

Johann Wolfgang Goethe-University
Ph.D. Program in Economics

Professor Dr. Uwe Walz
Sommersemester 2005

Advanced Microeconomic Theory I (Part 1: Game Theory)

Course Description:

This provides a profound introduction to game theory for doctoral students. It is intended to provide participants with a “tool-box” for understanding and analyzing state-of-the-art papers in this field, as well as for developing game-theoretical models in their own research.

We start with reviewing static games of complete information, the basic principles of which should be familiar to participants. In the following sessions, dynamic games and games of incomplete information will be introduced and analyzed. For all theoretical concepts, applications will be presented and there will be assignments which will be discussed at the end of each section. These assignments will also be collected and graded as part of the final grade for the course.

Class Time and Location:

Lectures: Monday, 4:15 pm – 5:45 pm, Room: 120C; Thursday, 8:15 pm – 9:45 pm, Room: 120C.

Discussion Sections: TBA, Room: 120C.

The discussion sections will primarily go over the solutions of the problem sets.

Course Website:

<http://www.wiwi.uni-frankfurt.de/profs/walz/lehreaktuellesgametheory.html>

The course website will contain course news/administrative announcements, class notes, problem sets and additional material. Participants are encouraged to check the website regularly. Some material on the website will be password protected. The password will be announced in class, and must not be passed on to anybody not attending the course this semester.

Course Requirements:

Grading for this part of the course will be based on the problem sets (20%) and the final exam for this part of the course (80%).

Course Logistics:

Office Hours: Uwe Walz: Tuesday, 2:00 pm – 3:00 pm
Teaching Assistant: TBA

Texts:

The following books cover most of the material to be discussed in this part of the course:

Primary References:

- Fudenberg, Drew and Jean Tirole (2000): *Game Theory*. MIT Press: Cambridge and London
- Gibbons, Robert (1992): *A Primer in Game Theory*. Pearson Education Limited: Harlow.

Secondary References:

- Binmore, Ken (1992): *Fun and Games*. D.C. Heath: Lexington, Massachusetts.
- Mas-Colell, Andreu, Michael Whinston and Jerry Green (1995): *Microeconomic Theory*. Oxford University Press: New York, Oxford.
- Morris, Stephen and Hyun Song Shin (2000): *Global Games: Theory and Applications*, Cowles Foundation Discussion Papers 1275R, Cowles Foundation, Yale University, Revised Aug 2001.
- Osborne, Martin and Ariel Rubinstein (1994): *A Course in Game Theory*. MIT Press: Cambridge and London

Further references will be provided as needed during the course.

Course Outline (Lectures):

Outline:

I. Introduction – Overview

II. Static Games of Complete Information

1. Games in Normal Form, Normal vs. Extensive Form, Dominated Strategies, Iterative Elimination of dominated Strategies, Nash Equilibrium Concept
(Fudenberg/Tirole 1.1/1.2; Gibbons 1.1)
2. Application, Oligopolistic Competition (Cournot, Bertrand, Hotelling)
(Fudenberg/Tirole 1.1-1.3; Gibbons 1.3)
3. Pure vs. Mixed Strategies, Existence of Nash Equilibria
(Fudenberg/Tirole 1.3; Gibbons 1.3)

III. Dynamic Games of Complete Information

1. Games in Extensive Form, Perfect vs. imperfect information, Credibility, Commitment, Backward Induction
(Fudenberg/Tirole 3.1-3.4; Gibbons 2.1)
2. Subgame Perfectness
(Fudenberg/Tirole 3.5/3.6; Gibbons 2.2)
3. Application of Dynamic Games / Two Stage Games
(Fudenberg/Tirole 4.1-4.3; Gibbons 2.2)
4. Repeated Games, Finite/Infinite Repeated Game, Trigger Strategies, Folk Theorem
(Fudenberg/Tirole 5.1-5.3; Gibbons 2.3)

IV. Static Games of Incomplete Information

1. Bayesian Games and Bayesian Equilibrium
(Fudenberg/Tirole 6.1-6.4; Gibbons 3.1)
2. Mechanism Design
(Fudenberg/Tirole 7.1-7.3; Gibbons 3.3)
3. Application: Auctions
(Fudenberg/Tirole 7.1/7.5; Gibbons 3.2)

V. Dynamic Games of Incomplete Information

1. Perfect Bayesian Equilibrium, Signaling Games, Applications
(Fudenberg/Tirole 8.1/8.2; Gibbons 4.1/4.2)
2. Refinements of Equilibrium Concepts, Sequential Equilibrium, Trembling Hand Equilibrium, Proper Equilibrium, Intuitive Criterion, Global Games
(Fudenberg/Tirole 8.3/8.4; Gibbons 4.4, Morris/Shin)
3. Further Applications, Reputation, Chain-Store, Cheap Talk Games
(Gibbons 4.3)