

SYLABUS PRZEDMIOTU W SZKOLE DOKTORSKIEJ

Tytuł	<i>Advanced Game Theory</i>
Tytuł w jęz. ang.	Advanced Game Theory

Status przedmiotu	obowiązkowy dla:
	do wyboru dla: SzD ekonomia

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Sygnatura przedmiotu:

Część A

1. Syntetyczna charakterystyka przedmiotu (główne hasła – około 400 znaków):

The course aims to present formally various topics in game theory. The course starts off with a recall of strategic or normal form game and definition of Nash equilibrium in pure and mixed strategies. We present a proof of Nash equilibrium existence using Kakutani fixed point theorem. Next, we define dominance and present a concept of rationalizability. If time allows, we also discuss evolutionary stable strategies and their relation to Nash equilibria. We also define a strategic form Bayesian game and game Bayes Nash equilibrium. Next we define extensive form game and subgame perfection, followed by weak perfect Bayesian equilibrium and sequential equilibrium. Having that we provide students with a selection of current results from repeated games and folk theorems. Later we discuss communication in games. Hard vs. soft information, disclosure, cheap talk and Bayesian persuasion. Also, we present a review of current results for games on networks including learning. Simple topologies on networks: regular lattice, Erdos-Renyi graphs, small-world networks. A course ends with a Nash bargaining solution, selection of solutions for TU and NTU cooperative games and if time allows foundations of the Nash program.

During tutorials we discuss applications including Cournot and Bertrand games, supermodular games, bargaining games, symmetric information games, time-consistency games, mechanism design and auctions.

2. Słowa kluczowe (3 – 6 słów):

noncooperative games, Nash equilibrium, Bayesian games, repeated games, extensive form games, cooperative games,

Część B

Przedmiotowe efekty uczenia się

Powiązanie z efektami uczenia się dla SzD

Wiedza (<i>liczba efektów od 2 do 5</i>)		
W.1	Student knows classic games, their assumptions, implications, and limitations.	
W.2	Student understands the difference between various models, equilibria and solutions in games.	
W.3	Student acquires knowledge of the formal tools necessary to study games	
Umiejętności (<i>liczba efektów od 2 do 5</i>)		
U.1	Student can read and understand current reserach papers in game theory.	
U.2	Student is able to select appropriate tools to analyse various games..	
U.3	Student is able to differentiate and solve for various concepts of equilibrium.	
Kompetencje społeczne (<i>liczba efektów od 1 do 3</i>)		
K.1	Student recognizes, where using game theory is necessary.	
K.2	Student sees the game theory implications in current discussions on the world economy	

Część C

Semestralny plan zajęć:

1. A short introduction to non-cooperative games. Strategic form game (definition). Best response. Pure strategy Nash Equilibrium (PSNE). Mixed strategies and Mixed Strategy Nash Equilibrium (MSNE). Existence of equilibrium
2. Applications. Cournot and Bertrand.
3. Lattice games. Posets, Lattices, Supermodularity, Increasing differences, Monotone comparative Statics. Tarski fixed point theorem.
4. Evolutionary stable strategies (ESS). Correlated equilibrium and other extensions.
5. Bayesian games. Types and Strategies. Bayesian equilibrium. Interim and ex-ante strategies
6. Extensive form games with complete information. History. Strategies. Nash equilibrium and subgame perfect Nash equilibrium.
7. Bargaining games.
8. Repeated games of complete information. Folks' theorems
9. Extensive form games with simultaneous moves and incomplete information. Sequentialrationality weak perfect Bayesian equilibrium. Sequential equilibrium (SE)
10. Repeated games of incomplete information. Survey of recent results.
11. Applications of asymmetric information games. Adverse selection. Screening and signaling games. Pooling and separating equilibrium. Existence. Moral hazard and optimal contracts (principal-agent)
12. Communication in games. Hard vs. soft information, disclosure, cheap talk. Bayesian persuasion.
13. Networks. Simple topologies on networks: regular lattice, Erdos-Renyi graphs, small-world networks. Learning in networks.
14. Open and closed-loop strategies. Time-consistency. Bequest games, quasi-hyperbolic discounting models and policy games. Markov stationary strategies
15. Intro to mechanism design. Implementation. Efficiency and optimal mechanisms.
16. Auctions. Private and independent valuations. Dutch and English auctions. First and second price sealed-bid auctions. Revenue equivalence theorem. Private, interdependent valuations. Common value auctions and winners curse
17. Nash bargaining solution. Axiomatization and solution. Cooperative game. Superadditive games. Characteristic form games (TU). Convex games. Core and Shapley value. Axiomatizations and non-cooperative foundations. (Dubey; Dubey-Shapley; Hart, Mas-Colell)
18. Nash program and foundations of general equilibrium.

Literatura podstawowa (jeśli wybrane fragmenty publikacji zwartych, to wskazane podanie rozdziałów, ew. stron):

1. M. Osborne, A. Rubinstein, A Course in Game Theory, MIT Press, Cambridge, Massachusetts 1994.
2. Fudenberg, D., J. Tirole, Game theory. MIT Press, Cambridge 2002.

Literatura uzupełniająca (jeśli wybrane fragmenty publikacji zwartych, to wskazane podanie rozdziałów, ew. stron):

1. R. Myerson, Game Theory. Analysis of Conflict, Harvard University Press, Cambridge, Massachusetts 1991;
2. Daalgaard P., Introductory Statistics with R: Springer, 2008.
3. Maschler, M., E. Solan, S. Zamir, Game Theory. Cambridge University Press 2013.

Część D

Forma zajęć:	Wymiar zajęć w godz.:
Ogółem godzin <i>w tym:</i>	45h
wykład	45h
Elementy oceny końcowej (ogółem 100%), w tym:	
egzamin	60%
Zadania domowe	40%
Liczba punktów ECTS	5 ECTS

Część E

Metody dydaktyczne (nauczania) stosowane przez prowadzącego

- M.1. wykład tradycyjny
- M.2. wykład z wykorzystaniem technik multimedialnych
- M.3. wykład konwersatoryjny (*z aktywnością doktorantów*)

Część F

Metody weryfikacji (sprawdziany) osiągnięcia przedmiotowych efektów kształcenia

- W.1. egzamin pisemny (*pytania otwarte, zadania*)
- W.2. egzamin ustny
- W.3. egzamin praktyczny
- W.12 zadania domowe