

SYLABUS PRZEDMIOTU W SZKOLE DOKTORSKIEJ

Tytuł	<i>Teoria decyzji</i>
Tytuł w jęz. ang.	Theory of Decisions

Status przedmiotu	obowiązkowy dla: <i>ogólny SzD</i>
	do wyboru dla:

Autor/autorzy sylabusa:	Zespół :	koordynator: dr Michał Lewandowski
		członek zespołu
		członek zespołu

Sygnatura przedmiotu:

Część A

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

The object of study is decision-making by humans in different decision contexts: certainty and uncertainty, statically and in time, individually and as a group. Two key questions are addressed: a) how SHOULD decisions be made and b) how decisions ARE made. These questions determine the focus of the two most important lines of thought in economics, namely the classical (rational, normative) approach and the increasingly more popular behavioral (psychological, descriptive) approach. Providing answers to these two questions helps both in making better decisions as well as in exploiting wrong decisions made by other people. During the lecture, students will learn two faces of decision theory: the mathematical one, using the axiomatic method to represent preferences, and the psychological one, using the experimental method to verify how people make their decisions.

Decision theory consists of five parts:

- A. **Decisions under certainty** (example questions: What are preferences and utility? How preferences are disclosed? How to measure the intensity of preferences? How to consider many criteria at once? How to choose the right option from the menu / list?)
- B. **Decisions under objective uncertainty/risk** (example questions: What is risk? How to measure risk and attitudes towards risk? How not to be deceived? How to overcome pitfalls of thinking involving probability? Does the rational man play the roulette, insure from the flood, place bets on the score of a sport event?)
- C. **Decision under subjective uncertainty**, simply called uncertainty, ignorance or ambiguity (example questions: Why do we differ in the assessment of the outcome of the next soccer game? Are the ice cream tasty regardless of the weather? Is Tomek Strzałecki the best decision theorist in the world?),
- D. **Decisions in time** (example questions: How to resist temptation? What is self-control? Take one marshmallow now or three in 15 minutes? How to stick to the plan?),

E. Group decisions (example questions: How did Kenneth Arrow get an idea at the summit and finish his PhD? Is democracy the right system of government? Is a dictator really so bad?).		
2. Słowa kluczowe (3 – 6 słów): Expected utility, prospect theory, statistical pitfalls, time inconsistency, ambiguity, subjective probability		
Część B		
Przedmiotowe efekty uczenia się		Powiązanie z efektami uczenia się dla SzD
Wiedza (liczba efektów od 2 do 5)		
W.1	Student of this course should know main preference representation theorems in the area of decision-making under certainty, uncertainty, over time and in groups and should be able to explain why they hold.	
W.2	Student of this course should know the main axioms that underlie the main models of decision-making under certainty, uncertainty, over time and in groups and their implications, should be able to assess whether experimental data is consistent with the axioms or not.	
W.3	Student of this course should be able to define precisely what the rational choice in the context of decision-making under certainty, uncertainty, over time and in groups is, should be able to sort choices according to level of departure from rationality that they exhibit.	
Umiejętności (liczba efektów od 2 do 5)		
U.1	Participants of this course should be able to identify the main formal components of the decision problem in the area of decision-making under certainty, uncertainty, over time and in groups, i.e. choice space, preference relation on this space, axioms of rational choice, function the represents the preference relation.	
U.2	Student of this course should be able to identify the structure of the representation theorems discussed during classes and to indicate main implications of these theorems in the area of decision-making under certainty, uncertainty, over time and in groups.	
U.3	Student of this course should be able to design experiments that test different models of preferences in the area of decision-making under certainty, uncertainty, over time and in groups.	
Kompetencje społeczne (liczba efektów od 1 do 3)		
K.1	Students of this course is aware of the advantage of formal preference modelling for the purposes of prediction of real-world behavior as well as of shaping real behavior in the context of decision-making under certainty, uncertainty, over time and in groups.	
K.2	Students of this course should be able to use relevant arguments in order to convince people of different backgrounds (dummies and experts of decision theory) of the importance of obeying the axioms of rational choice in the context of decision-making under certainty, uncertainty, over time and in groups.	
K.3	Students of this course understand (and is able to convince others) that	

	preference modelling in the context of decision-making under certainty, uncertainty, over time and in groups serves the purpose of understanding real-world human behavior, which is full of emotions and imperfections.	
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Część C	
Semestralny plan zajęć:	
1.	Weak order relation and choice functions
2.	Ordinal utility representation (Cantor, 1915)
3.	Semi-order, interval orders, partial orders
4.	Intensity of preferences, cardinal utility (Shapley, 1975)
5.	Multi-attribute utility theory with two attributes
6.	Multi-attribute utility theory with more than two attributes
7.	Expected Utility hypothesis of Daniel Bernoulli
8.	Expected Utility Theory axioms
9.	Expected Utility Theory representation (von Neumann, Morgenstern 1947)
10.	Risk attitudes in Expected Utility Theory
11.	Applications of Expected Utility Theory
12.	Expected Utility paradoxes
13.	Prospect Theory (Kahnemann, Tversky, 1979, 1992)
14.	Expected Utility Theory vs Expected Utility models
15.	Range-dependent utility (Kontek, Lewandowski, 2017)
16.	Subjective probability of de Finetti (1937) and Dutch books
17.	Decision rules under complete uncertainty and their application in predicting choice in strategic contexts
18.	Subjective expected utility axioms of Savage
19.	Subjective expected utility theory of Savage (1954)
20.	Subjective expected utility theory of Anscombe and Aumann (1963)
21.	Choquet expected utility (Schmeidler, 1986, 1989)
22.	Imprecise probabilities approach of Dempster, Shafer
23.	Maxmin Expected Utility model (Gilboa, Schmeidler, 1989)
24.	Variational preferences (Maccheroni, Marinacci, Rustichini, 2006) and other recent ambiguity models
25.	The static and dynamic discounted expected utility model
26.	Impatience and the static and dynamic beta-delta model. Applications of intertemporal choice: temptation, self-control

27. Sign and range-dependent utility for risk and time (Baucells, Kontek, Lewandowski)
28. Arrow Impossibility theorem in social choice
29. Gibbard and Satterthwaite impossibility theorem
30. Maskin's monotonicity

Basic literature:

1. Gilboa I., Lecture Notes on the Theory of Decision under Uncertainty, http://www.econ.hit-u.ac.jp/~kmkj/uncertainty/Gilboa_Lecture_Notes.pdf
2. Kreps David, Notes on the Theory of Choice, Westview Press, 1988.
3. Noor J., Lecture Notes on Economic Theory and Psychology
4. L.C. van der Gaag, S. Renooij, P. de Waal, Lecture notes in decision theory <http://www.cs.uu.nl/docs/vakken/bk/#schema>
5. Feldman A.M., R. Serrano, Welfare Economics and Social Choice Theory (2nd edition), Springer, New York, (2006).
6. Lewandowski M., Script in decision theory, <http://www.mlewandowski.waw.pl/wp-content/uploads/2016/02/tpd.pdf>

Supplementary reading:

1. Fishburn P., Utility theory for decision making
2. Raiffa H., Keeney R. L., Decision Analysis with Multiple Conflicting Objectives, Preferences and Value Tradeoffs, 1976
3. Gilboa I., Lecture Notes for Introduction to Decision Theory, https://itzhakgilboa.weebly.com/uploads/8/3/6/3/8363317/gilboa_notes_for_introduction_to_decision_theory.pdf
4. Blume L., Halpern J., Decision theory lecture notes, <http://www.cs.cornell.edu/courses/cs5846/2014sp/5846-14notes.html>
5. Dean M., Topics in Microeconomics - Decision Theory and Evidence, http://www.columbia.edu/~md3405/DT_15.shtml
6. Schmeidler D., Lecture notes on decision theory, http://www.tau.ac.il/~schmeid/PDF/Decision_Theory_Technical_Notes.pdf
7. Marinacci M., Gilboa I., Ambiguity and the Bayesian Paradigm, working paper, http://www.tau.ac.il/~igilboa/pdf/Gilboa_Marinacci_Ambiguity_and_Bayesian_Paradigm.pdf

Część D	
Forma zajęć:	Wymiar zajęć w godz.:
Ogółem godzin <i>w tym:</i>	60
Wykład	60
Elementy oceny końcowej (ogółem 100%), w tym:	
Egzamin pisemny tradycyjny	75%
Ćwiczenia	25%
Liczba punktów ECTS	7

Część E

Metody dydaktyczne (nauczania) stosowane przez prowadzącego

M.1. wykład tradycyjny
M.3. wykład konwersatoryjny (z *aktywnością doktorantów*)
M.13. prezentacja referatów

Część F

Metody weryfikacji (sprawdziany) osiągnięcia przedmiotowych efektów kształcenia

W.1. egzamin pisemny (*pytania otwarte, zadania*)
W.12. rozwiązywanie problemów domu