



Faculty of Science: Department of Economics

Course Syllabus

ECON2216.03 (2021, Winter): The Economics of Global Warming

Instructor: Ruth Forsdyke, Ruth.Forsdyke@Dal.ca

Lecture Slides & Videos: An announcement and slides are posted on Brightspace Tues, Thurs. am with readings. Some sections are illustrated with short videos.

Office Hours (Professor): Brightspace Collaborate, Tues. and Thurs. 11 am - 12 noon ADT (drop in), or email me to set up an appointment.

Teaching Assistants:

Nyasha Mandeya, ny589541@dal.ca and Kuda Sakutukwa (economics section), kd629066@dal.ca

Course Description:

This course uses economic principles to investigate such questions as: What are the benefits and costs of various time paths for abating emissions? How do we value the well-being of future generations? How do we balance helping the poor with environmental sustainability? What policies can align incentives with environmental sustainability?

Course Prerequisites and Exclusions:

PREREQUISITES: ECON 1101.03 with minimum grade of C.

EXCLUSIONS: ECON2850.06, PHYC2850.06

Note: “**PHYC2800: Climate Change**” is a course on climate change science which complements ECON2216. Taking both PHYC2800 and ECON2216 is similar to taking “The Science and Economics of Climate Change (**ECON2850.06** or **PHYC2850.06**), a full credit course (offered in June) but with more integration of the science and economics. **ECON2216.03** or **ECON/PHYC2850.06** provides knowledge and skills that will be built upon or complement **upper level environmental stream** courses including: **Econ3335: Environmental Economics**, **ECON3332: Resource Economics** and **ECON4350: Social Cost Benefit Analysis**.

Course Objectives/Learning Outcomes:

1. Understand basic science of greenhouse gases (GHGs) including their causes, impacts and ways to reduce them.
2. Understand that the GHG problem is not only technical but is also social due to “externalities” and requires both technical and social solutions.
3. Understand key categories of net abatement costs, climate change impacts and damages, the magnitude of estimates, estimation methods and the degree of uncertainty.
4. Understand policy solutions to mitigate and adapt to climate change and pros and cons.
5. Practice problem solving skills by applying economics in the context of global warming.
6. Apply basic linear algebra to find variables such as socially efficient carbon prices and gain skills plotting graphs and using these to evaluate and compare policies.
7. Learn how to find scientifically valid information on the GHG problem.
8. Learn and practice critical thinking, writing, and communicating.
9. Understand ethical and moral dimensions the GHG problem and its solutions.
10. Understand the seriousness and urgency of the GHG problem and how you can help.

Sample Course Materials:

[Stern, Nicolas \(2006\) *The Economics of Climate Change: The Stern Review \(SR\)* \(online\)](#)

[UN IPCC \(Oct, 2018\) Special Report: Global Warming of 1.5°C: Summary For Policy Makers](#)

[UNEP Emissions Gap Report \(2018\) Executive Summary](#)

[UN IPCC Summary for Policy Makers 5th Assessment Report \(available in Brightspace\)](#)

Brightspace Learning Management System:

The key material for the course is available under “content”, “discussions”, “announcements” and “Assessments”. Please check “**Announcements**” regularly to be sure not to miss important information.

Course Assessment:

There are two course assessment schemes as indicated below:

Component	Weight (% of final grade)		Date, Details
	Scheme 1	Scheme 2	
Midterm	20	22	Tues March 2nd
Final Exam	42	45	Scheduled by Registrar
Assignments	33	33	Best 3 out of 4 (2 prior to midterm and two after)
Discussion Board Participation	5	0	- post questions, comments on other posts, post links to material that helps relate course material to real world events, help other students, one or more participation exercises will be posted on announcements and at the start of slides.

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

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

Details on Course Work and Assessment

Readings:

- posted on the first page of the slides.

Lecture Slides/Videos:

Lecture slides and textbook readings are posted on Tuesday and Thursday. When you log into Brightspace, first visit announcements for new information. The videos may vary in length and may not cover all topics in the slides. To ask questions, use **Discussions** and/or visit the professor and/or TAs during **Virtual Office Hours**. If your question is likely to be of general interest to the class, ***we prefer that you use Discussions***. However, you may **email** your questions to the TAs or professor particularly if the question is not of general interest to the class.

Midterm and Final Exam: contain a mixture of Brightspace Quiz questions (ex. multiple choice, matching, ordering, fill in the blank) and written components (ex. graphing, microeconomic problems, short explanations and/or short essay).

Assignments: Your grade will be the average of the best 3 out of 4 assignments. *You must hand in individual assignments, which **must be written in your own words**.* These may contain written and Brightspace Quiz components. Written components must be submitted via **Assessments >> Assignments** as ONE PDF file (unless specified otherwise) such that pages are aligned with the top corresponding to the top of the computer screen to help markers. TAs will mark a selection of submitted questions. Brightspace quiz components should be submitted via **Assessments>>Quizzes**.

Practice Problems: These are provided for practice and are NOT handed in. **Answers** are posted so you can check your answers and if you get stuck, you may peak at answers to help you to see how to proceed. However, do your best to try the problem on your own before peaking at the answers.

Discussion Board Participation (optional):

Participate in Discussion board forums by means such as asking a question, making a comment, relating class content to real world events (ex. link to news article with brief explanation), or responding to posts made by the professor, TAs, or other students, and making helpful posts. You may either use your name or participate anonymously (meaning that other class members will not know who you are but the professor and teaching assistants will know your name). Discussion board participation is highly encouraged and constitutes an optional 5% of the grade (under scheme 1).

Virtual Office Hours: Held by the professor on Tuesday and Thursday (11 am to noon) in the Collaborate Virtual Rooms assessable via Brightspace. TA office hours will be announced. If you are unable to make these hours and have a question, please email the professor or TAs to set up an appointment.

Virtual Rooms (Collaborate): These are used for office hours and students may use these rooms at other times.

Course Content:

- *topics and dates are tentative as time permits.*
- *recommended background readings include sections from Stern Review of Climate Change (SR)*
- *other supplementary readings are provided on Brightspace.*
- *global warming economics news events posted on Discussions boards.*
- *some lectures indicated below cover more than one day.*

Lecture # and Topic	Background Readings
Part I: Introductory	
L1 Introduction & GHGs as a social problem with social solutions.	- slides, SR (Executive Summary) & IPCC Special Report 1.5 degrees are good background reading for January. Figueres, C.(2013) Three Years to Safeguard the Planet, <i>Nature (check graphs)</i>
L2 Climate Change as a Technical Problem with Technical Solutions (Science)	- slides, SR, Ch. 1, <i>Climate Change Science</i> or Kopp & Hsiang (2018) <i>An Economists Guide to Climate Change Science</i>
Part II: Markets and Policies that Directly Target Goods & Services	
L3 Markets & Welfare Analysis	- slides

L4_Market Failure due to Externalities	- slides, SR Ch. 2 (pg. 25 & key message box, pg. 23), Stavins & Fullerton “How Economists See the Environment”
L5_Policies that Directly Target Goods Markets (Pigou tax, subsidies, quotas, technology, performance, design standards, feed in tariffs, fossil fuel divestment).	- slides - Ch. 2 SR, Climate Change Ethics
Part III: Emissions, MAC MD Framework, Policies that Directly Target Emissions	
L6_Emissions Scenarios, Projections & Options for GHG Emissions Reductions (Kaya Identity)	- slides, Kaya Identity: SR Ch. 7, section 7.3 – 7.4, RCPs and SRES: http://www.ipcc.ch/ipccreports/sres/emission/index.php?idp=2
L7_Socially Efficient Emissions Levels/ One Period MAC MD Framework	- slides, SR, Section 2.2, pg. 24 – 28
L8_Shifts MACs and MDs related to Emissions Scenarios, RCPs, Jevons Paradox	- slides
L9_Policies that Directly Target GHGs Part I (Carbon Taxes, Emissions standards, Abatement Subsidies & Standards)	- slides, SR, Ch. 14, World Bank (2019) <i>State and Trends in Carbon Pricing</i>
Part IV: Measurement of Damages & Abatement Costs and IAMs	
L10_Damages and their Measurement	- slides, sections from SR, Ch. 3, 4, 5.
L11_Abatment Costs and their Measurement	- slides, SR, Ch. 9, 10
L12_Integrated Assessment Models (Climate Economy Models) and Discounting	- slides, SR, Ch. 2 (section 2.4, technical details in appendix), Nordhaus, Sztorc, (2013) DICE 13R: Introduction and Users Manual
Part V: Cap & Trade and Broader Policy	
L13_Cap & Trade & Policy Comparisons	- slides, Ch. 15
L14_Global Agreements and Carbon Border Tariffs	- slides, UNEP Emissions Gap Report (2018)
L15_Adaptation Policy and Geoengineering	- slides, SR, Ch. 18 - 20
L16_Green New Deal, Short Run Macroeconomic Dilemma	- slides, Harris, J. (2009) Ecological Macroeconomics, Consumption, Investment and Climate Change, <i>Real World Econ. Rev.</i> , 50(1), pp. 34-48 SR, Section 17.4,
L17_Problem of Public Misunderstanding	- slides

Course Policies:

Exam Conflicts & Time Zones: In cases of *conflicts on midterms and finals and time zones* which make it difficult to write at the same time as the other students, please email the professor to arrange to write an alternative test at an alternative time on the same day.

Late or Missed Midterms or Assignments: If you miss a midterm or assignment due to illness, as soon as possible, inform the professor via email and submit a **Declaration of Absence (DOA)** form available at: https://www.dal.ca/dept/university_secretariat/policies/academic/missed-or-late-academic-requirements-due-to-student-absence.html

In the case of a *missed midterm or more than one missed assignment*, other evaluation components will be given higher weight. There is no make-up midterm.

If the *final exam is missed due to illness*, please inform the professor by email as soon as possible to arrange to write an alternative exam.

Late assignments receive a *maximum penalty of 5% per day*, unless the student submits a DOA form and *will not be accepted after answers have been posted on the Brightspace*.

Students are responsible for ***checking Brightspace “Announcements” regularly***. Important information to guide your learning as well as occasional corrections to assignments or test review questions is posted there.

Online Access: When connecting to online resources, you are responsible for observing any applicable laws of the country you are connecting from.

You are responsible for establishing whether you have access to all course material as soon as the term begins and before the ADD/DROP date (Jan. 15th, 2020). If you do not have access to certain material, inform the instructor as soon as possible.

Alternative access methods are not guaranteed.

How to Learn in this Course:

- read through course syllabus to get an overview of what lies ahead.
- make a schedule, write down due dates in your planner and set aside times to study.
- Manage your time and avoid distractions such as social media while studying.
- After logging into Brightspace, check **Announcements** for new information.
- do all assignments
- read and work through the textbook readings using the slides to guide your focus and watch any posted videos. Take notes organizing the material in a manner that makes sense to you and relates material to prior knowledge. Charts, flow charts and mind maps may be helpful. Work through the mathematical problems and write down and/or talk through the method used. Make summaries to identify key points.
- do the practice problems on your own. If you get stuck, peak at the solution and then try on your own again. Repeat as necessary. Note down where you went wrong in your initial attempt. Ask questions in the tutorial session.
- relate course concepts to other things you know.
- ask questions while studying, in office hours and on discussion boards.
- start studying early for tests. Do review sheet problems.
- explain concepts to yourself and friends (orally and using words). Test yourself.
- If you are having trouble focussing your study, please visit office hours for advice.
- ask questions on the discussion boards and in office hours and tutorials.

University Policies and Statements:

This course is governed by the academic rules and regulations set forth in the University Calendar and by Senate

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect (The Center for Academic Integrity, Duke University, 1999). As a student, you are required to demonstrate these values in all of 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.

Information: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of a disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (Canada and Nova Scotia).

Information: https://www.dal.ca/campus_life/academic-support/accessibility.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.

Code: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

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

Statement: <http://www.dal.ca/cultureofrespect.html>

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 the office (Rm 3037, McCain Building), e-mail (elders@dal.ca) or leave message (902-494-6803).

Information: https://www.dal.ca/campus_life/communities/native.html

Important Dates in the Academic Year (including add/drop dates)

https://www.dal.ca/academics/important_dates.html

University Grading Practices

https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

Student Resources and Support

Advising

General Advising https://www.dal.ca/campus_life/academic-support/advising.html

Science Program Advisors: <https://www.dal.ca/faculty/science/current-students/academic-advising.html>

Aboriginal Student Centre: https://www.dal.ca/campus_life/communities/native.html

Black Advising Centre: https://www.dal.ca/campus_life/communities/black-student-advising.html

International Centre: https://www.dal.ca/campus_life/international-centre/current-students.html

Academic supports

Library: <https://libraries.dal.ca/>

Writing Centre: https://www.dal.ca/campus_life/academic-support/writing-and-study-skills.html **Studying for**

Success: https://www.dal.ca/campus_life/academic-support/study-skills-and-tutoring.html **Copyright Office:**

<https://libraries.dal.ca/services/copyright-office.html>

Fair Dealing Guidelines <https://libraries.dal.ca/services/copyright-office/fair-dealing.html>

Other supports and services

Student Health Services: https://www.dal.ca/campus_life/health-and-wellness/health-services/services.html

Counselling: https://www.dal.ca/campus_life/health-and-wellness/counselling.html

Student Advocacy: <https://www.dsu.ca/services/community-student-services/student-advocacy-service>

Ombudsperson: https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/where-to-get-help/ombudsperson.html

Scent-Free Program: <https://www.dal.ca/dept/safety/programs-services/occupational-safety/scent-free.html>