

# ECO481H1 F

## Special Topics in Economics with Data Analytics

### Fall 2024 Syllabus

#### Course Meetings

##### ECO481H1 F

Section	Day & Time	Delivery Mode & Location
LEC0101 Climate Economics	Monday, 10:00 AM - 1:00 PM	In Person: UC 152

Refer to ACORN for the most up-to-date information about the location of the course meetings.

Notes and problem sets will be administered through GitHub Classroom ([https://classroom.github.com/a/e\\_93nDbZ](https://classroom.github.com/a/e_93nDbZ)).

The course email address is: [eco481h1f.a@course.utoronto.ca](mailto:eco481h1f.a@course.utoronto.ca). Please direct all emails regarding the class and material to this address.

#### Course Contacts

**Course Website:** <https://q.utoronto.ca/courses/357914>

**Instructor:** Prof. Jeffrey Sun

**Email:** [je.sun@utoronto.ca](mailto:je.sun@utoronto.ca)

**Office Hours and Location:** Thursdays, 10am, EC264

**Teaching Assistant:** Hugo Cordeau

**Email:** [hugo.cordeau@mail.utoronto.ca](mailto:hugo.cordeau@mail.utoronto.ca)

**Office Hours and Location:** Mondays, 1pm, GE80 (Basement of Max Gluskin House)

#### Course Overview

Seminars or workshops in economics with a data analytics component may be offered in one or more topics each year. Note: hands-on analysis of real-world data using computer programs is a course requirement. The course is open to all students who meet the prerequisites and necessary support for applicable software is provided.

We study how climate changes (heat, sea levels, precipitation) affect human activity and welfare (agriculture, housing, infrastructure, health), when mediated by adaptation (migration, asset markets, trade) and other considerations (heterogeneity, space, frictions, expectations, uncertainty), in equilibrium.

We introduce frontier structural modelling methods. These provide theoretical insights and, together with data, quantitative welfare and policy analysis.

In a final project, students apply appropriate methods to a question of their choice. The final project will be completed part-by-part over the second half of the semester, with feedback at each stage. It will represent a large part of the final grade, although there will be opportunity for revision before final submission.

### Course Learning Outcomes

By the end of the course, students will be able to understand and evaluate:

- Many ways a changing climate might impact human activity and welfare
- How adaptations and markets might shape these impacts in equilibrium
- How to model these equilibrium impacts, incorporating where appropriate: adaptations, equilibrium effects, market structure, frictions, heterogeneity, space, expectations, and uncertainty
- The purposes and limitations of these models
- How to bring a model to data, reason about identification and (mis)specification, test hypotheses, and perform quantitative welfare and policy analysis

**Prerequisites:** ECO200Y1/ ECO204Y1/ ECO206Y1, ECO202Y1/ ECO208Y1/ ECO209Y1, ECO220Y1/ ECO227Y1/ (STA237H1, STA238H1)/ (STA247H1, STA248H1)/ (STA257H1, STA261H1), at least 1.0 credit in ECO at the 300+ level. Further prerequisites (e.g. ECO225H1/GGR272H1) may be required and may vary from year to year, consult the Department of Economics website/current Timetable for more information.

**Corequisites:** None

**Exclusions:** None

**Recommended Preparation:** None

**Credit Value:** 0.5

## Course Materials

Course materials and problem sets will be distributed through GitHub Classroom:

<https://classroom.github.com/classrooms/141776884-eco481-climate-economics>.

## Marking Scheme

Assessment	Percent	Details	Due Date
Problem Set 1	5%		2024-09-16
Problem Set 2	5%		2024-09-23
Problem Set 3	5%		2024-09-30
Problem Set 4	5%		2024-10-07
Problem Set 5	5%		2024-10-14
Problem Set 6	5%		2024-10-21

Assessment	Percent	Details	Due Date
<b>Final Project: Proposal</b>	5%		2024-11-04
<b>Final Project: Empirical Analysis</b>	5%		2024-11-11
<b>Final Project: Model Estimation</b>	5%		2024-11-18
<b>Final Project: Equilibrium and Counterfactual</b>	5%		2024-11-25
<b>Final Project: First Complete Draft</b>	15%		2024-12-02
<b>Final Project: Final Draft</b>	35%		2024-12-20

There will be an opportunity for motivated students to earn extra credit by completing an extension of their final project beyond the requirements of the class. Only one such extension will be allowed, and the core requirements must be completed before the extension is attempted.

### Late Assessment Submissions Policy

Please inform the instructor ahead of time if you require an extension. If an extension is granted and the assignment is submitted within the extended deadline, there is no penalty. Assignments submitted less than a week late without prior permission will face a 20 point penalty out of 100. Assignments submitted more than a week late without prior permission will not be accepted.

### Course Schedule

Note: As this is a new course and still in active development, this schedule is subject to change as the semester progresses.

Week	Description
<b>Week 1</b> Sept 9	Course overview and administrative housekeeping. Overview of climate science and climate economics. Structure of course and final project. The structural perspective to economic research. Substitution and equilibrium. Introduction to GitHub Classroom.
<b>Week 2</b> Sept 16	<b>Substitution.</b> Short-run vs. long-run substitution. Modelling approaches: perfect substitutes, constant spending shares, perfect complements. The CES utility function. An application to a gasoline tax.
<b>Week 3</b> Sept 23	<b>Equilibrium.</b> Partial Equilibrium vs. General Equilibrium effects. Modelling equilibrium. The method of tatonnement. Counterfactuals. Interpretation of results. An application to consumption information interventions.

<b>Week 4</b> Sept 30	<b>Estimation.</b> Model and data. CES and logit regression. Exogenous and endogenous variation. Instrumental variables estimation. An application to international trade.
<b>Week 5</b> Oct 7	<b>Production.</b> CES for production. The CES price index. An application to production networks.
<b>Week 6</b> Oct 14	<b>Heterogeneous Factor Use.</b> Focus on land use. "CES for factor use." An application to agriculture.
<b>Week 7</b> Oct 21	<b>Reallocation.</b> Focus on migration. "CES for reallocation." A discussion of capital reallocation. Dynamics and equilibrium. An application to sea level rise.
<b>Week 8</b> Nov 4	TBD
<b>Week 9</b> Nov 11	TBD
<b>Week 10</b> Nov 18	TBD
<b>Week 11</b> Nov 25	TBD
<b>Week 12</b> Dec 2	TBD

## Policies & Statements

### Plagiarism Detection Tool

Normally, students will be required to submit their course essays to the University's plagiarism detection tool for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the tool's reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of this tool are described on the Centre for Teaching Support & Innovation web site (<https://uoft.me/pdt-faq>).

## **Religious Accommodations**

As a student at the University of Toronto, you are part of a diverse community that welcomes and includes students and faculty from a wide range of cultural and religious traditions. For my part, I will make every reasonable effort to avoid scheduling tests, examinations, or other compulsory activities on religious holy days not captured by statutory holidays. Further to University Policy, if you anticipate being absent from class or missing a major course activity (such as a test or in-class assignment) due to a religious observance, please let me know as early in the course as possible, and with sufficient notice (at least two to three weeks), so that we can work together to make alternate arrangements.

## **Students with Disabilities or Accommodation Requirements**

Students with diverse learning styles and needs are welcome in this course. If you have an acute or ongoing disability issue or accommodation need, you should register with Accessibility Services (AS) at the beginning of the academic year by visiting <https://studentlife.utoronto.ca/department/accessibility-services/>. Without registration, you will not be able to verify your situation with your instructors, and instructors will not be advised about your accommodation needs. AS will assess your situation, develop an accommodation plan with you, and support you in requesting accommodation for your course work. Remember that the process of accommodation is private: AS will not share details of your needs or condition with any instructor, and your instructors will not reveal that you are registered with AS.

## **Academic Integrity**

All suspected cases of academic dishonesty will be investigated following procedures outlined in the [Code of Behaviour on Academic Matters](https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019) (<https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019>). If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, please reach out to me. Note that you are expected to seek out additional information on academic integrity from me or from other institutional resources. For example, to learn more about how to cite and use source material appropriately and for other writing support, see the U of T writing support website at <http://www.writing.utoronto.ca>. Consult the Code of Behaviour on Academic Matters for a complete outline of the University's policy and expectations. For more information, please see [A&S Student Academic Integrity](https://www.artsci.utoronto.ca/current/academic-advising-and-support/student-academic-integrity) (<https://www.artsci.utoronto.ca/current/academic-advising-and-support/student-academic-integrity>) and the [University of Toronto Website on Academic Integrity](https://www.academicintegrity.utoronto.ca) (<https://www.academicintegrity.utoronto.ca>).

## **Specific Medical Circumstances**

If you become ill and it affects your ability to do your academic work, consult me right away. Normally, I will ask you for documentation in support of your specific medical circumstances. This documentation can be an Absence Declaration (via ACORN) or the University's Verification of Student Illness or Injury (VOI) form. The VOI indicates the impact and severity of the illness, while protecting your privacy about the details of the nature of the illness. If you cannot submit a VOI due to limits on terms of use, you can submit a different form (like a letter from a doctor), as long as it is an original document, and it contains the same information as the VOI (including dates, academic impact, practitioner's signature, phone and registration number). For more information on the VOI, please see <http://www.illnessverification.utoronto.ca>. For information on Absence Declaration Tool for A&S students, please see <https://www.artsci.utoronto.ca/absence>. If you get a concussion, break your hand, or suffer some other acute injury, you should register with Accessibility Services as soon as possible.

### **Accommodation for Personal Reasons**

There may be times when you are unable to complete course work on time due to non-medical reasons. If you have concerns, speak to me or to an advisor in your College Registrar's office; they can help you to decide if you want to request an extension or other forms of academic consideration. They may be able to email your instructors directly to provide a College Registrar's letter of support and connect you with other helpful resources on campus.

### **Quercus Info (if using)**

This Course uses the University's learning management system, Quercus, to post information about the course. This includes posting readings and other materials required to complete class activities and course assignments, as well as sharing important announcements and updates. New information and resources will be posted regularly as we move through the term. To access the course website, go to the U of T Quercus log-in page at <https://q.utoronto.ca>. SPECIAL NOTE ABOUT GRADES POSTED ONLINE: Please also note that any grades posted are for your information only, so you can view and track your progress through the course. No grades are considered official, including any posted in Quercus at any point in the term, until they have been formally approved and posted on ACORN at the end of the course. Please contact me as soon as possible if you think there is an error in any grade posted on Quercus.

### **Late/Missed Assignments**

Please inform the instructor ahead of time if you require an extension. If an extension is granted and the assignment is submitted within the extended deadline, there is no penalty.

Assignments submitted less than a week late without prior permission will face a 20 point penalty out of 100.

Assignments submitted more than a week late without prior permission will not be accepted.

Please do not think of these penalties as punishments. They are merely necessary incentives to make sure that the course operates smoothly. If you are overburdened with work at some point, or are facing other personal or academic difficulties, please let me know and I will do what I can to make sure that this course does not add to those difficulties.

## **Attendance**

Attendance is mandatory. Accommodations will be generously made for personal, religious, or academic exceptions, but only with prior permission.

## **Mental Health and Well-Being**

Your mental health is important. Throughout university life, there are many experiences that can impact your mental health and well-being. As a University of Toronto student, you can access free mental health and wellbeing services at Health & Wellness (<https://studentlife.utoronto.ca/department/health-wellness/>) such as same day counselling, brief counselling, medical care, skill-building workshops, and drop-in peer support. You can also meet with a Wellness Navigation Advisor who can connect you with other campus and community services and support. Call the mental health clinic at 416-978-8030 ext. 5 to book an appointment or visit <https://uoft.me/mentalhealthcare> to learn about the services available to you.

You can also visit your College Registrar to learn about the resources and supports available: <https://www.artsci.utoronto.ca/current/academic-advising-and-support/college-registrars-offices>

If you're in distress, you can access immediate support: <https://uoft.me/feelingdistressed>

## **Recording Lectures (by Student)**

Students wishing to record lectures or other course material in any way are required to ask the instructor's explicit permission and may not do so unless permission is granted. This includes audio and video recording and photographing slides or other course materials.

Granting permission to record applies only for that individual student's own study purposes and does not include permission to "publish" or distribute them in any way. It is forbidden for a student to publish an instructor's notes on a website or to sell them in other form without formal permission.

## **Equity, Diversity and Inclusion**

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. U of T does not condone discrimination or harassment against any persons or communities.

## **Course Materials, including lecture notes**

Course materials are provided for the exclusive use of enrolled students. These materials should not be reposted, shared, put in the public domain, or otherwise distributed without the explicit permission of the instructor. These materials belong to your instructor, the University, and/or other sources depending on the specific facts of each situation and are protected by copyright. Students violating these policies will be subject to disciplinary actions under the Code of Student Conduct.

## **Privacy/FIPPA Statement**

Personal information is collected pursuant to section 2(14) of the University of Toronto Act, 1971 and at all times it will be protected in accordance with the Freedom of Information and Protection of Privacy Act. Please note that this course requires presentations of one's work to the group. For more information, please refer to <http://www.utoronto.ca/privacy>.

## **Re-marking Policy - Timeline and Protocol**

A&S policy on re-mark requests for term work specifies that students have two weeks from when the work was returned to make such a request. These requests should be made in person to the instructor or by email to the course email address.

## **Assignment Submission Method**

Assignments should all be submitted through GitHub Classroom. Further instructions will be given in the first class, then provided electronically.

## **Group Work**

Students are encouraged to work in groups, but each submission must be completed individually. In the second half of the course, all students will work on their own projects, but are encouraged to work together to help and support each other with these projects.

## **Use of Generative Artificial Intelligence**

Students may use artificial intelligence tools, including generative AI, in this course as learning aids or to help produce assignments. However, students are ultimately accountable for the work they submit.

Students may choose to use generative artificial intelligence tools as they work through the assignments in this course; this use must be documented in an appendix for each assignment. The documentation should include what tool(s) were used, how they were used, and how the results from the AI were incorporated into the submitted work.

Generative AI may NOT be used for submitted written work, including short and long answers. All written work must be written by the student themselves.