Course Description

Economics is the study of the use of scarce resources to satisfy human wants. Current debates over fisheries management, offshore oil drilling, and ocean zoning clearly demonstrate the importance of thinking about the ocean with an economist’s perspective. This class will use the toolkit of economic analysis to evaluate specific marine policies in the areas of ocean recreation, shipping, energy production, aquaculture, fishing, coastal construction, and coral reef protection. The course will utilize a variety of teaching methodologies including in-class experiments, mock debates, computer simulations, audiovisual presentations, guest speakers and traditional lectures.

Students may take the course on a pass-fail basis. To enroll in this course, students must have already taken Economics 130 or an equivalent microeconomics course approved by the professor.

Students must take each exam on the date scheduled. Exam dates will not be changed for individual students to accommodate job interviews, family events, etc. Exceptions will be made only for serious medical reasons or in the event of a death in the family. If a student athlete must be off-campus the day of an exam, s/he must take the exam on the same date and supply his/her answers by email or fax on that date.

Any student who feels s/he may need an accommodation based on the impact of a disability is invited to contact me privately. I would be happy to work with you, and the KOKUA Program (Office for Students with Disabilities) to ensure reasonable accommodations in my course. KOKUA can be reached at (808) 956-7511 or (808) 956-7612 (voice/text) in room 013 of the Queen Lili‘uokalani Center for Student Services. I know from personal experience how useful the services KOKUA provides can be, so please don’t be shy about contacting me.
**Student Learning Objectives**
The course is designed to enhance the student’s ability to understand economic concepts and models and to assess their relevance to marine resource issues and policies. After completion of the course, students should be able to:

1. Rigorously evaluate the economic impacts of marine management policies
2. Explain the linkages between economics, law and environmental science in the marine sector
3. Communicate with professionals working in the ocean economy

**Textbook**

TBD.

**Office Hours:**

My office is Saunders 532 and my office hours are on **Tuesdays from 10am-12pm**. It is best to make an appointment to ensure there isn’t another student there already. I use Google Calendar to schedule appointments. Just click on this link: [http://goo.gl/HSN0K2](http://goo.gl/HSN0K2) and select a 15 minute slot. Make sure that your Google Calendar is set to Hawai‘i time and that you are viewing the calendar in “Week” mode. If you can’t make any of these times, email me and we can set up an appointment.

**Assessment**

**Assignments, Midterms and Final**

There will be several short assignments during the semester. The assignments will typically be computational exercises and will be linked to the topics and case studies under discussion. You will sometimes need access to Microsoft Excel or similar software to complete the assignments. All of the College of Social Sciences computer labs have Excel installed ([http://www2.soc.hawaii.edu/pages/tech/lab.html](http://www2.soc.hawaii.edu/pages/tech/lab.html)). There will be two midterm exams (50 minutes) and a final exam (2 hours). The first midterm will be held in class on **Friday October 17**th. The second midterm will be on **Friday November 14**th. The final will be held on **Monday December 15**th from 9:45-11:45am.

**Research Paper**

In the research paper, you should apply the concepts and analytical tools from the course to analyze and evaluate a current or potential environmental policy. The paper should be 8-10 pages in length. Guidelines for preparing and writing the research paper will be offered later in the course. Research papers will be due at 5pm on **Friday December 5**th.

**Grades**

The course grade will be based upon assignments (10 percent), midterms (25 percent), research paper (25 percent) and the final (40 percent).
**Topics and Readings**

The readings listed below are required unless stated otherwise. Ideally, they should be completed prior to the lectures with which they are listed. Nearly all of the readings will be made available on Laulima.

1. **Introduction to the Ocean Economy and Microeconomics Refresher**
   We will begin with a quick overview of the different sectors and industries in the Ocean Economy (see the reading from the National Ocean Economics Program). I will then give a brief history of the Law of the Sea and its implications for different sectors in the ocean economy. We will conclude with an overview of the basic principles underlying most economic analysis. We will start with the simple model of a competitive market and introduce the concepts of consumer and producer surplus. We will extend our analysis to the realm of “market failures”, in particular the role of externalities, public goods and common property resources. This lecture will conclude with a broad discussion of the policy instruments used to address market failures such as taxes/subsidies, cap-and-trade regulation and enclosure of the commons. The case studies used to highlight these principles will include the 1973-74 Oil Crisis, the establishment of SO2 Permit Markets and the current carbon tax vs. cap-and-trade debate.

**Readings:**

Chapters 5-7 of *Economics of the Oceans*


“Primer on Ocean Jurisdictions: Drawing Lines in the Water”, *An Ocean Blueprint for the 21st Century*

2. **Basic concepts in Marine Science and Marine Ecology**
   What are the forces that affect the distribution and abundance of marine species? Phytoplankton is the “grass of the ocean” but it doesn’t grow everywhere. How do factors like the Coriolis effect and Ekman transport influence where phytoplankton occurs and, as a consequence, abundant marine life? We will also explore the role of temperature, light, salinity, habitat, growth, reproduction, competition and predation. The key concept of *density dependence* will be introduced. What does it mean, where is it observed/expected and what causes it? We will think about the different ways that we can model the life history of various marine species in order to make predictions about growth, movement, reproduction and species interactions. A critical component of this lecture will be showing the link between the ecological concept of negative density dependence and the economic concept of steady state harvest.

**Readings:**

Agardy, T., (2007) “Introduction to Marine Conservation Biology”, Lessons in Conservation, The official publication of the Network of Conservation Educators and Practitioners, of the Center for Biodiversity and Conservation at the American Museum of Natural History \(^1\) [Only read pages 7-23]

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Chapter 5 in Gurney and Nisbet, “Ecological Dynamics” [Not required]

3. Fisheries Bioeconomics
This topic is the core of the course. Students will learn how to couple market systems with natural systems in a unified modeling framework. We will focus on deriving bioeconomic equilibria and on optimizing yield from fisheries. We will look at a range of policies designed to achieve sustainability, economic optimality or both. This part of the course will introduce some of the empirical techniques used to test whether fisheries management policies are achieving their desired goals. A key case study will be the Alaskan halibut fishery and its transition through various forms of fisheries management. We will conclude with an exploration of the challenges a changing climate poses for the management of biological resources in the ocean. Students will learn how to numerically calculate the optimal harvest in a stochastic environment and use this to estimate the value of (i) avoiding future climate change and (ii) gathering information about likely future effects.

Open Access vs. the “Sole Owner”
Readings:
(1) Chapters 8 and 9 in Economics of the Oceans
(4) Chapters 2 and 3 of Ola Flaaten’s free textbook [not required]

Extinction under Open Access and the Sole Owner
Readings:
(1) Clark, “The Economics of Overexploitation”, Science, 1974

Local and Global Status of Fish Stocks
Readings:
(2) Myers and Worm, Nature, 2003 [not required]
(3) Worm et al., Science, 2006
(4) Worm and Hilborn et al., Science, 2009 [not required]

Video:
The End of the Line

Community management of the commons
Readings:

(2) Elinor Ostrom, Joanna Burger, Christopher B. Field, Richard B. Norgaard, and David Poldiansky (9 April 1999) ‘Revisiting the Commons: Local Lessons, Global Challenges’ *Science* 284 (5412), 278. [not required]

Government regulation of the commons: biological rules, effort restrictions and taxes

Readings:


Government-regulated “enclosure” of the commons: co-ops and catch shares

Readings:


Interactive Exercises:
In-class “Race to Fish” experiment.
Electronic over-fishing experiment²

Beyond the commons: dealing with fishing’s other externalities: bycatch and habitat damage

Readings:
(1) “Voluntary Cooperation in the Commons? Evaluating the Sea State Program with Reduced Form and Structural Models”, Abbott and Wilen, *Land Economics* [not required]

(2) Davies et al., *Marine Policy*, 2009 [not required]


Demand-side Management

Readings:

(2) “Can Eco-Labels Tune a Market? Evidence from Dolphin-Safe Labeling” JEEM [not required]

(3) “Backward Boycotts: Demand Management and Fishery Conservation” [not required]

_Illegal, Unreported and Unregulated (IUU) Fishing_

Readings:
(1) Chapter 14 of Economics of the Oceans
(2) “An economic analysis of illegal, unreported and unregulated (IUU) fishing: Key drivers and possible solutions”
(3) “The use of trade measures against illicit fishing: Economic and legal considerations” [Not required]

4. Marine Reserves and Ecosystem-Based Management
The use and design of marine reserves is one of the most exciting new developments in marine conservation and fisheries management. This part of the course will introduce tools that can be used to evaluate existing and potential marine reserves. Case studies will include the Channel Islands, the Northwest Hawaiian Islands and the California MLPA process. This topic will conclude with analyzing how economics can be incorporated into the movement towards ecosystem-based management of marine resources.

Readings:
(1) Chapter 17 of Economics of the Oceans

Interactive Exercises:
We will use the software created by the American Museum of Natural History (http://ncep.amnh.org/marine_simulation/) to design and implement our own marine reserves and study their effects on populations and fishery yields.

5. Recreational Fisheries
Recreational fisheries are very different to commercial fisheries, especially in terms of the incentives of participants and the types of regulations used. We will explore two topics in this section: the types of policies used to manage recreational fisheries and how do regulators make tradeoffs between commercial and recreational interests? A key case study will be the Gulf of Mexico Red Snapper Fishery.
**Readings:**
(2) McConnell and Sutinen, “Bioeconomic Models of Marine Recreational Fishing”, *JEEM* (1979) [not required]
(4) Gentner, 2009 [not required]

6. **Aquaculture**
Aquaculture is both a rising global industry and of important historical significance in many parts of the world. This part of the course will focus on emerging trends in the aquaculture industry, potential interactions with wild harvest, mitigation of negative impacts and the potential for demand-side management. Case studies will include Kona Blue Water Farms and the restoration of Hawaiian fishponds.

**Readings:**

7. **Economics of Offshore Energy Development and Shipping**
This lecture will begin with a discussion of the optimal extraction of non-renewable resources, in particular Hotelling’s Rule. We will combine this with our earlier study of Benefit-Cost Analysis to evaluate the pros and cons of extending offshore oil drilling in the United States. In addition to our study of non-renewable sources of energy in the ocean, we will consider the potential role of renewable sources such as wave, tide and geothermal power. The course will conclude with an explanation of the major legislation regulating shipping in US waters (the Passenger Vessel Services Act and the Jones Act) explore how this legislation has been used to extend market power. We will also discuss the debate over whether seaports should be subsidized, state-controlled and/or privately operated.

**Readings:**
(1) Chapters 21-23 of *Economics of the Oceans*
(2) Energy Information Administration. (2007) “Impacts of Increased Access to Oil and Natural Gas Resources in the Lower 48 Federal Outer Continental Shelf”
(3) “The Economics of Allowing More Domestic Oil Drilling” Hahn and Passell