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ECO326: GAME THEORY

University of Toronto
Department of Economics

Winter 2025

Lecture:	Monday, 10am – 12pm, location: UC 161
Tutorial:	Monday, 12 – 1pm, location: UC 161 (*starting Jan 13)*
Teaching Assistants:	Alexander Speers-Roesch, alex.speers.roesch@mail.utoronto.ca (tutorial)
	Alexandra Ballyk, alexandra.ballyk@mail.utoronto.ca
TA Office Hours:	tbd via survey on Quercus
Course website:	Quercus
	Students are responsible for reading course announcements, lecture notes, and other materials posted on the course website. No handouts will be distributed in class; please download them yourself.
Textbook:	There is no particular textbook for this class. Some books on game theory that you may find useful are:
	Game Theory for Applied Economists, Robert Gibbons
	Games, Strategies, and Decision Making, Joseph E. Harrington, Jr.
	Strategy – An Introduction to Game Theory, Joel Watson.

USE OF PIAZZA AND EMAIL POLICY

Piazza: We will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates, the TA, and myself. Rather than emailing questions to the TAs or me, please post your questions on Piazza. If you have any problems or feedback for the developers, email team@piazza.com.

Find our class signup link at: https://piazza.com/utoronto.ca/winter2025/eco326h1slec0101

Emails: I have found email to be inappropriate for addressing concerns of students in my courses. This is primarily because of its inefficiency as a means of communication: it is not feasible for me to individually respond to every email especially regarding specific questions on the material.

Any questions about the course content, lectures, problems sets, etc must be asked either on Piazza or during the office hours. My response to such emails will be: Ask it on Piazza. However, I do not respond to emails that ask a question that can be answered by looking at the syllabus or course website.

COURSE DESCRIPTION AND LEARNING OBJECTIVES

Most of our decisions are not made in isolation but involve interactions with others. We interact in social environments and encounter strategic situations every day. How much effort should we put into a group project? Whom should we vote for? How much should we bid in an auction? Game theory aims to help answer such questions and understand strategic situations better: game theoretic methods allow modeling and analyzing strategic interaction formally. It is therefore not surprising that game theory has become a central element in the toolbox of economists. It is also frequently used in fields such as computer science, political science, biology and business.

This class will provide you with the tools to represent a strategic situation as a game. We will cover the most common solution concepts to analyze static and dynamic strategic settings, with complete or incomplete information. These concepts can be used to understand strategic situations better. We will also discuss some of the most important economic applications of game theoretic reasoning, including competition in oligopolistic markets, bargaining, contracting situations, auctions, and signaling in labor markets.

Learning Objectives

- Become familiar with the central methods, solutions concepts and results in game theory.
- Understand how game theoretic methods can be used that to model and analyze strategic situations quantitatively.

PROBLEM SETS

Problem sets will be posted on Quercus. The only way to learn game theory is by applying the methods yourself and solving problems. Make sure to solve the problems yourself (or give it your best shot) and *write down the solutions **before*** solutions discussed in the tutorial.

TESTABLE MATERIAL

Students are responsible for all the material covered in the lectures and tutorial, the problem sets and the additional materials (that constitute additional reading) specified during lectures. I will try, as far as possible, to be quite specific during lectures and before quizzes on the exact material on which you can be tested. Different cohorts of students learn at different rates. The syllabus provides the maximal set of topics that can be covered in this class. In reality, the set of topics that we will end up covering will probably be fewer. I intend for tests and grading to be fair. You will not be required to know topics on the syllabus that we did not have the opportunity to cover.

ASSESSMENT/GRADING

In order to provide regular assessment and to provide a simple commitment device, there will be a quiz during the lecture hours approximately every fourth week (three times during the semester) and a term paper. These quizzes are aimed to be simple and will be closely based on the lectures and practice problems provided. Each quiz will be written for an hour's duration, but you will have up to the length of the lecture to complete them (110 minutes). The dates are given below.

Your grade for this course will be:

Quiz 1 (***January 27, 2025***)	25%
Quiz 2 (***March 3, 202***5)	25%
Quiz 3 (***March 31, 2025***)	25%
Term paper	25%

COURSE OUTLINE

The following is an outline of the maximal set of topics that may cover in the course. We will aim to cover everything of 1. – 4., and as much of 5. and the fun topics as possible. The topics will not necessarily be covered in the order listed. Dates, topics, and readings will appear in the class schedule, posted on Quercus. The fun topics will be discussed where they fit in and if time permits.

Introduction and Basics

1. Game representation, basic terminology and assumptions
    - Extensive form, normal form
    - Strategies

Games with complete information

2. Static settings
    - Dominance, iterated dominance, and rationalizability
    - Best responses, Nash equilibrium
    - Mixed strategies and mixed strategy equilibrium
    - Applications: Oligopoly, electoral competition
3. Dynamic settings
    - Subgame perfection
    - Repeated games (*time permitting*)
    - Applications: Entry games, Bargaining

Games with incomplete information

4. Static settings:
    - Bayesian Nash equilibrium
    - Applications: Market of lemons, auctions
5. Dynamic settings: (*time permitting*)
    - Perfect Bayesian equilibrium, sequential equilibrium
    - Application: Reputation

Fun topics (*time permitting*)

6. A selection of the following topics: Information aggregation, Cheap talk, Matching Markets, Mechanism design, Information design, Contract theory

GRADING POLICY

Quizzes can never be of uniform difficulty and as a result, grades will be readjusted or "curved" subject to the difficulty. The curved scores are the ones that will be uploaded to the course webpage.

Re-grading: The quizzes are graded by the teaching assistant. If a student would like to have their test re-graded, I will accept applications for re-grades if it:

1. Is made IN WRITING and given to me along with your ENTIRE assessment,
2. Clearly specifies which questions were improperly marked and explains why,
3. Is submitted within two weeks of the test being returned to you.

Note that the entire quiz will be re-graded, not just the disputed parts. Your grade can go up, down, or remain unchanged. These conditions do not apply to clerical errors such as the incorrect adding up of your score or questions that has mistakenly been missed and not been graded. If a clerical mistake occurs, contact the teaching assistant as soon as possible and she will adjust your score.

Crowdmark: 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 you information is stored on Crowdmark, please contact your course instructor.

MISSING A QUIZ / EXAM

Quizzes / exams are an important component of the course. A student can miss at most one quiz/exam. In order to earn credit for this missed quiz/exam/test, the procedure stated below must be followed.

1. Contact me by **EMAIL BEFORE** the test you will be unable to take and cc the TAs. Please state clearly in the subject line of the email that it is in regard to a missed test.
2. Provide 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 no request for accommodation is received, or if the request is deemed unacceptable, you will receive a

grade of zero for the academic obligation you missed. If the request is granted – that is, your reason for missing the academic obligation is considered acceptable – then you will get credit for the missed test as follows: For missed tests the weight from the missed test will be evenly split between the other tests. In other words, if a student misses say Quiz 2, then Quiz 1 and the Quiz 3 would each constitute 37.5% of the course grade. The grade from any more missed Quizzes will be forfeit.

Students cannot petition to re-write a test once it has begun. If you are feeling ill, please do not start the test, seek medical attention immediately, and the policy on Missed Term Work will apply.
Finally, note that holidays and pre-purchased plane tickets, family plans, your friend's wedding, lack of preparation, or too many other tests/assignments are not acceptable excuses for missing a test.

ACCESSIBILITY/ACCOMMODATION

The University provides academic accommodations for students with disabilities in accordance with the terms of the Ontario Human Rights Code. This occurs through a collaborative process that acknowledges a collective obligation to develop an accessible learning environment that both meets the needs of students and preserves the essential academic requirements of the University's courses and programs.

If you have a disability that may require accommodation, please contact me by e-mail by January 13, 2025. Attach to your e-mail the accommodation letter that you received from the Accessibility Service Office (*here*). The subject line of your e-mail should be: ECO326 VISA

ACADEMIC INTEGRITY

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behavior on Academic Matters outlines the behaviors that constitute academic dishonesty and the processes for addressing academic offences.
Academic integrity is considered one of the central values of this class. *In particular, any non-compliance with academic integrity or documented academic misconduct will result in automatic failure for the entire course.*

EQUITY STATEMENT

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.