

McGill University  
Department of Economics

## Game Theory (ECON546)

Winter 2019

### Instructor Contact Information:

Dr. Lingling Zhang

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Office: LEA434

Office hours: Mondays 12:30pm-2:30pm, Fridays 2:00pm-3:00pm or by appointment

### Regular classes:

**Times:** WF8:35am-9:55am

**Room:** BURN 1B36

**Teaching Assistant:** Mathieu T-Blais

**TA office hours:** TBA

**Course Overview:** This course studies situations where decision makers interact and their decisions affect each other's welfare. To make choices in such situation, each decision maker has to consider his/her expectation about the behavior of others. Game theory has a very general scope, encompassing questions that are basic not only to economics but also to other social sciences. Game theory is now part of almost every economist's and many social scientists' tool-kit. The objective of this course is to introduce to the students both the fundamentals of game theory and its applications to study of strategic behavior in social and economic environments.

**Textbook:** *An Introduction to Game Theory* by Martin J. Osborne, Oxford University Press, 2004.

### Other books:

Kenneth Binmore, *Fun and Games: A Text on Game Theory*, D.C. Heath and Company, 1992

Robert Gibbons, *Game Theory for Applied Economists*, Princeton University Press, 1992.

### Evaluation:

Participation and attendance.....10%

Midterm Examination (Max {Exam 1, Exam 2}) .....25%

Assignments (5 assignments) .....15%

Final examination .....50%

**Examinations:** There will be three exams.

**Exam 1 is scheduled on Feb. 8<sup>th</sup>, 2019**

**Exam 2 is scheduled on March 15<sup>th</sup> 2019**

**Final exam: TBA**

All examinations will be closed-note, closed book.

There will be a supplemental examination which will be worth 100% of your final grade.

McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see [www.mcgill.ca/students/srr/honest/](http://www.mcgill.ca/students/srr/honest/) for more information).

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

**Student Course Evaluations:** There will be a Mid-Course Evaluation designed by the instructor and an online Course Evaluation on Minerva which will be available by the end of the semester. Your feedback is important!

**Assignments:** There will be 5 assignments. Each assignment has 30 points in total. Assignments will be posted on Mycourses.

**Submission of work and late policy:** Please write your work in a booklet and submit it in class or drop by my office hours. There will be a due date for each assignment and will be announced in class and posted on Mycourses. Late submissions will lose points and the policy is given as follow:

1. For late submissions made within 24 hours of the due date and time, 5 points will be deducted.
2. 24 hours after the due date, no assignment will be accepted.

**Attendance:** Attendance and participation are worth 10% of your final grade. I will take attendance at every class. There will be 26 lectures. You will earn 1 point each time you attend class (except the exam dates), for a maximum of 20 points. Therefore, you could miss a few classes without affecting your attendance score. However, it's your responsibility to submit all assignments on time.

### **Course Outline**

1. Static Games of Complete Information<sup>1</sup> (Chapter 2-4)
  - a. Normal-Form Representation of Games (Strategic Games)
  - b. Nash Equilibrium

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<sup>1</sup> Complete information: each player's payoff function is common knowledge among all the players.

- c. Dominated actions
  - d. Cournot's model of Oligopoly
  - e. Mixed Strategy Equilibrium
- 2. Dynamic Games of Complete Information (Chapter 5-7)
  - a. Dynamic Games (extensive games) with Perfect Information<sup>2</sup>
  - b. Nash Equilibrium
  - c. Subgame Perfect Equilibrium
  - d. Backward Induction
  - e. Stackelberg's model of duopoly
  - f. Dynamic Games with imperfect Information
  - g. Bank Runs
  - h. Tariff and Imperfect International Competition
- 3. Coalitional Games and the core (Chapter 8)
  - a. Definitions
  - b. Voting Games
  - c. Matching Games
- 4. Repeated Games (Chapter 14)
  - a. Two-Stage Repeated Games
  - b. Finitely Repeated Prisoner's Dilemma
  - c. Infinitely Repeated Prisoner's Dilemma
  - d. Strategies
  - e. Subgame Perfect Equilibria
  - f. Collusion between Cournot Duopolists
  - g. Time-Consistent Monetary Policy
- 5. Bargaining (Chapter 16)
  - a. Bargaining as a dynamic game
  - b. Nash Bargaining Solutions
  - c. Dividing the Dollar
  - d. Bargaining Models
- 6. Games of Incomplete Information (Chapter 9 & 10)
  - a. Bayesian Games
  - b. Strategies
  - c. Nash Equilibrium
  - d. Signaling games
  - e. Job-Market Signaling
  - f. Education as a signal of ability
  - g. Cheap-Talk Games

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<sup>2</sup> Perfect information: at each move of the game, the player with the move knows the full history of the play the game thus far.