Learning Objectives and Course Content:

- To study the major issues and analytical tools in natural resource economics. We will cover positive and normative issues related to the management of renewable and non-renewable resources over time. Topics include common property resources, spatial modeling, imperfect competition, multiple equilibria, uncertainty, irreversibility, discounting, biodiversity conservation, climate change, and sustainability.

- To increase your ability to conduct economic research. The course offers a set of activities to increase your ability to think critically and formulate specific researchable questions, as well as improving your modeling and analytical skills.

Prerequisite: Econ 606 or the instructor’s consent.

Course Requirements:

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<tr>
<th>Requirement</th>
<th>Percentage</th>
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<tr>
<td>Homework</td>
<td>20%</td>
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<td>Midterm</td>
<td>20%</td>
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<tr>
<td>Final exam</td>
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<tr>
<td>Paper, presentation, participation</td>
<td>30%</td>
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We will read and discuss major articles that have helped define the field of resource economics and recent articles on the frontier. Reading the literature is important for gaining literacy and understanding the evolution of ideas and analytical techniques. Class time will be largely devoted to lecture and discussion of this material.

Over the semester, (for about every two weeks) you will hand in a question or insight arising from lecture, class discussion, class readings, other readings, or recent events. A couple of sentences will typically be sufficient for each question or insight. At the start of each class session we will spend a few minutes discussing selected issues raised by submitted questions or insights, or from outside events. We will use this time to think critically about the issue, formulate specific researchable questions, and potential modeling strategies.

There will be periodic problem sets. The best way to learn natural resource economics (or any branch of economics) is to solve problems. The problem sets will be mostly analytical but will also include some numerical problems. The latter type may involve the use of Excel or Matlab on the computer. I encourage you to work together on problem sets but each of you will hand in your own assignment.
You will complete a term paper that addresses a research question of your choice in resource economics. The paper could form a basis for your subsequent research.

**Texts**

There are two books that we will reference fairly extensively in the course:


Clark (2010) contains useful discussion of renewable resource models. Conrad and Clark (1987) contain a summary of important concepts and a set of exercises that will allow you to apply the concepts to resource problems. I will assign some exercises from this book on problems set. Most of the readings for the course are journal articles, and will be (mostly) available at Laulima. (See a separate reading list, to be distributed in class.)

There are several other useful reference books. You may wish to purchase or have access to them:

**Theory/methods**


**Topics**


Resource economics often employs techniques of dynamic optimization (optimal control theory and dynamic programming). What follows are good reference books for the subject.


**Disability Access**

If you feel you need reasonable accommodations because of the impact of a disability, please: (1) contact the KOKUA Program (V/T) at 956-7511 or 956-7612 in room 013 of the QLCSS (Queen Lili’uokalani Center for Student Services); (2) speak with me privately to discuss your specific needs. I will be happy to work with you and the KOKUA Program to meet access needs related to a documented disability.
Topics to be covered
I. The Big Picture: Resources and Sustainability

II. Renewable Resources:
    A. Review of Basic Growth Theory
    B. Bioeconomic Models: Optimal Harvesting (Fishery Models)
    C. Open Access and Regulation
    D. Common Property Resources: Game Theoretic Models
    E. Age Dependent Growth and Timing of Harvest (Forestry Models)
    F. Spatially Explicit Models
    G. Renewable Resource Management with Uncertainty
    H. Irreversibility, Uncertainty, and Option Value

III. Non-Renewable Resources
    A. The Basic Hotelling Model and Extensions
       Implications about intertemporal nonrenewable resource use
    B. Empirical Tests
       Empirical tests of Hotelling principles
    C. Exploration and Uncertainty
       Implications to resource use of exploration with uncertain outcomes
    D. Imperfect Competition
       Market power at industry/national levels and intertemporal use of nonrenewables

IV. Biodiversity
    A. Biodiversity Measures and the Value of Biodiversity
       Concepts/definitions, applications
    B. Strategies to Conserve Biodiversity
       Policies and institutions for biodiversity conservation
    C. Land Use Modeling
       What’s different from renewable/nonrenewable resources, implications of spatial attributes of land

V. Climate Change
    Review of science of climate change, optimal climate-change mitigation: review of current debates, policies for climate-change mitigation, international cooperation

VI. Sustainability
    Concepts/definitions, applications

VII. Other topics
    Resource, Environment, and International Trade