

**Advanced Microeconomics
(Economics 104)
Spring 2011
Course Description**

Contact information

- Instructor: Shachar Kariv
Office: 505 Evans Hall
E-mail: kariv@berkeley.edu
Web page: www.econ.berkeley.edu/~kariv
- GSI: Matthew Leister
E-mail: leister@berkeley.edu

Location and times

- Lectures will be held on Tue and Thu 3:30-5:00 in 180 Tan Hall, and sections will be held on Mon 9:00-10:00 in 87 Evans Hall, Wed 3:00-4:00 in 251 Dwinelle Hall, and Thu 2:00-3:00 in 51 Hildebrand Hall.

Office hours

- By appointment – Wed 1:00-3:00 PM.
- Walk-in – Mon 3:00-4:00 PM.

Please sign for only one time slot.¹ If you cannot make it to the time slot you are scheduled for, please email me or call (510-643-0712) to cancel your appointment. This will allow me to offer that slot to another student. There is no no-show/late-cancellation fee but please be considerate.

General information

- The course presents some of the main topics in game theory and designed to develop theoretical tools. 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.

¹Sign up @ <https://my.timedriver.com/WRPSQ>.

- The course is intended for students who wish to have formal study of economic reasoning with an emphasis on mastering the analytical tools. As such it relies on a higher level of abstraction and focuses on techniques of economic analysis rather than on the understanding of specific economic problems or institutions.

Prerequisites

- The prerequisite is a solid foundation in microeconomics (Econ 101A). To enroll in the course you must be familiar with the basic concepts of game theory at the 101A level. 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. Please come to see me as soon as possible if you do not feel confident that you have the necessary background.

Reading material

- The class will rely on handouts that will be given for each class and also be available for downloading in PDF format from my web page. The notes will contain a very large amount of the material in the course, but are only necessary (and not sufficient) readings. The notes are (always) work in-progress and inevitably contain errors. I would appreciate being told of any errors found in the notes. The following texts are very useful:
 1. Osborne M., **Introduction to Game Theory**, Oxford University Press, 2003 ((hereafter, O).
 2. Osborne M. and A. Rubinstein, **A Course in Game Theory**, MIT Press, 1994 (hereafter, OR).
- O presents the main topics of game theory at an accessible level suitable for undergraduate courses, and gives concrete understanding. OR 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 broad range of results. The notation and mathematical definition in the books are standard. Except for O and OR, I do not particularly suggest any other books unless otherwise announced in class (or you are really struggling with the material). Each class a specific references

will be given. All the books are available at any of the on-line booksellers.

- There are, however, also many more excellent books around. Two other game theory textbooks are:
 1. Gibbons R., **Game Theory for Applied Economists**, Princeton University Press, 1992.
 2. Myerson R., **Game Theory: Analysis of Conflict**, Harvard University Press, 1997.

Problem sets

- The course will rely heavily on problem sets. Each week a problem set will be assigned and will generally be due the following week. The problem sets are meant to be learning tools and thus will be not counted for the course grade. All questions in the problem sets are a required material.
- Many of the questions will be assigned from O and OR. Problem that will be labeled with a star are more challenging and often used to state subsidiary results or require mathematical skills. Please work on the problem sets with each other. Answer keys will be distributed but will not be available for downloading from the course web page.

Exams

- The requirements for a grade in the class are as follows: There will be a mid-term exam and a final exam (each worth approximately 1/2 of the class grade). The exams will test your basic knowledge in the course material and the ability to apply this material to new problems. Exams will be closed book and based on problem set type questions. The midterm examinations will be held on Tue Mar 8 during class time. The final examination will take place during all university examination week. Further details will be given later in the semester.

Outline

- The course covers non-cooperative game theoretic models, which are those in which the set of actions of individual players is the primitive of the analysis (by contrast to cooperative models in

which the sets of joint actions of groups of players are primitives). A lot of game theory, perhaps most of the developments from the 1950s and 1960s, concerns cooperative game theory, but more recently the emphasis has shifted towards non-cooperative game theory such that it became a main bag of tools for (micro) economists.

- The course concentrates exclusively on non-cooperative game, and, at that, mainly on equilibrium concepts. The course is divided to three parts, each consists of about six weeks: (i) strategic and extensive games with perfect information, (ii) strategic and extensive games with imperfect information, and (iii) optional topics, variations and extensions. The dimension on which the division of the course is based is as follows. Under perfect information, players are assumed to be able to observe all the decisions that have previously been made (they have perfect information about the entire history of actions that have been taken before them). Under imperfect information, by contrast, players may observe the actions of *some* other agents in the economy but they do not observe the actions of *all* the other players.
- A strategic game is a model in which each player chooses his plan of action once and for all, and these choices are made simultaneously. An extensive game, by contrast, is a model in which there is a specified an order of events and each player can consider her plan of action whenever it is her turn to make a decision. Repeated games is an interesting class of extensive form games which examine the logic of long term interaction and explain phenomena such as cooperation, threat and revenge. Bargaining games also use the model of an extensive form game (earlier work uses an axiomatic approach) to study situations in which people's interests conflict. The optional topic part of the course will cover some more recent developments in game theory.
- The topics in strategic games, or in the language of von-Neumann and Morgenstern (1944), a normal form game include: Nash equilibrium, which is one of the most basic concepts of game theory, existence of Nash equilibrium, mixed strategies Nash equilibrium, correlated equilibrium, which is closely related to Nash equilibrium, and evolutionary equilibrium. The part on extensive games first looks at the basic issues involved in moving from strategic form to extensive form game. Then, we will study solution con-

cepts for the games posed in this part, concentrating on subgame perfect equilibrium in games with perfect information (everyone is assumed to be informed of all the events that have already occurred), perfect Bayesian equilibrium in games with observable actions and sequential equilibrium (and its refinements) in games with imperfect information.