University of Victoria

Course Syllabus

Department of Economics

ECON 482/530: Advanced Resource Economics

(CRN: 21103/21106)

Winter Session: Second Term 2022 01

Instructor:

Dr. G. C. van Kooten
Office: BEC 330
Office hours: Monday 3:00-4:30 pm; or by arrangement

Location and Time:

Cornett B112
Tues: 4:30pm – 7:20pm

Pre-requisites: ECON 313/351 or permission of the Department

Course Description: An advanced course covering traditional topics of resource economics—the fishery, the forest, and the mine (non-renewable resources), but also climate change, the future role of electricity, the economics of electricity grids and the integration of renewable sources of energy (wind and solar) into existing grids. The course will also address the future of coal, oil and natural gas, and the question of Canada's oil sands, pipelines, and the potential role of nuclear energy in reducing CO_2 emissions. Since the course requires solving numerical problems, students should be familiar with the advanced features in Excel and/or a software program such as R, Matlab/Octave or Python.

Learning outcomes: Students successfully completing the course will be able to better understand the role of natural resources in society and, in particular, the part that energy plays in economic growth and development. They will have an enhanced knowledge of the economic implications of national and international policies to mitigate climate change. Students will also be able to solve numerical problems using one or more computer software packages that are also increasingly used in government and business. Finally, students should have a better understanding of how to provide a systematic written analysis of natural resource policy consistent with the standards for conference presentation (including posters) or journal publication.

Course Format: The course will be taught in a combined lecture/seminar/lab/discussion format. Some lectures might be online. Students will be required to participate in discussions and as part of a red vs blue team approach to defend one of two sides relating to topics of current importance. Major components of the course will include learning how numerically to solve various resource problems and a term project/paper—graduate students are required to write a term paper and present it in class; undergraduates have an option to write a paper or present a poster. I and my graduate students will be available for help/mentoring as needed.

Attendance is mandatory and a student can only miss class if they have a doctor's note.

Textbook:

There is no specific textbook for this course. Lecture notes on some topics and additional readings will be provided as needed. Some material of value can be found in:

van Kooten, G.C., 2021. *Applied Economics, Trade and Agricultural Policy Analysis*. Toronto: University of Toronto Press.

van Kooten, G.C., 2013. *Climate Change, Climate Science and Economics: Prospects for a Renewable Energy Future*. Dordrecht, NL: Springer. (Don't purchase but digital copy may be available through SpringerLink: https://link.springer.com/book/10.1007/978-94-007-4988-7)

van Kooten, G.C. and E.H. Bulte, 2000. *The Economics of Nature: Managing Biological Assets*. Oxford, UK: Blackwell Publishers. (pdf is free here)

Grading:	Assignments	30%
	Term work*	35%
	Term project	35%

* Based on the red team vs blue team exercises.

Grading Scale: Students should review the University's more detailed summary of grading.

A+	A	A-	B+	B	B-	C+	C	D	F or N
90-100	85-89	80-84	77-79	73-76	70-72	65-69	60-64	50-59	0-49

Blue Team vs. Red Team

Students will be allocated into three teams. The following topics will then be examined using an adversarial approach. Students on each team will be expected to work together, with each student presenting some 5-15 minutes of their team's case in favour or against a particular proposition. After each side has presented their case, the opposing side can raise upwards of three issues to which their opponents can respond. The team not at the plate will determine who won the debate. There will be no rowdy behaviour, shouting or what football fans know as unsportsmanlike comments; such things will reduce your team's overall mark. Further, you will direct discussion towards the opposition with a starting statement such as "honorable opponent, we disagree….".

The propositions we will consider are as follows:
1. Emissions of greenhouse gases, particularly CO_2, lead to climate change.
Proposition: Human emissions of CO_2 will lead to catastrophic climate change.

2. An energy transition is required to prevent climatic change:
Proposition: Net-zero is a realizable target for 2050.

3. Some 10,000 to 100,000 species are going extinct every year (https://wwf.panda.org/discover/our_focus/biodiversity/biodiversity/). Some 30% of the planet should be protected and agriculture greatly reduced (see https://www.canada.ca/en/environment-climate-change/corporate/international-affairs/partnerships-organizations/biological-diversity-convention.html and van Kooten and Bulte)
Proposition: Countries should protect 30% of their land from any development for biodiversity

COURSE OUTLINE

1. **Introduction: The planet's future?**

- Background readings: Betting on the Planet by John Tierney (NY Times Dec 2, 1990) and Apocalyptic Climate Change by Michael Shellenberger (Forbes Nov 25, 2019)

2. Basic Concepts

- Mathematics of resource economics and solving problems using computer software

3. The Economics of Renewable Resources

- The Fishery
- The Forest (material I have written)

4. The Economics of Exhaustible Resources

5. Climate Change Economics

- Climate modelling and Integrated Assessment Models (IAM). Selected readings from:

Nordhaus, W.D., 2019. Climate Change: The Ultimate Challenge for Economics, *American Economic Review* 109(6): 1991-2014. DOI: 10.1257/aer.109.6.1991

Nordhaus, W.D., 2018. Evolution of Assessments of the Economics of Global Warming: Changes in the DICE Model, 1992-2017, *Climatic Change* 148(4): 623-640.

Nordhaus, W.D., 2013. Integrated Economic and Climate Modeling. Chapter 16 in *Handbook of Computable General Equilibrium Modeling, Volume 1A, 1st Edition* (pp.1069-1131) edited by P. Dixon and D. Jorgenson. Dordrecht, NL: Elsevier. (DICE model found at https://sites.google.com/site/williamdnordhaus/dice-rice)

Pindyck, R.S., 2013. Climate Change Policy. What do the Models Tell Us? *Journal of Economic Literature* 51(3): 860-872.

- Pricing carbon: Taxes, carbon offsets and carbon markets

REPA Working Paper #2015-07 at http://web.uvic.ca/~repa/publications.htm

van Kooten, G.C. and C.M.T. Johnston, 2016. The Economics of Forest Carbon Offsets, *Annual Review of Resource Economics* 8(1): 227-246.

6. The Economics of Energy Resources and Energy Transition

- Net-zero: Energy transitions

Smil, V., 2020. *Numbers Don't Lie*. New York, NY: Penguin Books.

Smil, V., 2019. What we need to know about the pace of decarbonisation, *Substantia* 3(2) Suppl. 2: 69-73. doi: 10.13128/Substantia-700.

Smil, V., 2017. *Energy and Civilization. A History*. Cambridge, MA: MIT Press.

- The economics of electricity grids and the 'missing money' problem

REPA Working Paper #2015-07 at http://web.uvic.ca/~repa/publications.htm

Course Policies

This course adheres to the Undergraduate Course Policies of the Department of Economics that deal with the following issues:

- Academic concessions
- Academic integrity (plagiarism and cheating)
- **Attendance**
- Grading
- Inclusivity and diversity
- Late adds
- Late assignments
- Repeating courses
- Review of an assigned grade
- Sexualized violence prevention and response
- Students with a disability
- Term assignments and debarment from examinations
- Travel plans
- Waitlists

The following policies are explicitly included because of their importance.

Academic Integrity

For a definition of plagiarism see review What is Plagiarism. Academic integrity requires commitment to the values of honesty, trust, fairness, respect, and responsibility. Students are expected to observe the same standards of scholarly integrity as their academic and professional counterparts. A student who is found to have engaged in unethical academic behaviour, including the practices described in the Policy on Academic Integrity in the University Calendar, is subject to penalty by the University. If we should go back to online teaching and/or examinations, you will be asked to sign a pledge of integrity on each exam that you undertake online. Note: Submitted work may be checked usingplagiarism detection software.

Students are expected to adhere to the University's Code of Conduct for students.

University Policy on Human Rights, Equity and Fairness

The University is committed to promoting, providing and protecting a positive, supportive and safe learning andworking environment for all its members. See General University Policies

Accessibility & Health Resources

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, you are free to approach me; however, you must register with the Centre for Accessible Learning (CAL) for formal arrangements to be made. The CAL staffare available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

Health Services - University Health Services (UHS) provides a full service primary health clinic for students, andcoordinates healthy student and campus initiatives.

Counselling Services - Counselling Services can help you make the most of your university experience. Theyoffer free professional, confidential, inclusive support to currently registered UVic students.

Elders' Voices - The Office of Indigenous Academic and Community Engagement (IACE) has the privilege ofassembling a group of Elders from local communities to guide students, staff, faculty and administration in Indigenous ways of knowing and being.

Brightspace

Some lecture material will be available on Brightspace. This includes background lectures on optimal control theory and solving differential and difference equations, if needed, and the use of the software employed in class.

Attendance is mandatory

If a students misses more than three hours equivalent of class, they may NOT pass the course.

Students should check the course's Brightspace every now and then for information and updates.

Course Experience Survey (CES)

I value your feedback on this course. Towards the end of term you will have the opportunity to complete a confidential course experience survey (CES) regarding your learning experience. The survey is vital to providing feedback to me regarding the course and my teaching, as well as to help the department improve the overall program for students in the future.

When it is time for you to complete the survey, you will receive an email inviting you to do so. If you do not receivean email invitation, you can go directly to the CES log-in. You will use your UVic NetLink ID to access the survey, which can be completed on your laptop, tablet or mobile device. I will remind you nearer the time, but please be thinking about this important activity, especially the following three questions, during the course.

- What strengths did your **instructor** demonstrate that helped you learn in this course?
- Please provide specific suggestions as to how the **instructor** could have helped you learn more effectively.
- Please provide specific suggestions as to how this **course** could be improved.

E-mail correspondence

Emails should be limited to critical matters, such as inability to attend class, an exam, or prolonged illness, and should include the course name and number in the subject line. Questions on course material should be asked during office hours or in class. The standard format for writing a letter must be used. This means it should begin with a salutation (e.g., Dear….) and include full sentences, and it must conclude with a signature that includes your **fullname and V#** . Text message lingo should not be used.

Electronic devices

No electronic devices will be allowed during lectures, seminars, and other course activities unless permitted by the instructor.

Sexualized Violence Prevention & Response

UVic takes sexualized violence seriously, and has raised the bar for what is considered acceptable behaviour. Students are encouraged to learn more about how the university defines sexualized violence and its overall approach by visiting www.uvic.ca/svp . If you or someone you know has been impacted by sexualized violenceand needs information, advice, and/or support please contact the sexualized violence resource office in Equity and Human Rights (EQHR). Contact svpcoordinator@uvic.ca.