



Faculty of Science: Department of Economics

Course Syllabus

ECON2216.03 *The Economics of Global Warming*

Winter, 2023

Instructor: Ruth Forsdyke, Ruth.Forsdyke@Dal.ca, room C12 Maxwell House (902) 494-6990

Lectures: Mon., Wed. 16:05 - 17:25, Studley Henry Hick's Academic, Room 212

Office Hours (Professor):

Real (room C12 Maxwell House) Friday 10:30 am - noon

Virtual (online via Brightspace using Collaborate) Tues. 11 - 12 noon

Teaching Assistants (TAs):

Chukwuebuka Azolibe (CAzolibe@dal.ca) and Munia Morsheda (mr823860@dal.ca)

TA Office Hours TBA

Course Delivery: in person, lectures not recorded,

- lecture slides are posted for all lectures.

- posted covid videos are imperfect substitutes for in person lectures.

Part A: Course Information

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.

ECON2216.03 provides knowledge and skills that will be built upon or complement **upper level environmental stream** courses including: **Econ3335: *Environmental Economics***, **ECON3332: *Resource Economics*** and **ECON3350: *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” requiring 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 model 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.

“Education is a process of living, and not a preparation for future living.” John Dewey
“The human mind is our fundamental resource.” John F. Kennedy

Sample Course Materials Available Through Brightspace

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

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

[UNEP Emissions Gap Report \(2021\) Executive Summary](#)

[UN IPCC Summary for Policy Makers 6th Assessment Report \(available in Brightspace\)](#)

[Key Takeaways from COP 27: What did COP27 achieve and what needs to happen next?](#)

Brightspace Learning Management System:

Online material for the course is available in Brightspace under “**content**”, “**discussions**”, “**announcements**” and “**Assessments**”.

Students are responsible for checking “**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 |
|-------------|---------------------------|--|
| Midterm | 22 | Mon Feb. 13 in class |
| Final Exam | 45 | Scheduled by Registrar |
| Assignments | 33 | Best 3 out of 4 (2 prior to midterm and two after) |

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:

Lecture slides and textbook readings are posted online and may be updated after class dependent upon class specific events such as discussions, questions, and game results.

Midterm and Final Exam: The midterm is in class and the final exam will be scheduled by the registrar.

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 >> Assessments** 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, I recommend taking a peak at answers to help you to see how to proceed and the continue trying to solve the rest of the problem on your own and peaking again as needed.

Discussion Board:

You are encouraged to 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).

Virtual Office Hours and Rooms:

Virtual rooms can be accessed through "Content">>"Collaborate" and are where the virtual office hours are held. Some extra rooms will be set up so students can meet to study together.

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> <i>UNIPCC Summer</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 - SR, Ch. 13, Towards a Goal for Climate Change Policy |
| 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, SR 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 Battle of Perspectives | - slides & demo |

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 class, after class, during 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.

Course Policies:

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 through Brightspace. This form may only be used twice for this course. These are 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.

Class slides are a complement, not a substitute for reading the textbook. It is recommended that you read assigned readings prior to the lecture.

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. If you do not have access to certain material, inform the instructor as soon as possible. Alternative access methods are not guaranteed.

Students are responsible for **checking the final exam schedule prior to booking any flights.**

Part B: 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 or e-mail the Indigenous Student Centre (1321 Edward St) (elders@dal.ca).

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

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

<https://academiccalendar.dal.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=117&chapterid=-1&topicgroupid=31821&loadusercredits=False>

University Grading Practices

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

Part C: 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/undergrad-students/degree-planning.html>

Indigenous Student Centre: https://www.dal.ca/campus_life/communities/indigenous.html

Black Students 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 & Wellness Centre: https://www.dal.ca/campus_life/health-and-wellness.html

Student Advocacy: <https://dsu.ca/dsas>

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

Safety

Biosafety: <https://www.dal.ca/dept/safety/programs-services/biosafety.html>

Chemical Safety: <https://www.dal.ca/dept/safety/programs-services/chemical-safety.html>

Radiation Safety: <https://www.dal.ca/dept/safety/programs-services/radiation-safety.html>

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

Dalhousie COVID-19 information and updates: <https://www.dal.ca/covid-19-information-and-updates.html>