GR5212: Microeconomic Analysis II Part I – Game Theory

Spring 2017

Columbia University

Contact Details

Professor: Mark Dean

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Classes: 4.10 to 5.25 on Mondays and Wednesdays in IAB 410

Office Hours: 10.00 to 12.00 Wednesdays, or by appointment (Room 1031 IAB)

Website: http://www.columbia.edu/~md3405

CourseWorks: https://courseworks.columbia.edu/portal/site/ECONG5212_001_2017_1

Teaching Assistant: RC Lim

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Recitation: 6.00pm to 7.00pm Tuesdays, Kent 413

Office Hours: 4.30pm – 5.30pm on Tuesdays in the Lehman Library Group Study Area

Course Description

G5212 is the second semester course in the microeconomics sequence for the MA program. It consists of two halves: Game Theory (first half) and Information Economics (second half), both of which will be taught by me.

Game Theory, also known as Multi-person Decision Theory, studies situations in which outcomes and payoffs to agents depend on the behavior of every agent. Game theory is used to study problems of coordination, cooperation and conflict resolution. It has revolutionized economics since its official birth in 1944 with publication of "Theory of Games and Economic Behavior" by mathematician John von Neumann and economist Oskar Morgenstern. Game theory has applications in several fields, such as economics, business, political science, law, evolutionary biology, and computer science.

The first half of the course focuses mainly on "non-cooperative game theory", a study of strategic situations in which individuals act independently.

Prerequisites

The formal prerequisite to this course is G5211.

Assessment

Assessment for the first part of the course will consist of four elements: A midterm exam (20%), homeworks (20%) and a final (60%)

Homeworks

There will be 4 problem sets. You are encouraged to work with your classmates in solving them, but I request each of you to write up and turn in your own answers. Solutions to the problems will be posted on the course website. Each homework will be graded from $0 - 10$. Late homeworks will not be accepted or graded.

Midterm and Final

In addition to homeworks, there will be one midterm exam (for the first half of the course – i.e. a 'quarter term'), and one final exam. The midterm will take place in class on 15th Feb and will cover material up to and including 8th Feb. The final is currently scheduled to take place in an extended class on the 8th March and will cover materiel from the whole course.

Course Materials

By and large, the course will be based on slides/lecture notes, which I will make available online. For this part of the course, there is one required text – "Microeconomic Theory", by Mas-Colell et al. (which I think you already have). Other useful texts include

- Osborne and Rubinstein (1994). *A Course in Game Theory*

- Gibbons (1992), *Game Theory for Applied Economists*

- Fudenberg and Tirole (1991), *Game Theory*

Course Policies

Regrading

Corrected assignments and exams will be available in the class mailbox at most seven days after the deadline or the date of the test. Students then have at most seven days to introduce a complaint regarding a grade (that means exactly two weeks after the deadline or the date of the test or assignment submission). I deal personally with all complaints. Requests must be placed in my mailbox on the 11th floor of IAB. I expect them to be specific and motivated. This means that you must include a copy of the question(s) that need(s) to be re-graded, a copy of your answer(s) and the relevant section of the answer key, and an explanation as to why the question(s) need(s) to be re-graded. If I find the request motivated, then I will re-grade the question(s) myself (which may possibly result in a lower grade if I find it justified). My decision is final. Please do not use either my or the TAs' office hours to complain about

grades.

Academic Dishonesty

As members of an academic community, each of us has a responsibility to participate in scholarly discourse and research in a manner characterized by intellectual honesty and scholarly integrity, and cheating on exams is a very serious violation. Any suspected case of cheating will be reported to the university, and students who breach their intellectual responsibility in this regard should anticipate being asked to leave Columbia.

Class Conduct

Cell phone use is not allowed. Laptops are fine for taking notes, but please respect your classmates and instructor by limiting yourself to class-related activities. Though you may be a phenomenal multi-tasker, using a laptop for purposes other than taking notes is distracting to those around you

Topics

1. Introduction **(MWG Chapter 7)**

2. Solving Strategic Form Games

   a. Dominance **(MWG Chapter 8B)**

   b. Rationalizability **(MWG Chapter 8C)**

   c. Nash Equilibrium **(MWG Chapter 8D)**

   d. Refinements

   e. Experimental Evidence

3. Solving Extensive Form (i.e. sequential) Games

   a. Subgame Perfect Nash Equilibrium and Backward Induction **(MWG Chapter 9B)**

   b. Application: Bargaining **(MWG Chapter 9 Appendix A)**

   c. Repeated Games

4. Solving Games of Incomplete Information

   a. Strategic form games: Bayes Nash Equilibrium **(MWG Chapter 8E)**

   b. Application: Auctions **(MWG Chapter 23B)**

   c. Extensive form games: (Weak) Perfect Bayes Nash Equilibrium

   d. Refinements