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## Syllabus EC812B Microeconomics II

Last Updated on January 8, 2020

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This is the second half of the first-year graduate course in Microeconomics. Similar to the first half of this sequence that you had in the fall (EC812A), the goal of this course is to offer you a rigorous introduction to the key ideas in microeconomics and provide you the mathematical and modeling tools that are essential to pursue independent research in economics.

However, there is one key contrast between this course and its prequel. EC812A concludes by discussing that, under certain conditions, perfectly competitive market is the most efficient social institution for allocation of resources. In this course, we complement this finding by asking what happens if these conditions are relaxed. That is, how well would a market perform if there is market power, information asymmetries between buyers and sellers, or externalities? Furthermore, how would we improve the allocation of resources when the market does not perform well?

But in order to study these issues, first we need to develop a new tool: game theory. We will spend at least a third of the course in developing the key ideas of game theory and then apply them to explore several issues of market imperfections.

**Instructor.** My name is Hanzhe Zhang. My office hour is by appointment. For any questions, email me: [hanzhe@msu.edu](mailto:hanzhe@msu.edu), or simply stop by my office anytime. Lectures are Tuesdays and Thursdays.

**Teaching Assistants.** The teaching assistants are Su Hwan Chung (email: [chungsu@msu.edu](mailto:chungsu@msu.edu), office hour: 3-5pm on Thursdays in Old Botany), who is primarily in charge of the TA sessions, and Kit Zhou (email: [zhoukath@msu.edu](mailto:zhoukath@msu.edu), office hour: 3-6pm on Wednesdays in Main Library 3rd Floor), who is primarily in charge of grading. You can also email your TAs for an appointment if you cannot meet them during their office hours. The TAs will also hold recitations on Fridays 10:20am-12:20pm in 106B Berkey Hall. You are strongly encouraged to attend these sessions regularly. The purpose of these sessions is to present you the opportunity to ask questions on the homework solutions that you may have trouble following or past prelim questions. If needed, the TAs may also cover supplemental course materials in these sessions.

**Textbooks.** The primary textbook for this course is:

- Mas-Colell, Andreu, Michael D. Whinston, and Jerry R. Green, *Microeconomic Theory*, Oxford University Press, New York, 1995. (MWG)

For the game theory section, you may also consider buying:

- Gibbons, Robert, *Game Theory for Applied Economists*, Princeton University Press, New York, 1992. (G)

This is a classic text in game theory and offers a less technical and more applied discussion. If you find the game theory part in MWG too terse to follow, you can use this book as a primer. Other references worth checking out are:

- Jehle, Geoffrey A., and Philip J. Reny, *Advanced Microeconomic Theory*, Pearson, 2011. (JR)  
Chapter 7 covers game theory, Chapter 8 covers information economics, and Chapter 9 covers mechanism design.
- Mailath, George, *Modeling Strategic Behavior: A Graduate Introduction to Game Theory and Mechanism Design*.

**Grading.** Grading will be based on problem sets and exams. The problem sets count for 20% of the grade. Each of the four exams counts for 20% of the grade.

**Problem Sets.** The problem sets are turned in individually. You may consult any material and any classmate. I strongly encourage you to work in groups since the exchange of ideas between group members offers invaluable learning experience. It will also help you better cope with the workload.

**Exams.** All exams will be closed book. They are intended to mimic the actual prelim setting and contents. All exams are mandatory and may only be missed because of an acceptable documented reason. If you foresee such a difficulty, please make every attempt to discuss with me prior to the exam. Unexcused exams receive a zero.

**Remarks.** As you could see below, we will be covering a considerable amount of material, most of which are conceptually deep and analytically challenging. The key to master this material is to make sure that you consistently work hard and stay up-to-speed with the class lectures. Doing the problem sets will help you a lot in this regard. Do not let backlog or the problems pile up. There is very little slack time built into this syllabus. If you allow a backlog to build up, you may find it difficult to catch up!

Also, we will heavily emphasize the rigor of our analysis. So, I expect you to be very comfortable with the mathematical toolkit developed in EC812A. MWG's mathematical appendix is also a very useful resource if you are stuck with math issues.

## Course Outline

| Class | Date                | Content   | Source       |
|-------|---------------------|---|--------------|
| 1     | Tuesday, 1/07       | Normal Form Representatino of a Game                  | MWG 7, G 1   |
| 2     | Thursday, 1/09      | Extensive Form Representation of a Game               | MWG 7, G 1   |
| 3     | Tuesday, 1/14       | Dominant and Dominated Strategies                     | MWG 8, G 1   |
| 4     | Thursday, 1/16      | Nash Equilibrium                                      | MWG 8, G 1   |
| 5     | Tuesday, 1/21       | Trembling Hand Perfect Nash Equilibrium               | MWG 8        |
| 6     | Thursday, 1/23      | Bayesian Nash Equilibrium                             | MWG 8, G 3   |
| 7     | Tuesday, 1/28       | Monopoly; Oligopoly: Bertrand and Cournot Models      | MWG 12BC, G2 |
| 8     | <b>Friday, 1/31</b> | <b>Exam 1: Game Theory</b>                            |              |
| 9     | Tuesday, 2/04       | Subgame Perfect Nash Equilibrium                      | MWG 9, G 2   |
| 10    | Thursday, 2/06      | Weak Perfect Bayesian Equilibrium                     | MWG 9, G 4   |
| 11    | Tuesday, 2/11       | Sequential Equilibrium                                | MWG 9, G 4   |
| 12    | Thursday, 2/13      | Oligopoly: Stackelberg Model                          | MWG 12D, G 2 |
| 13    | Tuesday, 2/18       | Oligopoly: Finitely Repeated Games                    | MWG 12D, G 2 |
| 14    | Thursday, 2/20      | Oligopoly: Infinitely Repeated Games and Collusion    | MWG 12D, G 2 |
| 15    | Tuesday, 2/25       | Review Session  |              |
| 16    | <b>Friday, 2/28</b> | <b>Exam 2: Market Power</b>                           |              |
| 17    | Tuesday, 3/10       | Adverse Selection                                     | MWG 13B      |
| 18    | Thursday, 3/12      | Signaling   | MWG 13B, G 4 |
| 19    | Tuesday, 3/17       | Signaling and Belief Refinement                       | MWG 13B, G 4 |
| 20    | Thursday, 3/19      | Monopolistic Screening                                | MWG 14C      |
| 21    | Tuesday, 3/24       | Moral Hazard  | MWG 14B      |
| 22    | <b>Friday, 3/27</b> | <b>Exam 3: Information Economics</b>                  |              |
| 23    | Tuesday, 3/31       | Mechanism Design: Dominant Strategy Implementation    | MWG 23B      |
| 24    | Thursday, 4/02      | Mechanism Design: Bayesian Implementation             | MWG 23C      |
| 25    | Tuesday, 4/07       | Mechanism Design: Quasilinear Bayesian Implementation | MWG 23D      |
| 26    | Thursday, 4/09      | Externalities: Pigouvian Tax and Property Rights      | MWG 11B      |
| 27    | Tuesday, 4/14       | Public Goods  | MWG 11C      |
| 28    | Thursday, 4/16      | Public Goods and VCG Mechanism                        | MWG 23C      |
| 29    | Tuesday, 4/21       | Review Session  |              |
| 30    | <b>Friday, 4/24</b> | <b>Exam 4: Mechanism Design and Externalities</b>     |              |