Econ 485: Game Theory with Applications to Economics

Spring 2022

Course synopsis: Econ 485 is an upper division undergraduate course in microeconomic theory. The goal is to give a rigorous introduction to the main concepts of game theory: strategy, solution concepts for games, strategic behavior, commitment, cooperation, and incentives. The course emphasizes the applications of the theory as much as the theory itself. Most of the applications will focus on economics, for example: oligopoly theory, or contract theory.

Prerequisite: either MATH 112, MATH 124, MATH 127, MATH 134, or MATH 145; 2.0 in ECON 300. However, a few spots are usually reserved for non-economics majors.

Learning goals: at the end of the course, the students should be able to

- build games that represent common economic situations.

- understand standard economic models based on simple game theory

- apply standard solution concepts to static games, dynamic games, repeated games and games of incomplete information.

Textbooks

- **Game Theory for Applied Economists**, by Robert Gibbons, Princeton University Press, 1992 (required).

- **The Art of Strategy: A Game Theorist's Guide to Success in Business and Life**, by Avinash Dixit and Barry Nalebuff, Norton, 2010 (optional). Lots of applications. (see also Thinking Strategically, by Avinash Dixit and Barry Nalebuff, Norton, 1993).

Other textbooks:

- Game theory: An Introduction, by Steve Tadelis, Princeton University Press, 2013. A very good alternative to Gibbons.

- Games of Strategy, by A. Dixit, S. Skeath and D. McAdams, Norton, 2021 (5th Ed.). A bit "chatty."

- Game Theory, by Fudenberg and Tirole, MIT Press, 1991. This is the "bible" for game theorists but sometimes challenging to follow.

- Playing for Real, by Ken Binmore, Oxford Press, 2007. A very good book, free on line at UW Libraries.

- Games, Strategies, and Decision Making, Joseph E. Harrington, Jr., Worth Publishing, 2009. Lots of examples from industrial organization.

Course requirements

Grades are based on quizzes, final, non-graded problem sets (see below) and class participation.

There will 4 quizzes and a final. Each test is cumulative.

o   The first quiz, worth 10% of the grade, will be on Wednesday April 13.

o   The second quiz, worth 10% of the grade, will be on Wednesday April 20.

o   The third quiz, worth 20% of the grade, will be on Monday May 2.

o   The fourth quiz, worth 20% of the grade, will be on Wednesday May 18.

o   The final, worth 25% of the grade, will be on Thursday June 9 at 12:30pm.

You will be allowed to discard the quiz where you did the worst and report the weight to the quiz where you did the best. You cannot discard the final exam.

(Those dates are subject to change)

- Your class participation will count for 10% of your grade. For the lectures on Zoom, you will be asked to turn on your camera.

- The problem sets will also count for 5%. Note that the problem sets will not be graded. The problem sets allow you to check whether you are making good progress in understanding the material. To provide some incentive to do them regularly, I will collect your answers (on canvas) and keep track of who turn them in to assign the 5% of the grade. To receive credit, you must make a good faith attempt to solve ALL problems on the problem sets. This record may also be used in cases of "close decisions" regarding grades.

- The Economics department has a policy on academic conduct and academic honesty. Please be familiar with it: http://econ.washington.edu/undergrad/academic_conduct/

Readings (from Gibbons)

- Lecture 1 (3/28):   pp. 1-7 (strict dominance)

- Lecture 2 (3/30):   pp. 8-12 (Nash equilibrium) + pp. 14-21 (Cournot)

- Lecture 3 (4/4):   pp. 21-22 (Bertrand) +   pp. 29-32 (mixed strategy)

- Lectures 4 (4/6):   pp. 29-32 (mixed strategy)

- Lecture 5 (4/11):   pp.55-57 and 115-122 (extensive form)

- Lecture 6 (4/13):   **Quiz 1 (Wednesday April 13) +** pp.57-64 (backward induction and Stackelberg)

- Lecture 7 (4/18):   pp.57-64 (backward induction and Stackelberg) + pp.71-79 (subgame perfection)

- Lecture 8 (4/20):   **Quiz 2 (Wednesday April 20) +** pp.71-79 (subgame perfection)

- Lecture 9 (4/25):   pp.71-79 (subgame perfection)

- Lectures 10 (4/27):   pp. 82-107 (repeated games)

- Lecture 11 (5/2):   **Quiz 3 (Monday May 2)**

- Lectures 12-13 (5/4+9):   pp. 82-107 (repeated games)

- Lectures 14-15 (5/11+16): pp. 143-154 (static games of incomplete information)

- Lecture 16 (5/18):   **Quiz 4 (Wednesday May 18)**

- Lecture 17 (5/23):   pp. 173-183 (dynamic games of incomplete information)

- Lecture 18 (5/26):   pp. 183-190 (signaling games)

- Lecture 19 (5/30):   **Holiday (Monday May 30)**

- Lecture 20 (6/1):   pp. 233-239 (refinement of PBE)