ECO2905H1F -- The Economics of Algorithms

Course website: Quercus

Lecture: Tuesday 2 pm – 4 pm, OI 4422

Instructor: Yao Luo

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Office hours: Tuesday 4.30 pm – 5.30 pm, or by appointment

Objectives

This course examines how algorithms shape market structures and outcomes from an industrial organization perspective. Combining empirical studies with theoretical analysis, it aims to equip students with the skills to critically evaluate the economic tradeoffs involved in algorithmic applications, including pricing, matching, platform dynamics, and regulatory impacts. Students will also explore the influence of algorithms on labor markets and the information economy, develop analytical abilities to assess market strategies, and formulate recommendations to address contemporary challenges arising from the widespread use of algorithms across various economic sectors.

Prerequisites

Please check the academic calendar. The Department checks whether students have the course prerequisites, and students are removed if they do not have them. Instructors cannot waive prerequisites.

Grading

There will be two homework assignments, one presentation, one term test and one term paper. Each problem set counts for 10%. The presentation counts for 10%. The term test counts for 35%. The term paper counts for 35%.

Each homework assignment is due at the beginning of class on the due date. This course will use Crowdmark. Collaboration is encouraged (maximum group size: 3 students). Collaborating students submit a single group answer. You are encouraged to type your homework, but handwritten work will be accepted if it is clearly presented. Make sure to put your name and student number on the front page. No late problem sets will be accepted.

The following policy is intended to accommodate missing an assignment or test due to medical, personal, family or other unavoidable reasons. Each time a student misses an assignment or test needs to

1. inform the instructor by email within 24 hours of the due time or the beginning of the test,

2. fill in a simple form: https://forms.gle/2n3o1PNnMj1ev2Rp8,

3. submit one of the following recognized forms of documentation:
   a. Absence Declaration via ACORN
   b. U of T Verification of Illness or Injury Form (VOI)

      c.   College Registrar's letter

      d.   Letter of Academic Accommodation from Accessibility Services

If you submit both problem sets, you get the higher mark for both. If you miss one problem set, your mark for the missed problem set is equal to the mark for the other problem set. You will get zero for all your problem sets if you miss all the problem sets.

Students who miss the term test take the makeup term test on <u>November 5th, 2024 (time TBA, location TBA)</u>. Consistent with university policy, there will be no "makeup" test for the makeup term test and a grade of zero will be applied if the students fail to write the makeup test. The makeup test will include all the materials covered right up to the lecture before the makeup test.

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. The course instructor reserves the right to ask students to explain their process for creating their assignment.

This course will use Crowdmark, a collaborative online grading tool for marking and providing feedback on graded term assessments. Crowdmark provides efficiencies with grading, data recording, returning term assessments and handling regrade requests. Copies of student work marked in Crowdmark, including grading and feedback, will be available online to students for at least one year. Digital (i.e., online) copies will serve as the authoritative record for course administrative purposes, and paper copies of assessments scanned and uploaded to Crowdmark will be destroyed after the term has ended and final grades are approved. If students have questions about how your information is stored on Crowdmark, please contact your course instructor.

Important Dates

1.   Homework due dates: September 24th, 2024 (HW1) and November 5th, 2024 (HW2)

2.   Term test: October 15th, 2024

3.   Presentation: November 19th, 2024, and November 26th, 2024

4.   Term paper due date: December 12th, 2024

Students with Disabilities

Please inform the instructor as soon as possible if you would like special accommodation either in class or when the building must be evacuated. Please also see the following website: http://www.accessibility.utoronto.ca.

Academic Misconduct

Students should note that I do not tolerate any form of academic misconduct. Any student caught engaging in such activities will be subject to academic discipline ranging from a mark of zero to dismissal from the university as outlined in the academic handbook. Any student abetting or otherwise assisting in such misconduct will also be subject to academic penalties. Please also see the following website: http://academicintegrity.utoronto.ca.

Email Policy

I will respond to emails within 24 hours on a weekday, 48 hours on a weekend, according to these policies: I only respond to emails posing questions that can be answered in 1-3 sentences. Please come to my office hours for detailed questions; I do not respond to emails that request information that can be found on the website or the syllabus. For the results of the graded materials, please come to my office hours.

Test Score Appeals

1. Please write a short paragraph explaining why you should obtain additional points. Turn in a hard copy of this by the end of the week following the week in which exams are first handed back. This holds regardless of whether you are in class when exams are returned.

2. Conditional on this argument found persuasive by me, the entire exam will be re-graded. Your score may go up or down.

Course Outline

1. Introduction

2. Predictive Algorithms

3. Platforms

4. Generative AI

5. Pricing Algorithms

6. Matching Algorithms

7. Algorithms and The Labor Market

8. Algorithms under Competition

9. Uncertainty

10. Other Topics