# ECO2030: Microeconomic Theory II
## Fall 2018

Instructor: Martin J. Osborne

This module of PhD micro is designed (a) to equip students who do not intend to pursue research in economic theory with the main game-theoretic tools used in contemporary economics, and (b) to provide students who plan to pursue research in economic theory a solid grounding in game theory.

The text is

Martin J. Osborne and Ariel Rubinstein, A course in game theory (MIT Press, 1994)

(The website for the book has a list of typos and other information you may find useful.)

If you have no background in game theory, you may also find useful my book An introduction to game theory (Oxford University Press, New York, 2004).

The course covers the following topics.

- Nash equilibrium (Ch. 2 through 2.5)
- Mixed strategy equilibrium (Ch. 3 through 3.3)
- Bayesian games (2.6)
- Extensive games with perfect information (Ch. 6)
- Bargaining games (Chs. 7 and 15)
- Repeated games (Ch. 8)

**Problem sets**

The only way to learn analytical material is to do problems! I will assign a Problem Set after each class. Each Problem Set will be due at the start of the next Tuesday class. (Thus two Problem Sets will be due every Tuesday except October 23, one from the previous Tuesday and one from the previous Thursday.) Your solutions to each Problem Set will be assigned a grade of 0, 1 or 2. Discussing the problems with others is encouraged, but the work you submit must be entirely your own. (In particular, copying answers from another person's solutions is not acceptable.)

It is essential that you keep up with the Problem Sets, so late submissions will not be accepted. I will make solutions to each Problem Set available after the class in which it is due.

**Tutorials**

The tutorials are an integral part of the course. In each tutorial, the TA will help you to solve a small number of problems. He will *not* tell you the solutions, but will lead you to construct solutions yourselves. You should be ready to participate actively. I will post a file of the questions for each tutorial by noon of the previous day; please take a copy (either paper or electronic) to the tutorial. After each tutorial, I will post solutions.

**Past exams**

Note that the material covered in the course varies a bit from year to year.

- Winter 2018: without solutions, with solutions
- Winter 2016: without solutions, with solutions
- Winter 2014: without solutions, with solutions
- Winter 2013: without solutions, with solutions
- Winter 2012: without solutions, with solutions
- Winter 2011: without solutions, with solutions
- Winter 2010: without solutions, with solutions
- Winter 2009: without solutions, with solutions
- Winter 2007: without solutions, with solutions
- Winter 2006: without solutions, with solutions
- Winter 2005 [Solutions]
- Winter 2004 [Solutions]
- Winter 2003 [Solutions]
- Winter 2002 [Solutions]

## Class schedule

The class meets TR9-11 (except October 23, when the class meets 1-3) in WW120. The tutorial session, led by Ruizhi Zhu, meets R2-4 in WW120 starting on October 25.

I will post slides for each class at latest the day before the class. The *compact* versions are best for printing, the *complete* ones best for viewing on a screen.

Class 1 (October 23)
    Nash equilibrium (Sections 2.1–2.3 of "A Course in Game Theory").
    Slides: complete (664KB, 2018-10-22 15:26:21) | compact (177KB, 2018-10-22 15:26:32)
    Problems for Tutorial 1 (35KB, 2018-10-22 15:27:12)
    Problem Set 1 (40KB, 2018-10-22 15:26:45)
Class 2 (October 25)
    Nash equilibrium continued (Section 2.4); introduction to mixed strategy Nash equilibrium (Section 3.1). [Section 2.5 will be omitted; I will return to the material in Section 2.6.]
Class 3 (October 30)
    Mixed strategy Nash equilibrium continued. [Read Section 3.2. Sections 3.3 and 3.4 will be omitted.] Rationalizability and iterated elimination of strictly dominated actions (Section 4.2). Introduction to Bayesian games (Section 2.6).
Class 4 (November 1)
    Bayesian games continued (Section 2.6); purification of mixed strategy equilbria (Sections 3.2.3 and 3.2.4)
Class 5 (November 13)
    Auctions; juries
Class 6 (November 15)
    Extensive games with perfect information: strategies, Nash equilibrium, subgame perfect equilibrium, the one deviation property (Sections 6.1, 6.2).
Class 7 (November 20)
    Extensive games with perfect information: backward induction; Stackelberg games; ultimatum game; holdup game; adding chance moves and simultaneous moves (Section 6.3); Chain-Store game (Section 6.5.1).
Class 8 (November 22)

Bargaining theory: bargaining game of alternating offers (Chapter 7, omitting the proof of uniqueness in Proposition 122.1).

Class 9 (November 27)

Nash bargaining solution (Sections 15.1, 15.2 (using the approach on pp. 308–309), 15.3). Relation between Nash solution and subgame perfect equilibrium of bargaining game of alternating offers (Section 15.4). Introduction to repeated games.

Class 10 (November 29)

Repeated games (Sections 8.1–8.5 (preferences with discounting only)).

Class 11 (December 4)

Repeated games: Subgame perfect equilibrium (Section 8.8), finitely repeated games (Section 8.10).

Class 12 (December 6)

Extensive games with imperfect information: Introduction (Sections 11.1, 11.4, 11.5, 12.1–12.3).

## Evaluation

The final exam for this module will be scheduled by the Graduate Office in the department.

Your mark for the module will be 90% of your percentage mark on the final exam plus 10% of your percentage mark on the problem sets.

Your grade in ECO2030 will be the determined by the average of your marks in this module and the second module.