

# Environmental Economics

## Faculty of Science

ECON 5517 Winter 2023/2024

*Dalhousie University acknowledges that we are in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People and pays respect to the Indigenous knowledges held by the Mi'kmaq People, and to the wisdom of their Elders past and present. The Mi'kmaq People signed Peace and Friendship Treaties with the Crown, and section 35 of the Constitution Act, 1982 recognizes and affirms Aboriginal and Treaty rights. We are all Treaty people.*

*Dalhousie University also acknowledges the histories, contributions, and legacies of African Nova Scotians, who have been here for over 400 years.*

### Course Instructor

Name	Email	Office Hours
Nathan Ayer	nayer@dal.ca	Please email me to set up meetings

### Course Description

The field of Environmental Economics emerged as a discipline to incorporate environmental dimensions into conventional economic theory and models, with particular emphasis on quantifying and addressing negative externalities and placing monetary value on public goods. The field has historically been more positive than normative, and tended towards an inward view using empirical analysis to model and predict interpersonal and intertemporal decision-making by individuals and firms, valuation of environmental benefits and damages, and willingness to pay to reduce pollution and protect environmental amenities.

In this updated version of ECON 5517, emphasis is placed on broadening the scope of inquiry to consider larger questions such as the positioning of the human economy within a finite Earth system and the related implications, considering the strengths and limitations of alternative economic models (e.g., circular economy, steady state economy) and macroeconomic measures of wellbeing. While maintaining some of the core elements of traditional Environmental Economics (valuation of ecosystem goods and services, decision-making by economic actors such as individuals, firms, and governments), the updated course encourages students to explore bigger questions about the role economic actors play in creating contemporary environmental and sustainability challenges, the tools and approaches available to them to mitigate and address these issues, practical examples of current approaches taken by firms and government, tools for assessing progress on sustainability, and consideration of alternative objectives and frameworks for economic activity.

## Course Prerequisites

ECON 5000.03 or ECON 5509.03 or ECON 6609.03

## Student Resources

### Office Hours

I will not hold regular office hours on-campus and would prefer that students who require one-on-one meetings email me to set up meetings. Meetings will be held via Zoom or Teams at an agreed-upon day and time.

## Course Structure

### Course Delivery

The course is an in-person lecture format with two weekly lectures held in Room 2016 of the McCain Arts and Social Sciences Building on Wednesdays and Fridays from 08:35 – 09:55pm AST. Attendance and participation during these weekly lectures is essential to student learning and development.

**Format:** In addition to the weekly lectures, the course generally consists of required readings for each week, in-class discussions, and several written assignments. There is no mid-term or final exam, however students will complete a significant term paper requiring research and writing throughout the term.

## Course Materials

### Brightspace Site

The class Brightspace site contains the syllabus, all required readings and resources, class announcements, along with drop boxes for all assignments. To access the ECON 5517 Brightspace site, click the 'Brightspace' link at the top of the main Dalhousie web page ([www.dal.ca](http://www.dal.ca)) and then log in using your Dal NetID and password.

### Readings

Readings for this course draw primarily upon the peer-reviewed literature and book chapters. All articles or chapters indicated in the schedule chart below are *required* readings. It is essential that you have the readings for each week completed in advance of the week for which they apply. Your ability to participate and ask questions during our weekly classes will be greatly enhanced if you have done the readings.

All required readings are available on the course Brightspace site as pdfs.

In addition to required readings, in some places in the weekly schedule and in the weekly content holder on the Brightspace site I may also provide links to very useful related websites, articles, and other resources. These are not required readings but additional resources that are

likely to be of interest and useful. I will likely add to these supplemental resources over the course of the semester as our discussions progress and as relevant materials come up.

## Assessment

### Assignments

All assignments should be uploaded to the relevant assignment drop box on Brightspace by the deadline indicated. You **must** upload your completed assignments in one of the following formats: .doc or .docx (.pages will NOT work, .pdf will not be accepted). Feedback will be returned electronically via Brightspace or via a marked-up Word document in track changes.

Assessment	Due Date and Times (all times Atlantic time)	Weight
Term Paper Outline	11:59pm on Friday February 7	15%
Critical Reflection #1	11:59pm on Friday March 1	20%
Critical Reflection #2	11:59pm on Friday March 22	20%
Term Paper E-Poster	11:59pm on Friday April 5	10%
Final Term Paper	11:59pm on Wednesday April 17	35%

### Term Paper Outline (15%)

Beyond the weekly readings and lectures and class discussions, your primary learning opportunity in this class will be the research and preparation of a term paper on a topic of your choosing, but one that somehow relates to issues addressed in the course. To encourage you to select a topic and begin exploring the relevant concepts and literature, 15% of your course grade is based on a term paper outline that is due earlier in the term. The outline will be used as an opportunity for you to get your initial ideas down on paper, and to get input from me on the appropriateness of the topic, and recommendations on changes in approach and/or useful resources that may support your research and analysis of key issues.

Your document should provide an outline of the key sections and sub-sections that you plan to include in the final report, an initial thesis statement and objectives, and an overview of key arguments and evidence that you have compiled from your initial review of the relevant literature. The outline can include written sections, but bullet point form is also acceptable at this stage, the objective is to get your ideas on paper, not to craft a formal essay.

I will provide some suggested topics in class however I encourage you to select a topic that you are interested in/passionate about, or that relates to your broader field of study or career interests. The term paper outline should be uploaded to the Brightspace site by 11:59pm on Friday February 9.

### Critical Reflections (40%, @20% each)

Students will write two brief critical reflections on key topics covered in class. These critical reflections will be approximately 750-1,000 words in length and should include a minimum of five (5) literature references to support the arguments provided.

Critical Reflection 1 is due by 11:59pm on Friday March 1, and students may choose to write about:

- The implications of recognizing planetary boundaries for economic development goals; or
- The implications of ecologically unequal exchange for sustainable development.

Critical Reflection 2 is due by 11:59pm on Friday March 22, and students may choose to write about:

- The rationale for, and limitations of, alternative indicators/indexes of well-being; or
- The rationale for, and limitations of, monetary valuation of ecosystem goods and services.

Students may propose alternative topics for the critical reflection assignments, however these must be approved by the instructor in advance.

### **Term Paper E-Poster (10%)**

More specifics on the format of this assignment will be provided later in the term. The objective of the “E-Poster” is to allow students to advance their thinking on their term paper by synthesizing key information into a succinct electronic poster format, podcast, or letter to the editor, etc. to be shared with their classmates to introduce them to interesting new topics in Ecological Economics. This assignment is due by 11:59pm on Friday April 5.

### **Final Term Paper (35%)**

Based on feedback on your outline and your ongoing research throughout the semester, a final term paper on your topic will be submitted at the end of the term (11:59pm on Wednesday April 17). Term papers should be between 3,000 and 3,500 words (excluding references, footnotes, etc.). The paper should include deep engagement with the relevant literature, synthesis of the key findings and insights from the literature, and formulation of arguments, discussion, and recommendations on the topic based on student perspectives. As with all other written assignments, use APA in-text citations and provide an APA formatted reference list.

Further details on expectations for the term paper will be provided in class and on Brightspace during the term.

Conversion of numerical grades to final letter grades follows the [Dalhousie Grade Scale](#)

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (0-49)
A- (80-84)	B- (70-72)	C- (55-59)	

## **Course Policies**

**Assignment formatting:** All assignment submissions must use Arial or Times New Roman 12pt font, 1.5 spacing, and default margins.

**Citation Style:** Outlines and final term papers must use the APA (American Psychological Association) citation style in all assignments. Students should familiarize themselves with the

current edition of the APA style, available by weblink on the course Brightspace site and LibGuide.

**Plagiarism detection software:** Plagiarism is a serious academic offense, and plagiarism detection software will be used for all submissions.

**Gradebook:** Grades for individual assignments will be posted to the Gradebook in Brightspace. Please keep paper and/or electronic copies of all assignments until final grades are posted.

**Late penalties:** Assignments submitted after the deadline indicated will be penalized 5% per day, including weekends. Late assignments must still be submitted on Brightspace, but you must also send an email notification to your instructor that you have done so. Extensions will be considered in cases of a documented absence or Student Declaration of Absence (see below).

## Learning Objectives

A student who successfully completes this course will be able to:

- Understand that the human economy is embedded within a biophysically limited Earth system and the related environmental, social, and economic challenges that this presents;
- Understand the key mechanisms and roles and responsibilities of economic actors (i.e., individuals, firms, and government) as they relate to contemporary environmental and sustainability challenges;
- Describe and discuss the strengths and limitations of specific alternative economic models that have been proposed as pathways to sustainability;
- Discuss the strengths and limitations of price- and non-price-based measures to assess national welfare;
- Describe the various rationale for and limitations of putting prices on things like ecosystem services and biodiversity in aid of policy making;
- Understand the strengths and limitations of selected existing economic principles and policies as they relate to achieving sustainability based on a broader view and inquiry informed by ecological limits and principles; and
- Understand the challenge of achieving social, economic, and physical well-being for all humanity within the limits of the biosphere.

## Course Content

The very detailed course schedule chart below is a component of this syllabus and contains details of the weekly lectures and required reading. Further details regarding the course follow the schedule.

Week	Date	Weekly Topics	Description and Readings	Key Dates and Assessments
1	Jan 10/12	<ul style="list-style-type: none"> <li>Course Introduction and Overview</li> <li>Key Themes and Concepts</li> </ul>	<p>We will do an overview of the structure of the course, key themes and fundamental concepts, evaluation structure, and expectations for class and assignments.</p> <p>Readings: No readings this week</p>	
2	Jan 17/19	<ul style="list-style-type: none"> <li>Foundational Environmental Issues, Mechanisms, and Economic Actors</li> </ul>	<p>We will establish key contemporary environmental issues, the mechanisms that lead to these issues and their implications, and discuss the roles and responsibilities of individuals, firms, and government in contributing to, and resolving, contemporary environmental issues.</p> <p>Readings: No readings this week</p>	
3	Jan 24/26	<ul style="list-style-type: none"> <li>Ecological and Socioeconomic Dimensions and Thresholds</li> </ul>	<p>We will discuss the biophysical limitations of the human economy, key indicators and thresholds, as well as socioeconomic objectives and thresholds to be pursued within these biophysical limits.</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Hall, C. A. S. (2022). The 50<sup>th</sup> anniversary of the Limits to Growth: Does it have relevance for today's energy issues? <i>Energies</i> 15: 4953.</li> <li>Steffen et al. (2015) Planetary boundaries: Guiding human development on a changing planet. <i>Science</i>. 347(6223): 1259885-1-1259885-9.</li> <li>Skim the update to Steffen et al. - Rockstrom et al. (2023) Safe and just Earth system boundaries. <i>Nature</i> 619: 102-111.</li> <li>Raworth, K. (2017) A Doughnut for the Anthropocene: humanity's compass in the 21<sup>st</sup> Century. <i>The Lancet</i>. <a href="https://doi.org/10.1016/S2542-5196(17)30028-1">https://doi.org/10.1016/S2542-5196(17)30028-1</a></li> </ul>	

			<p>You may also want to watch Raworth's TED Talk on Doughnut Economics here:  <a href="https://www.youtube.com/watch?v=Rhrcbcg8HBw">https://www.youtube.com/watch?v=Rhrcbcg8HBw</a></p>	
4	Jan 31/Feb 2	<ul style="list-style-type: none"> <li>Comparative Advantage, Unequal Exchange, and Global Economic Flows</li> </ul>	<p>We will discuss the foundational economic principle of comparative advantage, its role in driving the logistics of global resource extraction and manufacturing, and its contributions to unequal ecological exchange and how this can undermine sustainability objectives.</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Hornborg, A. 1998. Towards and ecological theory of unequal exchange: articulating world system theory and ecological economics. <i>Ecological Economics</i> 25: 127-136.</li> <li>Roos, A. 2022. Global asymmetries in the rise of solar power: An LCA-based account of ecologically unequal exchange between Germany and China 2002-2018. <i>Ecological Economics</i> 199: 107484.</li> <li>Henrique &amp; Bohm (2022) The perils of ecologically unequal exchange: Contesting rare-earth mining in Greenland. <i>Journal of Cleaner Production</i> 349: 131378.</li> </ul>	<b>No Class Feb 2</b>
5	Feb 7/9	<ul style="list-style-type: none"> <li>Ecomodernism, Kuznet's Curve, and Capital Substitution</li> </ul>	<p>We will discuss the current dominant paradigm of ecomodernism, the role of economic development as a precursor to environmental management and sustainability, and the potential trade-offs associated with overreliance on manufactured capital substitutions for natural capital.</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Asafu-Adjaye et al. (2015) An Ecomodernist Manifesto.</li> <li>Ayres, R. U. (2007). On the practical limits to substitution. <i>Ecological Economics</i> 61: 115-128.</li> <li>Silvere Konan, Y. &amp; K. Aklobessi. 2021. Revisiting the environmental Kuznets curve: Evidence from West Africa. <i>Environmental Economics</i> 12(1): 64-75.</li> </ul>	<b>Term Paper Outline (15%) due by 11:59pm February 9</b>

6	Feb 14/16	<ul style="list-style-type: none"> <li>Motivations, Contributions, and Limitations of Sustainable Firms</li> </ul>	<p>We will discuss the role of firms in a sustainable economy, the current and future incentives and motivations for taking action, the different ways firms can contribute, and the limitations of relying on firms to achieve sustainability.</p> <p>Readings: To be posted on Brightspace</p>	
7	Feb 21/23	<b>Reading Week – No Classes</b>		
8	Feb 28/Mar 1	<ul style="list-style-type: none"> <li>Tools for Assessment of Biophysical and Economic Dimensions of Sustainability</li> </ul>	<p>We will discuss different tools that are currently being used to assess economic activities, economic actors, biophysical flows in the economy, and their potential integration with existing economic tools used by firms and governments.</p> <p>Readings: To be posted on Brightspace.</p>	<b>Critical Reflection #1 (20%) due by 11:59pm March 1</b>
9	Mar 6/8	<ul style="list-style-type: none"> <li>Critical Natural Capital, Conservation, and Valuation of Ecosystem Goods and Services</li> </ul>	<p>We will discuss the concept of conserving critical natural capital, and methods and approaches used to assign economic value to ecosystem goods and services to support policy development which may protect important areas of natural capital.</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Farber, S.C., R. Costanza &amp; M.A. Wilson (2002) Economic and ecological concepts for valuing ecosystem services. <i>Ecological Economics</i>. 41:375-394</li> <li>Costanza, R., R. De Groot, P. Sutton, S. van der Ploeg, S.J. Anderson, I. Kubiszewski, S. Farber &amp; R.K. Turner (2014) Changes in the global value of ecosystem</li> <li>Melathopoulos, A.P., G.C. Cutler &amp; P. Tyedmers (2015) Where is the value in valuing pollination ecosystem services to agriculture? <i>Ecological Economics</i>. 109: 59-70.</li> </ul>	
10	Mar 13/15	<ul style="list-style-type: none"> <li>Circular Economy, Bioeconomy, and Alternative Economic Models</li> </ul>	<p>We will discuss the strengths and limitations of emerging alternative economic models, their relationship to ecological and social objectives and thresholds, and necessary conditions for their successful implementation.</p>	



			Readings: To be posted on Brightspace	
11	Mar 20/22	<ul style="list-style-type: none"> <li>GDP and Alternative Measures of Economic Progress and Wellbeing</li> </ul>	<p>We will discuss alternative objectives for the human economy, ways of assessing and tracking economic progress, and tracking alternative measures of societal well-being relative to the use of GDP growth as a key indicator.</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Costanza, R., M. Hart, I. Kubiszewski, &amp; J. Talbot (2014) A short history of GDP: Moving Towards Better Measures of Human Well-being. <i>Solutions</i>. 5(1):91-97.</li> <li>Cobb, C.; T. Halstead; and J Rowe (1995) "If the GDP is Up, Why is America Down?" <i>The Atlantic Monthly</i>. (October 1995) 59-78.</li> <li>Kubiszewski, I., R. Costanza, C. Franco, P. Lawn, J. Talberth, T. Jackson &amp; C. Aylmer (2013) Beyond GDP: Measuring and achieving global genuine progress. <i>Ecological Economics</i>. 93:57-68.</li> </ul>	<b>Critical Reflection #2 (20%) due by 11:59pm March 22</b>
12	Mar 27/29	<ul style="list-style-type: none"> <li>Green Growth and Efficiency vs. Steady State Economy and Sufficiency</li> </ul>	<p>We will discuss the prospects and limitations of green growth based on ecoefficiency measures relative to an alternative approach of a steady state economy rooted in concepts like sufficiency. Particular attention will be put on individual human needs and decision making and their role in sustainability.</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>Hickel, J. &amp; G. Kallis. 2019. Is green growth possible? <i>New Political Economy</i>. DOI: 10.1080/13563467.2019.1598964</li> <li>Konstantinos Charonis, G. 2021. Degrowth, steady state and circular economies: Alternative discourses to economic growth. <i>Society Register</i> 5(3): 75-94.</li> <li>Heindl, P. &amp; P. Kanschik. 2016. Ecological sufficiency, individual liberties, and distributive justice: Implications for policy making. <i>Ecological Economics</i> 126: 42-50.</li> </ul>	<b>No Class Mar 29</b>
13	Apr 3/5	<ul style="list-style-type: none"> <li>Fossil Fuel Dependence, Just</li> </ul>	<p>We will explore various dimensions of a global shift away from fossil fuels to an economy based on renewable energy systems, including the social and economic implications,</p>	<b>Term Paper E-Poster due by 11:59pm on April 5</b>

		Transition, and Economic Implications	<p>confounding factors to a full transition, and necessary measures for planning and ensuring a just transition.</p> <p>Readings:</p> <ul style="list-style-type: none"> <li>• Rami, D. et al. 2023. The fiscal implications of the US transition away from fossil fuels. <i>Review of Environmental Economics and Policy</i> 17(2): 295-315</li> <li>• Covert, T. et al. 2016. Will we ever stop using fossil fuels? <i>Journal of Economic Perspectives</i> 30(1): 117-138</li> </ul>	
14	Apr 8/9	<ul style="list-style-type: none"> <li>• Course Wrap Up and Sharing of Term Paper Research Findings</li> </ul>	<p>We will wrap up the course by revisiting key themes and discussing future needs for research in this field. We will also have class discussion and sharing of key findings from student term paper research.</p> <p>Readings: No readings this week</p>	<b>Final Term Paper due by 11:59pm on April 17</b>

## University Policies and Statements

### Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit or e-mail the Indigenous Student Centre at 1321 Edward St or [elders@dal.ca](mailto:elders@dal.ca). Additional information regarding the Indigenous Student Centre can be found at: [https://www.dal.ca/campus\\_life/communities/indigenous.html](https://www.dal.ca/campus_life/communities/indigenous.html)

### Internationalization

At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." Additional internationalization information can be found at: <https://www.dal.ca/about-dal/internationalization.html>

### Academic Integrity

At Dalhousie University, we are guided in all our work by the values of academic integrity: honesty, trust, fairness, responsibility, and respect. As a student, you are required to demonstrate these values in all the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. Additional academic integrity information can be found at: [https://www.dal.ca/dept/university\\_secretariat/academic-integrity.html](https://www.dal.ca/dept/university_secretariat/academic-integrity.html)

### Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion, please contact the Student Accessibility Centre ([https://www.dal.ca/campus\\_life/academic-support/accessibility.html](https://www.dal.ca/campus_life/academic-support/accessibility.html)) for all courses offered by Dalhousie with the exception of Truro. For courses offered by the Faculty of Agriculture, please contact the Student Success Centre in Truro (<https://www.dal.ca/about-dal/agricultural-campus/student-success-centre.html>)

### Conduct in the Classroom – Culture of Respect

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view. Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While

expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

### **Diversity and Inclusion – Culture of Respect**

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness (Strategic Priority 5.2). Additional diversity and inclusion information can be found at: <http://www.dal.ca/cultureofrespect.html>

### **Student Code of Conduct**

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner - perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution. The full Code of Student Conduct can be found at:

[https://www.dal.ca/dept/university\\_secretariat/policies/student-life/code-of-student-conduct.html](https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html)

### **Fair Dealing Policy**

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. Additional information regarding the Fair Dealing Policy can be found at: [https://www.dal.ca/dept/university\\_secretariat/policies/academic/fair-dealing-policy-.html](https://www.dal.ca/dept/university_secretariat/policies/academic/fair-dealing-policy-.html)

### **Originality Checking Software**

The course instructor may use Dalhousie's approved originality checking software and Google to check the originality of any work submitted for credit, in accordance with the Student Submission of Assignments and Use of Originality Checking Software Policy. Students are free, without penalty of grade, to choose an alternative method of attesting to the authenticity of their work and must inform the instructor no later than the last day to add/drop classes of their intent to choose an alternate method. Additional information regarding Originality Checking Software can be found at:

[https://www.dal.ca/dept/university\\_secretariat/policies/academic/student-submission-of-assignments-and-use-of-originality-checking-software-policy-.html](https://www.dal.ca/dept/university_secretariat/policies/academic/student-submission-of-assignments-and-use-of-originality-checking-software-policy-.html)

### **Student Use of Course Materials**

Course materials are designed for use as part of this course at Dalhousie University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as books, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this course material for distribution (e.g., uploading to a commercial third-party website) may lead to a violation of Copyright law.