

ECONOMICS 201B PART I
GAME THEORY
SPRING 2022
JAN 18 - MAR 3
COURSE OUTLINE

I. Contact information

- Instructor: Shachar Kariv [kariv@berkeley.edu]
- GSIs: Grady Killeen [gkilleen@berkeley.edu] and Andrew Tai [atai1@berkeley.edu]

II. Times

- Lectures: Tue and Thu 11-12:30 (Evans 60)
- Sections: Mon 8-10 (Evans 75) and 2-4 (Wheeler 124), Thu 8-10 (Social Sciences Building 54) and Fri 8-10 (Barker 110).

III. Office hours

TBD. You can e-mail us question, and we will try to respond promptly. In case you have any trouble, there are plenty opportunities for help. I would also be happy to discuss with you any issues beyond the course work, not necessarily of game-theoretic substance.

IV. General information

This part of the course presents some of the main topics in game theory and designed to develop theoretical tools. Owing to the limitation of time, the topics covered will necessarily be only a small fraction of what one could (and ideally, should) cover in this course, and thus, the course cannot provide a complete coverage of game theory. The course is intended to give PhD students a basic course in game theory.

The general style of the course is formal, and the number of theorems and proofs is relatively high. For some parts, the formal mathematical requirements are not mild. Because game-theoretic techniques are used in all fields of economics, the material taught in the course is necessary for students who want to do applied research and not specialize in pure theory. The course does not go deep enough into details for students who anticipate applying the theory in their research.

V. Prerequisites

The course is open solely to PhD students and specially qualified undergraduates. The prerequisite is Economics 201A. There is probably variance in the extent of exposure to the materials in the course, and there may be gaps that one should catch up on, in particular if she or he did not take undergraduate game theory course. Please come to see me as soon as possible if you do not feel confident that you have the necessary background.

VI. Reading material

Handouts The class will rely on handouts that will be given for each class and also be available for downloading in PDF format from the course bCourses. The notes will contain a very large amount of the material in the course, but are only necessary (and not sufficient) readings. They are work in progress and inevitably contain errors. I would appreciate being told of any errors found in the notes.

Books The only required textbook for the course is:

- Osborne M. and A. Rubinstein, *A Course in Game Theory*, MIT Press, 1994 (hereafter, OR).

The book presents the main topics of game theory at a level suitable for our purposes and emphasizes the theory's foundations as well as recent topics in game-theoretic research. It provides precise definitions and full proofs of a broad range of results. The notation and mathematical definition in the book are standard. The book can be downloaded (for free) in PDF from the authors' websites. There are also other excellent books around. The only other recommended textbook is:

- Osborne M., *Introduction to Game Theory*, Oxford University Press, 2003 (hereafter, O).

Osborne presents the main topics of game theory at an accessible level, and contains excellent review questions. Good additional references for the course are the standard graduate level microeconomic theory textbooks:

- Kreps D., *A Course in Microeconomic Theory*, Princeton University Press, 1990 (Chapters 11-15).
- Mas-Colell A., J. Green and M. Whinston, *Microeconomic Theory*, Oxford University Press, 1995 (part III).

VII. Problem sets

The course will rely heavily on problem sets. The problem sets are meant to be learning tools and thus will be not counted for the course grade. All questions in the covered chapters from OR are a required material. Additional practice questions will be given from O. Please work on the problem sets with each other. Answer keys will be distributed and available for downloading from the course bCourses site.

VIII. Exam

The requirements for a grade in the class are as follows. There will be a final exam (worth approximately 1/2 of the class grade). The exam will test your basic knowledge in the course material and the ability to apply this material to new problems. Exam will be based on problem set type questions. The exam will be held after the last lecture on Mar 3 (not during class time).