Syllabus: Advanced Microeconomic Theory II
Spring 2018

Class time and place: Monday 3:10–6:00pm in No. 3 Teaching Building 103.

Blackboard: Course materials, such as lecture slides, problem sets and solutions, will be available on Blackboard (http://course.pku.edu.cn).

Instructor: Ju Hu, Yiyuan 510, juhu@nsd.pku.edu.cn;
office hours: Thursday 3:30–5:30pm, or by appointment.

Description: This is the second course of the microeconomic theory sequence. It is graduate level introduction to general equilibrium theory and game theory. The goal of this course is to introduce students to the basic theoretical models and techniques, which are widely used in modern economics, for analyzing general equilibrium and strategic interactions. After this course, everybody will have a solid background for either applying the techniques to develop and study your own microeconomic models or diving further into more advanced theories.

Prerequisites: Students must have taken Advanced Microeconomic Theory I and Mathematical Economics.

Problem sets: Problem sets will be assigned every week. They are an integrated part of the course. You should spend a great deal of time and effort on them. You will not do well on the exams if you do not master them. You are encouraged to work in groups, but not by dividing up the questions. Write them up individually.

Exams: There will be a midterm exam on April 17 and a final exam. Your grade will be based 40% on the midterm and 60% on the final. Your problem sets will count in marginal cases.

Teaching Assistant: Chaoya Feng, fengchaoya@pku.edu.cn. Review sessions are scheduled on every Tuesday 6:40–8:30pm in No. 3 Teaching Building 101.

Texts: The primary texts will be Mas-Colell, Whinston and Green (1995)[MWG] and my lecture notes whose game theory part is based on George Mailath's lecture notes. I suggest that you print out the lecture notes and bring a copy to class. This will facilitate notes taking and navigation between pages.

In addition, there are other texts that might be helpful. Jehle and Reny (2011)[JR] is another good first year graduate micro text which is at a slightly lower level than MWG and easier to digest. Fudenberg and Tirole (1991) is *the* encyclopedic graduate noncooperative game theory text. It covers much more than what we will discuss in this course. If you need more exercises beyond those in your problem sets, you can do the problems in the relevant chapters (e.g. Ch 1,3 and 6) in this book. Osborne and Rubinstein (1994) is another graduate text in game theory which covers both noncooperative and cooperative game theory. It discusses more theory than applications. Finally, there are two math books that might be useful references at hand: Ok (2007) and Vohra (2004).

Tentative course outline:

- General equilibrium (MWG 15.B-15.D, 16.B-16.D, 17.B-17.C, 19.B-19.F; JR 5.1-5.4)
  - pure exchange economies
  - production economies
  - general equilibrium with uncertainty
  - general equilibrium with incomplete markets
- Normal and extensive form games (MWG 7.B-7.D, 8.B, 8.D, 9.B; JR 7.1, 7.2.1-7.2.2, 7.3.1-7.3.6)
  - definitions and examples
  - strategic dominance
  - Nash equilibrium
  - backward induction, non-credible threats and subgame perfection
- Mixed strategies (MWG 7.E, 8.C)
  - definitions
  - Nash equilibrium in mixed strategies

  - dominance in mixed strategies
  - behavior strategies
- Games with nature (MWG 8.E; JR 7.2.3)
  - examples
  - games with incomplete information
- Dynamic games (MWG 9.C; JR 7.3.7)
  - sequential rationality
  - perfect Bayesian equilibrium
  - sequential equilibrium
- Signaling (MWG 13.C; JR 8.1.2)
  - basic game and intuitive criterion refinement
  - general theory
  - job market signaling
- Topics I: Repeated games (MWG, 12.AA)
  - basic structure, Nash equilibrium and subgame perfect equilibrium
  - automaton representations
  - short-lived agents
  - imperfect public monitoring
- Topics II: Bargaining (MWG 22.E, 22.AA)
  - Nash bargaining
  - Rubinstein bargaining
  - extension: exogenous risk of break down
  - extension: outside options

About theorem numbering in the lecture notes: The numbering of theorems, lemmas, definitions and equations follows the form $X.Y$ where X refers to the set number of the lecture slides and Y refers to the number of the theorem/lemma/definition *within* this set of lecture slides. For example, Theorem 2.13 means the 13th theorem in Lecture Slides 2.

References

Fudenberg, Drew and Jean Tirole, *Game Theory*, Cambridge, Massachusetts: MIT Press, 1991.

Jehle, Geoffrey A. and Philip J. Reny, *Advanced Microeconomic Theory*, 3rd ed., New York: Prentice Hall, 2011.

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

Ok, Efe A., *Real Analysis with Economic Applications*, Princeton, New Jersey: Princeton University Press, 2007.

Osborne, Martin J. and Ariel Rubinstein, *A Course in Game Theory*, Cambridge, Massachusetts: MIT Press, 1994.

Vohra, Rakesh V., *Advanced Mathematical Economics*, London: Routledge, 2004.