Spring 2021

Economics 703: Microeconomic Theory II

Modeling Strategic Behavior:
Game Theory and Mechanism Design

Preliminary and subject to change
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This is a graduate introduction to game theory and mechanism design. While it is designed for first year Economics Ph.D. students, others are welcome. While I provide more background verbally on many of the examples, I assume that students have seen some undergraduate game theory (such as covered in Osborne, 2004, Tadelis, 2013, and Watson, 2013). In addition, some exposure to intermediate microeconomics and decision making under uncertainty is helpful.

Logistic Overview

1. **Lectures** will be delivered synchronously via Zoom, during the regularly scheduled class time (Tuesdays and Thursdays, 1:30pm-3:00pm). The lectures will be recorded and available in Canvas. The Zoom details can be accessed from Canvas.

2. **Recitations** will be delivered synchronously via Zoom, during their regularly scheduled time.

3. **Office hours** will be conducted via Zoom, and are open to anyone, and you can simply "drop in."

4. **Problem sets** will be assigned weekly.

5. **The final grade** will be determined by two midterms (25%) and the final exam (50%).

6. **The midterm exams** will be given around the one third and two third point (the precise timing tba). Each will be a 24-hour open-book take-home exam.

7. **The final exam** will be given at the scheduled time. The final will be a 24-hour open-book take-home exam.

Logistic Details

1. **Canvas** is used to post announcements, slides, homework assignments, homework solutions, additional handouts, and other important materials. You are responsible for regularly checking, downloading and reading materials posted on the site, as they form an integral part of the class.

2. **Piazza** will be used for all class discussions and questions. Any questions to do with class material and organization should be posted there. Post all content-related questions about problem sets, lecture, and the course on piazza. This is a great way to collaborate with classmates. The TA and I will monitor, and occasionally post, on this forum. To enroll in piazza for this class, follow the following link: `https://piazza.com/upenn/spring2021/srs_econ7030012021a`.

3. **Email.** Use for correspondence that is not appropriate for piazza. *Include Econ 703 in the subject line.*

4. **Problem sets** will be assigned every week. They are an important part of the course; you should spend a great deal of time and effort on them. You are encouraged to work in groups on the problem sets. However, before meeting in the group you should have attempted each question—groups work well when they allow you to learn from each other, they do *not* work well when they are used to facilitate a division of labor (you learn nothing from copying another student's answer; a similar comment applies to copying from previous years' solutions).

5. **Regrades**: Any request for a regrade must be in writing with a written explanation of the issue. The entire exam is regraded, and there is no guarantee that the grade will not go down (this does not apply if the issue is a mistake in totaling the final score). While we make every effort to avoid errors, errors do occasionally creep in. Without an "all regrade" policy, a bias towards only correcting errors in one direction is introduced.

Course Material

1. A preliminary version of the lecture slides is posted on Canvas. These will be updated.

2. The structure of the course follows my text, Mailath (2019). While the book is available from Amazon, a cheaper (and slightly updated) alternative is the *free* PDF available on my website at `http://web.sas.upenn.edu/gmailath/books/modeling-strategic-behavior/`.

   Three other books you may find useful:

   (a) Mas-Colell, Whinston, and Green (1995). For many years the standard first year graduate micro text.

   (b) Kreps (1990a). While a little older (and perhaps a little idiosyncratic, though no more so than Mailath, 2019), this book is another excellent first year graduate micro text with extensive discussion of the strengths and weaknesses of game theoretic modeling. (Some of the best material from Kreps (1990a) is in Kreps (1990b).)

   (c) Jehle and Reny (2011). A little less technical than the other two books. If you decide to purchase this online, make sure you buy the **third edition**, which is significantly different and improved from the second edition.

3. Review problems are posted on Canvas.

Tentative Course Outline

The current course schedule with readings will be available on canvas.

1. Normal and Extensive Form Games

2. A First Look at Equilibrium

3. Games with Nature and Games of Incomplete Information

4. Existence of Nash Equilibrium

5. Dynamic Games, Sequential Rationality, Perfect Bayesian and Sequential Equilibria

6. Signaling

7. Repeated Games

8. Topics in Dynamic Games (Markov Perfect Equilibrium, the Coase conjecture, and/or Reputations)

9. Bargaining

10. Mechanism Design, Revelation Principle and Revenue Equivalence

11. Principal-Agent Settings with Hidden Action

References

JEHLE, G. A., AND P. J. RENY (2011): *Advanced Microeconomic Theory*. Pearson Education, third edn.

KREPS, D. M. (1990a): *A Course in Microeconomic Theory*. Princeton University Press, Princeton, NJ.

——— (1990b): *Game Theory and Economic Modelling*. Oxford University Press, Oxford.

MAILATH, G. J. (2019): *Modeling Strategic Behavior: A Graduate Introduction to Game Theory and Mechanism Design*. World Scientific Press.

MAS-COLELL, A., M. D. WHINSTON, AND J. GREEN (1995): *Microeconomic Theory*. Oxford University Press, New York, NY.

OSBORNE, M. J. (2004): *An Introduction to Game Theory*. Oxford University Press, New York.

TADELIS, S. (2013): *Game Theory: An Introduction*. Princeton University Press.

WATSON, J. (2013): *Strategy: An Introduction to Game Theory*. WW Norton.