EPFL

FIN-620 | **Game Theory**

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Cursus	Sem.	Type
Finance		Obl.

Language of teaching	English
Credits	3
Session	
Exam	Written
Workload	90h
Hours	**28**
Lecture	28
Number of positions	

Remark

If you would like to attend this course, please send an email to: edfi@epfl.ch to register

Summary

Game theory deals with multiperson strategic decision making. Major fields of Economics, such as Microeconomics, Corporate Finance, Market Microstructure, Monetary Economics, Industrial Organization, International Trade Theory all build on game theoretic foundations.

Content

The aim of the course is to provide an introduction to non-cooperative game theory for PhD and advanced graduate students. Topics are selected on the basis of their relevance for active areas of research in Finance. They contain an analysis of non-cooperative static and dynamic games. Emphasis is placed on the role of information in determining game outcomes, in designing incentives and in renegotiating existing incentive schemes.

1. Static Games of Complete Information
a. Course overview
b. Strategic-Form Games
c. Iterated Strict Dominance
d. Pure-Strategy Nash Equilibrium
e. Mixed-Strategy Nash Equilibrium
f. Correlated Equilibrium
2. Dynamic Games of Complete Information
a. Extensive Form Games
b. Subgame Perfect Nash Equilibria
c. Repeated Games and Folk Theorems
d. Bargaining à la Rubinstein-Stahl
3. Static Games of Incomplete Information
a. Bayesian Equilibrium
b. Public good provision
c. War of Attrition
d. Purification and Mixed Strategies
e. Market for Lemons
f. No trade theorems
4. Auctions
a. Orders of Stochastic Dominance
b. First Price Auctions
c. Dutch Auctions
d. Second Price Auctions
e. English Auctions
f. Revenue Equivalence
g. Common Values
h. Share Auctions
5. Global Games

a. Global games vs Bayesian Games
b. Currency Attacks
c. Coordination Likelihood
6. Mechanism Design
a. Definition of Mechanism
b. Revelation Principle
c. Optimal Mechanisms
d. Vickrey-Clarke Groves Mechanisms
e. Budget Balance
7. Dynamic Games of Incomplete Information
a. Signalling Games
b. Perfect Bayesian Equilibrium
c. Reputation
d. Pooling, Separating and Semi-Separating Equilibria
e. Spence's Education Model
f. Equilibrium Refinements
8. Moral Hazard
a. Linear Contracts
b. General Contracts
c. Dynamic Moral Hazard
The emphasis given on alternative topics may vary depending on class needs and time restrictions

Keywords

Game Theory
Contract Theory

Learning Prerequisites

Required courses

Bachelor-level Calculus and Probability Theory

Recommended courses

Intermediate-level Microeconomics

Learning Outcomes

By the end of the course, the student must be able to:
- Define alternative notions of Equilibria
- Derive game equilibria and select among them
- Design games and incentive schemes to induce desired targets

Assessment methods

- The course is accompanied by 8 problem sets. They are excellent preparation for the exam, but do not count as part of the final grade.
- The final grade for the course is:

Grade=100%*Final Exam

Resources

Bibliography

No single textbook covers the entirety of the topics that we will consider.
The required textbooks for the course are:
Fundenberg, Drew and Jean Tirole, 1991, Game Theory, 7th Edition, MIT Press ISBN-13: 978-0262061414

Bolton, Patrick and Mathias Dewatripont, 2004, Contract Theory, MIT Press, ISBN-13: 978-0262025768

Students with no prior exposure to Game Theory, are highly recommended to accompany their study with the following introductory text:

• Gibbons, Robert, 1992, A primer in Game Theory, Prentice Hall, ISBN-13: 978-0745011592

Additional readings will be provided in class or electronically.
The following textbooks may also be helpful on some of the topics covered:

• Mas-Colel, Andreu, Michael Whinston and Jerry Green, 1995, Microeconomic Theory, Oxford University Press, ISBN-13: 978-0195073409

• Binmore, Kenneth, 1992, Fun and Games: A Text on Game Theory, D.C. Heath, ISBN-13: 978-0195073409

• Salanie, Bernard, 1992, The Economics of Contracts: A primer, 2nd Edition, MIT Press, ISBN-13: 978-0195073409

• Krishna, Vijay, 2009, Auction Theory, 2nd Edition, Academic Press, ISBN-13: 978-0195073409

• Tirole, Jean, 2005, The Theory of Corporate Finance, Princeton University Press, ISBN-13: 978-0691125565

• Tirole, Jean, 1988, The Theory of Industrial Organization, MIT Press, ISBN-13: 978-0262200714

• Laffont, Jean-Jacques and Jean Tirole, 1993, A Theory of Incentives in Procurement and Regulation, MIT Press, ISBN-13: 978-0262121743

Ressources en bibliothèque

• A primer in game theory / Gibbons
• Game Theory / Fundenberg
• Contract Theory / Bolton

Notes/Handbook
ACADEMIC INTEGRITY
Students are required to adhere to the following rules:

• Any material handed out in class is not to be distributed to any other students without permission from the instructor. Do not consult past editions of the Game Theory course.

• Any communication between students in different sections concerning the content of the class discussion of group assignments is prohibited.