

**Economics of Natural Resources**

ECO6143 (fall 2023)  
University of Ottawa  
Monday 8h30-11h20  
Room LMX 258

**Professor:**

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Office hours: Wednesdays 10am-noon  
(with prior email notification)

*This course is offered in person only, including all evaluations.  
No exception can be granted.*

**Official course description**

The concept of scarcity rents in static and dynamic settings. Basic property regimes: open access, exclusive access, and common property. Policy instruments. The importance of transaction costs. General-equilibrium and political-economic aspects of property regimes. Conflict. Elements of dynamic optimization. Renewable and non-renewable resources.

**Course Learning Outcomes and Methods**

A main learning objective is to understand the mechanisms that underlie the mismanagement of natural resources and their larger economic consequences, such as conflict, wealth, and income distribution. The approach is mostly theoretical; it is meant to be relevant for both high- and low-income economies, as well as through history.

We begin by introducing fundamental theoretical concepts in natural-resource economics, such as rents, property rights, transaction costs, time discounting, stock-flow dynamics, and bio-economics. Armed with these concepts, we can then extend the theoretical analysis to various issues such as: natural resource abundance and conflict; common-property resources and cooperation; local communities and the role of the state; trade openness and resource overuse; resource privatization and income distribution; or the industry supply curve for a renewable resource.

The theoretical analysis makes heavy use of the micro-economic tools that students have acquired in their undergraduate studies. Given the unavoidable importance of strategic behavior between users of natural resources, game theory provides an especially insightful analytical approach. When it comes to intertemporal trade-offs and stock-flow dynamics, analytical tools in capital theory are called for. In some instances, reviews of analytical methods will be conducted in class.

As a graduate course, another learning objective consists in introducing the student to the research process. To this end, our primary theoretical approach will at times be complemented by the consideration of some empirical work. The student will therefore learn to appreciate the importance of the complementarity between theory and evidence in the scientific process.

## **Evaluation**

There is a total of 100 points to *accumulate*. There will be two mid-term examinations (1.5 hours; 20 points each) and one final (3 hours; 40 points) examinations. Unless otherwise noted, the mid-term examinations will take place on **Monday October 2nd** and **Monday November 6th**. The date for the final exam will be determined by the Faculty. The final exam is fully cumulative.

Although a course in natural-resource economics can be somewhat technical, it remains a course in economics as a **social science**. Much emphasis is thus put on interpreting the results and discussing their implications for society and economic policy. **The evaluation will reflect this.**

The ability to interpret and discuss results can only be properly achieved through long-term maturation of ideas. Students are thus expected to be up-to-date in their weekly material. To this end, exercises and readings will be assigned weekly. An **individual and hand-written** copy of the answers to problems is to be submitted the following week. Detailed solutions will then be provided, but individual copies will not be corrected in detail. I will look only at honest attempts to solve and interpret the problems. It goes without saying that class attendance is mandatory; missing more than two classes or two classes in a row is not acceptable. Assiduous attendance and assignment completion will make up for the last 20 points. You can miss one assignment submission without being penalised.

The final exam and all mid-terms will take place in a classroom.

No online evaluation can be provided.

## **Attendance**

Regular attendance is of course expected. Students who miss classes (without justification as per Faculty rules) waive the right to meet at office hours and request any sort of exception.

## **Course notes and material**

There is no textbook for this course. The study material is based on class notes and articles assigned to read.

## THEMES<sup>1</sup>

1. Introduction
2. What makes natural resources different? (Hotte 2013)
  - The concepts of appropriability and nonreplicability.
3. Natural resources and scarcity rents
  - Locational land rent (Hartwick and Olewiler 1998, ch 3)
  - Dynamic rents: A non-renewable resource extraction problem
4. **Review:** Elements of capital theory and time discounting (Hanley, Shogren and White 1997, ch 7)(Clark 1976, chapter 3)(Nicholson 1992, chapter 24)
5. **Review:** Elements of game theory  
*This review is to be done by yourself. It is especially important for those who have done little game theory before. Students are invited to go over chapter 15 of Varian (1992), especially sections 1 to 4 in the first week of classes.*
6. Property regimes and resource use (Cheung 1970) (Gordon 1954, Hardin 1968) (Dasgupta and Heal 1979, ch 3)(Eggertsson 1990, chap 4)(Hartwick and Olewiler 1998, ch 3)(Smith 1968, Brooks, Murray, Salant and Weise 1999, Hardin 1968)
  - The open access fishery (Gordon (1954))
  - Free access: A game-theoretical analysis of property regimes with two users (Cheung 1970)(Dasgupta and Heal 1979, ch 3)
  - Free access with multiple users (Cheung 1970)(Dasgupta and Heal 1979, ch 3)
  - Anti-commons: Property rights as exclusion (Buchanan and Yoon 2000, Heller 1998, Alchian and Demsetz 1973)
  - Common-property resources (Libecap and Wiggins 1984, Ostrom 1990, Coleman 1990, Eggertsson 1990, Ostrom 2000, Dayton-Johnson and Bardhan 2002)
7. Empirical paper I: *There will be blood: Crime rates in shale-rich U.S. counties*, James and Smith (2017)
8. The dynamics of a renewable resources
  - A bio-economic model of a fishery (Perman, Ma, McGilvray and Common 2003, Karp 2017)

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<sup>1</sup>The order of the following themes corresponds roughly to their chronological appearance in the course. However, readings, references, and their timing are subject to change. Starred items will probably not be covered in the fall 2023 semester in order to make time for the empirical paper discussions. I chose to still mention them because I believe that they are fundamental to a proper understanding of natural resource economics. PhD students who want to specialize in the field should cover them eventually.

- The backward-bending supply curve (Copes 1970, Hartwick and Olewiler 1998)
9. \*The pigovian tax solution to the free access problem
    - The smoking factory example (Coase 1960)
    - The multiple user pasture example
  10. \*The Coase theorem and transaction costs (Coase, 1960; Coleman, 1990, chap. 3)
    - The negotiated solution in the smoking factory example (Coase 1960)
    - Transaction costs: The airport with night flights example
    - Pigovian taxation, property rights and transaction costs
  11. General equilibrium and property regimes (Cohen and Weitzman 1975)(Weitzman 1974) (Samuelson 1974, de Meza and Gould 1992)
    - The fixed-factors model (Cohen and Weitzman (1975))
    - Income distribution and resource privatisation in general equilibrium
  12. Empirical paper II: *Commodity price shocks and civil conflict: Evidence from Colombia*, Dube and Vargas (2013)
  13. Trade, natural resources and property rights (Hotte, Long and Tian 2000)(Pethig 1976, Chichilnisky 1994)(Margolis and Shogren 2009)(Garfinkel, Skaperdas and Syropoulos 2008)(Hotte 2013) (Copeland and Taylor 2009)(Brander and Taylor 1998)
    - Trade and open access in the resource sector
    - Trade and endogenous property rights (Hotte 2000)
  14. Resource privatization in general equilibrium with mobile capital (Congar and Hotte 2021; Manning, Taylor, and Wilen 2018)
  15. Empirical Paper III: *Credit Markets, Property Rights, and the Commons*, Noack and Costello (2022). (Other relevant references: Assunção et al. (2020); Anderson (2017); McWhinnie (2009); Agnew et al. (2009); Sumaila et al. (2007); Costello et al. (2008); Brander and Taylor (1997); Cull and Morduch (2018))
  16. \*Fishery dynamics and present-value maximizing in discrete time (Hartwick and Olewiler 1998, Perman et al. 2003, Karp 2017)
  17. \*Topics on property rights
    - Conflict, state presence, and natural-resource use (Hotte (2001) )
    - Theft versus trespass as different manifestations of property right issues (Hotte, McFerrin and Wills 2013)

## References

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### **Policy on the EIN grade (incomplete)**

In all economics courses, students who fail to complete work (either a single piece of work or a combination of work) worth a total of 25% or more of the final grade will receive a grade of EIN in the course. The EIN grade is equivalent to a failure mark (F). See Regulation A-3 (<https://www.uottawa.ca/about-us/policies-regulations/academic-regulations/a-3-grading-system>) for details. Please note that a denied request for a deferral may therefore lead to failing the course.

### **Missed exams and requests for deferral**

An absence from an evaluation that is not excused will result in a mark of 0. Students can ask to be excused from attending an exam/test or to write an exam/test/assignment at a later date. To do so, they must complete and submit online a request for deferral form, along with a medical certificate and any other supporting documents within five working days of the evaluation. Only one deferral can be granted per course. Students whose request is approved will be required to write a deferred evaluation, except where the professor offers a re-weighting scheme. (If available, such a scheme is described in this syllabus.) A deferred evaluation must be taken as soon as possible after the original date, but in any case no later than six (6) months after the end of the term (Academic Regulation A-8).

Deferred final examinations will take place on **Saturday, January 13th, 2024, at 9:00 a.m.**

Students should reflect deeply before requesting a deferred evaluation, since they can only receive one deferral per course. Students who are struggling to keep up with their schedule may find it worthwhile to withdraw from the course and take it again at a later date. In Fall 2023, the deadline to withdraw from this course (without financial reimbursement) is November 17th. For further information on withdrawing from the course, consult the link <https://www.uottawa.ca/course-enrolment/withdrawing-from-a-course>.

### **Exam conflicts**

Any conflict with a midterm exam schedule should be reported to the Professor at the beginning of the term. This request is especially applicable to the type 3 conflict (two in-class exams back-to-back) for students with special learning needs.

Any conflict with a final exam schedule should be reported to the Faculty's undergraduate office as soon as the final examination schedule is released.

### **Intellectual Property Rights of Course Content**

If you would like clarification regarding the intellectual property right of course content, please visit the Copyright Office webpage or consult your professor.

### **Institutional Policies and Academic Regulations**

It is very important to know the institutional policies and academic regulations associated with your academic success. This information is available on the Faculty of Social Sciences website, on the <https://www.uottawa.ca/faculty-social-sciences/student-hub> under the "Institutional policies and academic regulations" tab.

### **Academic Fraud Regulations**

If you would like clarification regarding academic integrity and misconduct, please consult Academic Regulation A-4 or consult your professor.

### **Academic Regulations A-1 on bilingualism at the University of Ottawa**

Per Academic Regulation A-1 : “Except in programs and courses for which language is a requirement, all students have the right to produce their written work and to answer examination questions in the official language of their choice, regardless of the course’s language of instruction.”

**Student help resources at uOttawa**

uOSatisfACTION

<https://www.uottawa.ca/about-us/provost/student-satisfaction>

Getting help for students

<https://www.uottawa.ca/campus-life/health-wellness/getting-help-students>