper, but it should have that potential with further work. A separate handout provides more guidance regarding the research paper and its components.

If you would like help to improve your writing skills, you may wish to visit the UK Writing Center, located in the W.T. Young Library:

<http://www.uky.edu/AS/English/wc/>

Paul Dudenhefer (Duke University) has produced a writing guide targeted to economists.

<http://lupus.econ.duke.edu/ecoteach/undergrad/manual.pdf>

Class Participation

A large part of this class involves discussing the reading and homework assignments. Thus, I expect you to attend class, pay attention, and join in the discussions. Preparation of the reading and homework assignments before class is necessary for good discussion. Please feel free to ask questions at any point during lectures.

You will also receive a number of problem-based homework assignments. These typically relate to the mathematical and econometric models that we will discuss, and should be completed before the corresponding lecture. These assignments will not be submitted; however, you are expected to complete (or at least attempt) them as part of your preparation for class. Failure to do so may affect the class participation component of your grade.

Outline and Tentative Schedule

<u>Date</u>		<u>General Topic</u>	<u>Specific Topic</u>	<u>Due Dates</u>
8/29/2013	Th		Course overview	
9/3/2013	T	Market failure	Intro to market failures	
9/5/2013	Th		Externality model	Assignment 1
9/10/2013	T		Coase Theorem	
9/12/2013	Th		Common pool resource	Assignment 2
9/17/2013	T		More CPR, public goods	Presentation (Ostrom et al), assignment 3
9/19/2013	Th	Policy	Intro to policy	
9/24/2013	T		Policy equivalence model	Assignment 4
9/26/2013	Th		Policy differences	
10/1/2013	T		Uncertainty and policy (Weitzman)	
10/3/2013	Th		Revenue recycling	Presentation, (Parry et al), research paper (proposal)
10/8/2013	T	Resource Management	Fishery model	Assignment 5
10/10/2013	Th		Resource policy	Presentations (Newell et al; Homan and Wilen)
10/15/2013	T		Hotelling's rule	Assignment 6
10/17/2013	Th		More Hotelling	
10/22/2013	T	Valuation	Intro to valuation	Research paper (references)
10/24/2013	Th		WTP vs. WTA	
10/29/2013	T		Stated preferences	Review/critique paper
10/31/2013	Th		More SP	Assignment 7, presentation (Carson et al)
11/5/2013	T		Revealed preferences	Presentation (Leggett and Bockstael)
11/7/2013	Th		More RP	Assignment 8
11/12/2013	T		Review for exam	
11/14/2013	Th		(No lecture)	Mid-term exam
11/19/2013	T	Applications	Applied topics A	
11/21/2013	Th		Applied topics A	
11/26/2013	T		Applied topics B	Research paper (first draft)
11/28/2013	Th		(No class: Thanksgiving)	(No class)
12/3/2013	T		Applied topics B	
12/5/2013	Th		Applied topics C	
12/10/2013	T		Applied topics C	
12/12/2013	Th		Applied topics D	
12/13/2013	F		Last day of class	Research paper (final version)

This schedule is subject to change. Applied topics (after the mid-term) will be selected with student input; see the Reading List for examples.

Course Policies

Academic Misconduct

The official university policy on academic misconduct can be found in Section 6.3 of the Rules of the University Senate. The website is (follow the link to Section 6):

<http://www.uky.edu/StudentAffairs/Code/part2.html>

When writing research papers, be careful not to plagiarize the work of others. For help with identifying and avoiding actions that constitute plagiarism, the following resources may be useful:

<http://www.uky.edu/Ombud/Plagiarism.pdf>

http://wps.prenhall.com/hss_understand_plagiarism_1/0,6622,427064-,00.html

Discussion with your classmates on assignments is allowed, and even encouraged. However, any assignment that is submitted for a grade is expected to reflect your own work.

Accommodations

If you have a documented disability that requires academic accommodations, please see me as soon as possible. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, jkarnes@uky.edu) for coordination of campus disability services available to students with disabilities. We can then collaborate on the best solution. The DRC's website is:

<http://www.uky.edu/StudentAffairs/DisabilityResourceCenter/index.html>

Attendance and Absences

I expect you to attend class, pay attention, and join in discussions. In the classroom, please be courteous to me and to your classmates. A few guidelines:

- **Silence your phones** – Please turn off the ringers of cell phones. If you really must answer a call, please leave the room first.
- **Be on time** – Please avoid coming late to class or leaving early.

Any student with an excused absence (as defined by [Senate Rule 5.2.4.2](#)) will be allowed to make up a missed assignment or exam. However, the student must notify the instructor within one week (and preferably before the absence) and provide appropriate written verification of the excused absence.