

**FISH 230**  
**Economics of Fisheries and Oceans**

Spring 2022  
MWF 10:00-11:20; FSH 102  
5 Credits

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| Instructor  | TAs  |
|---|--|
| Abby Schamp<br>OH: Wednesday 4-5pm by Zoom<br>Zoom: 211 850 7875<br>Or OH in Savery 319F by appt (really!)<br>schampab@uw.edu | Minyan Shen<br>OH: Thursday 10-11am by Zoom<br>Zoom: 353 760 7214<br><a href="mailto:minyans@uw.edu">minyans@uw.edu</a><br><br>Sudiksha Joshi<br>OH: Tuesday noon-1pm by Zoom<br>Zoom: sudijoshi<br><a href="mailto:joshi27s@uw.edu">joshi27s@uw.edu</a> |

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Spring 2022 is expected to be primarily in-person. While we hope to stay in-person throughout the quarter, we are prepared for switching to online learning if necessary and will remain flexible as necessary. The governing philosophy in this course will be to do what works for learning. We fully expect that you may have technical difficulties and that we may have technical difficulties, and that we will try exercises that do not achieve their learning goals. We expect all of us to work hard to “make it work”, but we should all be forgiving and adapt when it does not. This will include liberal exceptions to time windows, throwing out ineffective assignments and assessments, and shifting to timely topics as the world shifts around us.

**Overview**

The primary objective of this course is to develop an understanding of how and why people interact with the oceans, and why these interactions often lead to environmental degradation. To develop this understanding, we will use the tools and methods of economics to examine three major, current environmental issues: ocean change and the consequences of our food and energy choices; overfishing; and offshore oil drilling. For each issue, we will carry out a four-step evaluation process:

- 1) assess the status of and evidence for the problem;
- 2) identify the incentives that lead people to choose problem-causing actions;
- 3) consider alternative policies to manage those incentives; and
- 4) discuss why effective management has not yet been implemented.

**Learning Goals**

Through the four-step problem evaluation process, the chosen applications will introduce frameworks that explain behavior and outcomes:

- Know the status of ocean health, with respect to warming, acidification, sea level rise and hypoxia; fish stock status; and oil spill risk, and the primary causes of that status.
- Interpret and apply the model of competitive equilibrium
  - Explain how prices, quantities and allocations are determined through markets to predict the effects of supply and demand shocks, including taxes and subsidies.
  - Understand why economists think of markets as efficient.
  - Explain ocean change as an externality problem, and understand how commonly discussed policy approaches work.
  - Apply the model to infer changes in price and quantities based on news events.
- Analyze fisheries as a renewable common pool resource
  - Explain the predicted outcome for unregulated common pool resources.
  - Explain how commonly discussed policy approaches are addressing the problem.
  - Apply the model to infer economic and ecological outcomes in new situations.
- Identify who bears the costs and receives the benefits of policies, and identify when policy effects are sufficient to motivate political activity.
  - Analyze the incentives present in the political system to identify policies that are or are not politically viable.
- Interpret results from the tools of environmental economists use to evaluate policies that tradeoff between people's welfare and environmentally destructive activities.

Pedagogical and evaluation methods will practice skills in:

- Critical reading of news and interpretation of events to understand described motivations and effects.
- Developing and structuring arguments that explain how and why.
- Applying and interpreting graphical models.
- Writing and revising technical communication conveying models to readers.

### ***Readings***

We will be framing some of our issues through a recently released (2021) book by a thought leader who happens to be local. It is widely available for electronic reading at modest cost. It is also available free to students through the UW Libraries, either through one-user online access or 24-hour offline access.

*How to Avoid a Climate Disaster: The Solutions We Have and the Breakthroughs We Need*, by Bill Gates.

You are required to have a microeconomics text, but any one will do. Past students have liked Mankiw's book, so if you don't have easy access to a different one, get any edition between the third and ninth (current) from your favorite online store. You may also want to use the open access textbook that is linked below.

*Principles of Microeconomics* by N. Gregory Mankiw  
*Principles of Microeconomics* by Steven Greenlaw and David Shapiro  
<https://openstax.org/details/books/principles-microeconomics-2e>

### **Canvas**

Many required and supplemental readings will be posted on the course Canvas site, along with assignments. You will be responsible for accessing the site on a regular basis.

### **Methods of Instruction**

This course will operate as a “partially flipped” classroom. Key content may be delivered in both in short pre-recorded videos, and in class. Class meetings will involve a variety of activities, often mixing modes of instruction within a single class meeting.

**Prerecorded videos** will introduce key models and frameworks, and are to be watched before class. Textbook readings are supportive of lecture materials, and may be referenced as needed. They will remain posted so they can be reviewed at any time.

**Lectures** allow me to reinforce the frameworks we will be using for analysis, drawing on models and interpretations from different sources. Lectures will make extensive use of the whiteboard, and will involve constructing a lot of graphs. They will be your primary guide to the material I think is important, and thus will appear on quizzes and exams.

**Full-class discussions** will enable us to reach a common understanding on the important conclusions and implications of class readings. Non-textbook readings are expected to be completed before the class in which they are covered. We will have full class discussions during the Status & Evidence stage of each unit.

**Small group discussions** will allow small groups to collectively respond to some questions I frame. These are often precursors to full-class discussions.

**Class exercises** will allow small groups to practice solving problems using the models and frameworks developed in class. Often, we will read a short newspaper article, or listen to or watch a news clip, apply the models we are currently learning to better understand the event reported, the actions of the people affected, and the reasoning or mechanisms behind the reported effects. These applications will be practice for exam short answer questions and your final project.

**Class games** are experiential games that give hands-on experience facing the decisions of the people whose choices we are studying. In addition to being fun, they provide focus and insight that will help you interpret and apply models.

### **Grading**

Grades will be determined as follows:

|             |     |               |     |
|-------------|-----|---------------|-----|
| Quizzes     | 10% | Midterms (2)  | 35% |
| Assignments | 15% | Final Project | 40% |

### **Mid-terms**

There are two mid-term exams during the term, each counting for 17.5% of the grade. The exams emphasize the most recently covered material, and are not explicitly cumulative. Roughly half the points on the exam consist of college-level multiple choice questions. The balance of the exam is short answer questions, most of which ask you to apply models from class to interpret news article given to you with the exam.

Exam I: 4/29/22

Exam II: 5/20/22

### **Homework Assignment and Quiz Policy**

**Assignments** will be posted on Canvas. We expect approximately one assignment per week, with around a week to complete each assignment. Assignments frequently feature previous exam short answer questions.

**Quizzes** will be posted on Canvas by 1pm on Thursdays and consist of five multiple-choice questions, to be completed before the beginning of class each Friday (unless there is an exam). They are designed to help you keep up with the material, and give you practice on the type of questions on the multiple-choice section of the exams. Your lowest quiz score will be dropped.

### **Final Project**

In the lieu of a final exam, we will have a final paper in which you will apply the skills you have learned in this course. You will research and analyze a current local, state, national or global environmental or natural resource issue. In grading the papers, I will be looking for your ability to carry out the four-step approach to environmental issues used in class: a solid description of scientific evidence demonstrating that there is an issue; an analysis of the incentives which have led to the situation you are studying; a coherent discussion of how one policy option addresses the incentives causing the problem; and then an explanation of why that effective policy has or has not been implemented in the case you describe. Since this is an *economics* class, particular emphasis will be placed on your analysis of the incentives involved in your problem using the tools we have discussed in class.

### **Extra Credit**

We will offer several opportunities to earn extra credit. We will play several in-class games to reinforce concepts, and some of these games will be scored for extra credit, such as the prisoner's dilemma game and the goat farming game. You will also have the opportunity to sign up for one group video for extra credit, where 2-5 students will research a topic that interests them and will make a 3-5 minute video to be shown to the class. General topics and dates available will be posted to the discussions section of Canvas. These videos will give students with specific interests an opportunity to do more research into them and give the class an opportunity to learn about these topics. All videos must be turned in by 5pm on canvas the day before they are scheduled to be

viewed. Total extra credit points will not exceed 10% of total non-extra credit course points.

## ***Policies***

### ***Attendance***

This class covers wide range of tools and factual material, including new ways of thinking about and managing the environment. Attendance will not be taken during class. However, attending and participating in the synchronous class is the primary way to understand the models being used and how they apply to the problems we are studying; attendance is essential to doing well in this class.

### ***Class Exercises***

Economics requires practice, including solving math problems and drawing graphs. We will distribute class exercises during class on some days to practice the material and allow everyone to ask questions as they try it for themselves. While these exercises will not be graded, full participation will be essential to success in the course.

### ***In-class Technology***

We encourage in-class technology to be limited to reduce distractions. Using a tablet to take notes is fine, especially if you have a stylus to draw graphs. You may use a laptop to take notes, however this is not recommended due to our emphasis on hand drawn graphs.

### ***Collaboration***

Your peers are often your best resource for learning. Working in groups to complete exercises and plan and revise your final paper is strongly encouraged. However, any work you turn in must be in your own words. It is suggested you make sparse notes in a group setting, and then write up your own answers to turn in.

### ***Re-Grading***

If you want an assignment or mid-term to be regraded, you may submit your work back to us with a written document explaining why you believe the grading is incorrect. We will consider your explanation and respond within approximately one week.

### ***Academic (Mis)Conduct***

At the University level, passing off anyone else's scholarly work (which can include written material, exam answers, graphics or other images, and even ideas) as your own, without proper attribution, is considered academic misconduct. Because I am interested in how well you understand and can explain the situations and models discussed in class, it is imperative your work is in your own words. Shared homework or test answers or plagiarized assignment answers, will receive a zero for the assignment for involved parties and will be referred to the university for disciplinary action.

Plagiarism, cheating, and other misconduct are serious violations of the University of Washington [Student Conduct Code \(WAC 478-120\)](#). I expect that you will know and follow the university's policies on cheating and plagiarism. Any suspected cases of academic misconduct will be handled according to University of Washington regulations.

For more information, see the College of the Environment [Academic Misconduct Policy](#) and the University of Washington [Community Standards and Student Conduct website](#). University plagiarism policies apply.

### *Disability*

Full participation in this course requires the ability to read and synthesize written material, attend three classroom sessions a week (up to 80 minutes), participate in class discussion, and compose mathematical and graphical answers to homeworks and projects. If you anticipate or experience barriers to your learning or full participation in this course based on a physical, learning, or mental health disability, please contact the instructor to discuss possible accommodation(s) within the first week of class, or at least a week before you anticipate an issue. The instructor will maintain confidentiality of the disability and associated accommodations.

A more complete description of the disability policy of the College of the Environment can be found <http://coenv.washington.edu/intranet/academics/teaching/disability-accommodation/>. If you have, or think you have, a temporary or permanent disability that impacts your participation in any course, please also contact Disability Resources for Students (DRS) at: [206-543-8924](tel:206-543-8924) V / [206-543-8925](tel:206-543-8925) TDD / [uwdss@uw.edu](mailto:uwdss@uw.edu) e-mail / <http://www.uw.edu/students/drs>.

**Reading List (Subject to change)**

- Acheson, J. and R. Gardner. 2011. Modeling Disaster: The Failure of Management of the New England Groundfish Industry. *North American Journal of Fisheries Management* 31(6):1005-18.
- Anderson, C., M. Krigbaum, M. Arostegui, M. Feddern, et al. 2018. How Commercial Fishing Effort is Managed. *Fish and Fisheries*. DOI: 10.1111/faf.12339.
- Deweese, C. 1998. Effects of Individual Quota Systems on New Zealand and British Columbia Fisheries. *Ecological Applications* 8(1):S133-38.
- Economist Explainer. 2016. What is the Nash Equilibrium and Why Does it Matter? <http://www.economist.com/blogs/economist-explains/2016/09/economist-explains-economics>
- Field, B. *Natural Resource Economics: An Introduction*. 2001. Long Grove, IL: Waveland.
- Foale, S., D. Adhuri, P. Alino, E. Allison et al. 2013. Food Security and the Coral Triangle Initiative. *Marine Policy* 38:174-83.
- Gates, B. 2021. *How to Avoid a Climate Disaster: The Solutions We Have and the Breakthroughs We Need*. New York, NY: Knopf.
- IEM. 2010. A Study of the Economic Impact of the Deepwater Horizon Oil Spill. [http://gnoinc.org/wp-content/uploads/Economic\\_Impact\\_Study\\_Part\\_I\\_-\\_Full\\_Report.pdf](http://gnoinc.org/wp-content/uploads/Economic_Impact_Study_Part_I_-_Full_Report.pdf)
- Klein, N. 2014. This Changes Everything: Capitalism vs. the Climate. Simon & Schuster. Introduction available at [https://www.democracynow.org/2014/9/17/thursday\\_naomi\\_klein\\_on\\_her\\_new\\_book](https://www.democracynow.org/2014/9/17/thursday_naomi_klein_on_her_new_book)
- Knapp, G. 2007. The Chignik Salmon Cooperative: A Case Study of Allocation to a Voluntary Self-Governance Organization.
- IPCC, 2013: Summary for Policymakers. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- Mississippi River Gulf of Mexico Watershed Nutrient Task Force. 2013. Reassessment 2013: Assessing Gulf Hypoxia Action Plan.
- National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling (NCBPDHOSOD). 2011. Deep Water: The Gulf Oil Disaster and the Future of Offshore Drilling. [http://docs.lib.noaa.gov/noaa\\_documents/NOAA\\_related\\_docs/oil\\_spills/DWH\\_report-to-president.pdf](http://docs.lib.noaa.gov/noaa_documents/NOAA_related_docs/oil_spills/DWH_report-to-president.pdf)
- NOAA 2000. Final Integrated Assessment of Hypoxia in the Northern Gulf of Mexico. [http://oceanservice.noaa.gov/products/hypox\\_final.pdf](http://oceanservice.noaa.gov/products/hypox_final.pdf)
- Sewell, B et al. 2013. Bringing Back the Fish: An Evaluation of US Fisheries Rebuilding under the Magnuson-Stevens Fishery Conservation and Management Act. NRDC Report R:13-01-A. <https://www.nrdc.org/sites/default/files/rebuilding-fisheries-report.pdf>
- Weber, M. and J. Gradwohl. 1995. *The Wealth of Oceans*. New York: WW Norton.
- Welch, C. 2013. Sea Change. <http://apps.seattletimes.com/reports/sea-change/2013/sep/11/pacific-ocean-perilous-turn-overview/>

**Class Schedule (Preliminary and subject to revision)**

*Readings in Italics are to be completed before the class for which they are listed (others are for reference)*

A \* indicates that a student extra-credit video may take place on this date

| <b>Date</b>                              | <b>Topic</b>  | <b>Concepts</b>   | <b>Readings</b>  |
|--|---|---|--|
| 3/28                                     | Introduction:<br>Resource management or <i>people</i> management?           |   |  |
| 3/30                                     | <i>Incentives</i> : Social dilemmas   | Prisoner's dilemma exercise                                   | <i>NYT Nash Equilibrium</i><br><i>Klein Introduction</i>       |
| 4/1                                      | <i>Status &amp; Evidence</i> : Capitalism vs. the Climate                   |   | <i>Gates 1-3</i>   |
| 4/4                                      | <i>Incentives</i> : What motivates people? Tradeoffs, happiness and utility | Opportunity sets<br>Indifference curves<br>Budget constraints | Mankiw Ch. 1 (1-7)<br>Greenlaw Ch. 2.1 &<br>Appendix B         |
| <b>Marine Pollution &amp; Dead Zones</b> |   |   |  |
| 4/6                                      | <i>Status &amp; Evidence</i> : Ocean Change                                 |   | <i>IPCC Report</i>   |
| 4/8                                      | <i>Incentives</i> : How do markets set prices?                              | Trade exercise  | Mankiw Ch. 4<br>Greenlaw Ch. 3                                 |
| 4/11                                     | <i>Incentives</i> : Model of competitive equilibrium                        | PS, CS, Efficiency<br>Subsidies, Taxes                        | Mankiw Ch. 7<br>Greenlaw Ch. 3                                 |
| 4/13                                     | <i>Incentives</i> : Analyzing the market for Gasoline*                      | S/D Shocks  |  |
| 4/15                                     | <i>Incentives</i> : Externalities   |   | Mankiw 203-209<br>Greenlaw Ch. 12.1 & 13.1                     |
| 4/18                                     | <i>Policies</i> : Command and control; taxes and subsidies; cap-and-trade   | Pigouvian taxes<br>Cap-and-trade                              | <i>Gates 10,11</i><br>Mankiw 209-220<br>Greenlaw Ch. 12.2-12.4 |
| 4/20                                     | <i>Policy Implementation</i> : The collective choice model**                |   |  |



|          |   |  |  |
|----------|---|--|--|
| 4/22, 25 | <i>All 4 steps:</i> Extension to Hypoxia  | CRP<br>TMDLs<br>Subsidy removal                              | <i>NOAA 2000</i>   |
|          | <b>Fisheries and Overfishing</b>  |  |  |
| 4/27     | <i>Status &amp; Evidence:</i> Overfishing                                       | Evidence<br>Council System                                   | <i>Wealth of Oceans Ch. 8</i><br><i>Sewell 2013</i>  |
| 4/29     | <b>Exam I: Marine Pollution Unit</b>  |  |  |
| 5/2      | <i>Incentives:</i> Common property resources (static)                           | Static CPR exercise (Goat farming game)                      | Mankiw 232-237<br>Greenlaw Ch. 13.3  |
| 5/4      | <i>Incentives:</i> Static bioeconomic model                                     | Graphical  | <i>Field Ch. 13</i>  |
| 5/6      | <i>Incentives:</i> How much to produce?   | Production functions<br>Profit max<br>P=MC<br>Short/long run | Mankiw Ch. 13<br>Greenlaw Ch. 7 & 8  |
| 5/9      | <i>Policy:</i> Self-governance*   | Community Management   | <i>Spatial: Foale et al. 2013</i><br>TBD   |
| 5/11-13  | <i>Policy:</i> Managing the commons   | TAC and Derby<br>Spatial<br>Catch shares<br>ITQ              | <i>Overview: Anderson et al. 2018</i><br><i>Halibut derby, ITQ: Dewees 1998</i><br><i>Catch Shares: Scheld et al. 2014</i> |
| 5/16     | <i>Policy Implementation:</i> Applying the collective choice model to fisheries |  | <i>Acheson &amp; Gardner 2011</i>  |
| 5/18     | <i>Catch-up and review</i>  |  |  |
| 5/20     | <b>Exam II: Fishery Unit</b>  |  |  |

**Managing Disasters: Offshore Drilling, Pandemics, etc.**

|      |  |   |                         |
|------|--|---|-------------------------|
| 5/23 | <i>Status &amp; Evidence: Deepwater Horizon</i>                                |   | <i>NCBPDHOSOD Ch 6.</i> |
| 5/25 | <i>Incentives: Understanding the risk of disasters</i>                         | Probability<br>Expected value<br>Rational violations        |                         |
| 5/27 | <i>Incentives: Optimal nonrenewable resource use*</i>                          | Discounting<br>Net present value                            |                         |
| 5/30 | <i>Memorial Day (no class)</i>   |   |                         |
| 6/1  | <i>Policy: Cost-benefit analysis &amp; environmental damage assessment</i>     | Cost-benefit analysis<br>Economic Impact<br>Hedonic pricing | <i>IEM 2010</i>         |
| 6/3  | <i>Summary &amp; Final Project workshop (Synchronous attendance mandatory)</i> |   | <i>Gates 12</i>         |
| 6/8  | <i>Final Project Due NOON</i>  |   |                         |