

ECONOMICS 200A: Microeconomics

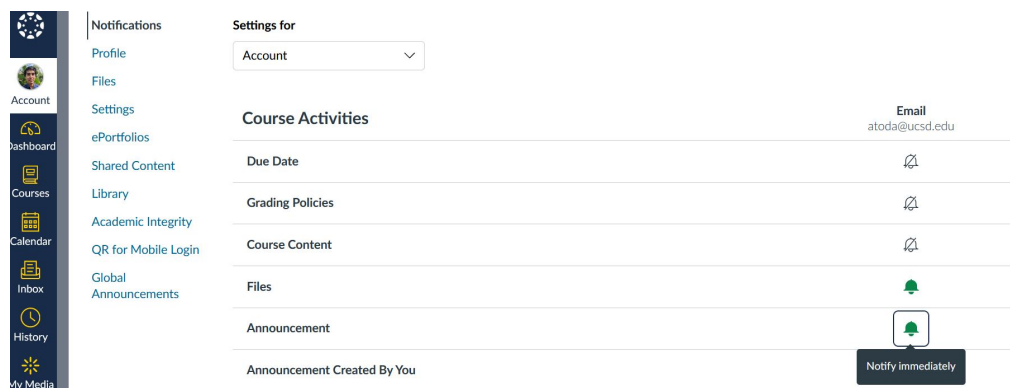
Fall 2023

Basic information

Lectures	Tu/Th 9:00-10:50, SSB 107
Instructor	Prof. Alexis Akira Toda
Office hours	Th 11:00-12:00, Otterson Hall 4S127
Email	atoda@ucsd.edu
Webpage	https://alexisakira.github.io/ (Go to Teaching → Mathematical Economics)
TA	Kelvin Leong, mleong@ucsd.edu

Canvas

I will be using Canvas (<https://canvas.ucsd.edu>) to communicate with you. Please access it and familiarize yourself. We do not monitor Canvas Inbox; please do not use it. Most importantly, please turn on the notification setting to receive announcement notifications. Go to **Account** → **Notifications** and select “Notify immediately” for “Announcement”. See the screen shot below. Make sure to also check your spam folders. In the past, I received complaints such as “we didn’t receive announcements” but this is an issue at the student’s end.



Course description

Carl Friedrich Gauss said mathematics is the queen of the sciences (and number theory is the queen of mathematics).¹ Paul Samuelson said economics is the queen of the social

¹http://en.wikiquote.org/wiki/Carl_Friedrich_Gauss

sciences.² Not surprisingly, modern economics is a highly mathematical subject.

The first 7.5 weeks of Econ 200A covers mathematical economics (classical general equilibrium theory). We study the mathematical foundations of economic theory in the approach known as the Arrow-Debreu model of general equilibrium. Partial equilibrium (things like demand and supply curves), which you have probably learned in college, considers each market separately. General equilibrium (GE for short), on the other hand, considers the economy as a whole, taking into account the interaction of all markets. Treating the economy as a whole allows economists to draw normative predictions such as efficiency.

The abstract theory of general equilibrium with complete markets (GE for short) was pioneered by Kenneth Arrow, Gerard Debreu, Lionel McKenzie, etc., in the 1950s. GE has strong normative predictions (e.g., efficiency) but few quantitative predictions (Sonnenschein-Mantel-Debreu theory, which will be briefly touched upon). The abstract theory of general equilibrium with incomplete markets (GEI for short) was pioneered by Peter Diamond, Oliver Hart, Darrell Duffie, John Geanakoplos, etc., in the 1970-1980s. It gave up most of the normative predictions without much gain in quantitative predictions. The *abstract* theory of both GE and GEI is matured and I do not recommend writing a dissertation on these topics. However, general equilibrium is now *applied* everywhere—in macro, finance, trade, etc.—and there is a recent growing and fascinating literature that applies general equilibrium theory in specific contexts.

Due to the time constraint, this course covers only the abstract theory of general equilibrium with complete markets with a few applications in macro, finance, and trade.

Course material

There are three important components of the course material, which are

- Lecture notes,
- Slides,
- Question bank.

These are all posted at my personal website at <https://alexisakira.github.io/teaching/mathematical-economics> and will be updated regularly.

The lectures will be based on on my lecture notes, and I will mostly use slides to explain the essential points. However, I expect students to actually read the lecture notes to reinforce understanding. The question bank is optional but I highly recommend you to study some of it, as it is essentially the universe of my past exam questions (undergraduate mathematical economics, graduate core microeconomics, and graduate qualifying exam).

The following textbooks may be useful, though none of them are required.

Debreu (1959) Classic, concise description of the general equilibrium theory.

Mas-Colell et al. (1995) Standard graduate-level textbook.

Starr (2011) This book is written by UCSD Emeritus Professor Ross Starr, who has taught this course for many years before I took over. It does not contain many examples but is self-contained and pedagogic in that it proceeds from the easy and special case to the difficult and general case. An added bonus is an accessible proof of the Brouwer fixed point theorem.

²Samuelson “Economics”, 10th edition, preface.

Bewley (2007) This book is roughly at the same level as **Starr (2011)**, but contains lots of examples and exercises and thus may complement your study.

The course will use a lot of math. Thorough familiarity with Math Camp (Econ 205) material is assumed. Relevant topics are basic linear algebra (but not much), calculus, convex analysis, and constrained optimization. For the last two topics, my EME book draft³ is more than sufficient.

Preliminary course outline

1. Introduction
2. Definition of Arrow-Debreu model
3. Quasi-linear model: mathematical formulation of Bentham’s “greatest happiness principle”
4. First and second welfare theorems: mathematical formulation of Smith’s “invisible hand”
5. Existence of equilibrium (correspondences, maximum theorem, Brouwer and Kakutani fixed point theorems)
6. Computation and uniqueness of equilibrium
7. International trade
8. Finance

Assignments

There will be weekly assignments. Each assignment will be due the following week. I recommend you typeset your solution using L^AT_EX (resources are available on my website). You need to submit your assignments to Canvas in a PDF format.

Exam

Date, location, and format to be determined.

Grade

The weights are 40% assignments and 60% exam on a 0-100 scale.

Questions

The best opportunity to ask questions is *during* the class, for two reasons. First, you can resolve your question immediately (assuming—well—I know the answer). Second, your classmates are likely to have similar questions, so they can benefit from questions being resolved and I benefit by saving time. So, don’t be shy, please ask questions.

³<https://alexisakira.github.io/files/EME.pdf>

References

Truman F. Bewley. *General Equilibrium, Overlapping Generations Models, and Optimal Growth Theory*. Harvard University Press, Cambridge, MA, 2007.

Gerard Debreu. *Theory of Value*. Cowles Foundation Monograph 17. Yale University Press, New Haven, 1959.

Andreu Mas-Colell, Michael D. Whinston, and Jerry R. Green. *Microeconomic Theory*. Oxford University Press, New York, 1995.

Ross M. Starr. *General Equilibrium Theory: An Introduction*. Cambridge University Press, 2 edition, 2011.