



Subject card

Subject name and code	Decision analysis, PG_00045316						
Field of study	Data Engineering						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2026/2027		
Education level	first-cycle studies	Subject group			Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			English		
Semester of study	5	ECTS credits			6.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Informatics In Management -> Faculty of Management and Economics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr Nina Rizun					
	Teachers	mgr Jaromir Durkiewicz dr Nina Rizun					
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours		Self-study	SUM	
	Number of study hours	60	8.0		82.0	150	
Subject objectives	The aim of the course is to discuss the issues concerning decision analysis and rationale procedures based on the heuristics, descriptive and simulative methods in the context of the applications in management area						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_K02] makes competent and ethical decisions to create and maintain economic, social and environmental values	The student makes informed and responsible decisions, considering economic, social, and environmental consequences and applying ethical principles when evaluating and selecting optimal decision alternatives			[SK1] Assessment of group work skills [SK2] Assessment of progress of work [SK3] Assessment of ability to organize work [SK4] Assessment of communication skills, including language correctness [SK5] Assessment of ability to solve problems that arise in practice		
	[K6_U01] analyzes and evaluates complex processes in the context of their improvement possibilities, using various methods, including analytical and simulation	The student analyzes complex decision problems in organizations using analytical methods and decision models (e.g., decision trees, scenario analysis, simulations) and evaluates alternative courses of action to improve decision-making processes.			[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task		
	[K6_W04] demonstrates creative and entrepreneurial activity in formulating and implementing innovative ideas	The student understands and explains decision-making principles under uncertainty and applies decision analysis methods to generate and evaluate innovative solutions to business and organizational problems			[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects		

Subject contents	Course content – lecture		
	<p>Decision-making process. Decision making vs problem solving. Models in decision-making process Deterministic models LP Discrete variables. Sensitivity Analysis Complex problems and heuristics solutions Complex problems. Evolutionary algorithms Non-linear programming Risk and Uncertainty Decision trees Utility theory Risk premium and risk aversion Multi-criteria decision making</p>		
	Course content – laboratory		
	<p>Decision-making theory: Data preprocessing case LP - standard - geometric LP problems with SOLVER LP - Integer variables Binary and mixed variables Non-linear problems Network problems contd. - location determining Risk and uncertainty measures Decision trees and Expected utility and Risk premium</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	exam	60.0%	60.0%
	colloquium	60.0%	40.0%
Recommended reading	Basic literature	<p>1. Gressel, Simone, Nazim Taskin, and David Pauleen. "Management decision-making, big data and analytics." (2020): 1-336.. 2. Nermend, K., Łatuszyńska, M., & Thalassinos, E. (Eds.). (2021). Decision-making in management: Methods and behavioral tools. Springer Nature. 3. Marchau, V. A. W. J., et al. "Decision making under deep uncertainty: from theory to practice." (No Title) (2019). 4. Heilig, Thorsten, and Ilhan Scheer. Decision intelligence: Transform your team and organization with AI-Driven decisionmaking. John Wiley & Sons, 2023.</p>	
	Supplementary literature	<p>1. Bakke D.: The Decision Maker: Unlock the Potential of Everyone in Your Organization, One Decision at a Time Hardcover. Pear Press, 2013. 2. Fisher, T., & Adams, R. (2018). Problem Solving in Organizations: A Methodological Handbook for Business and Management Students</p>	
	eResources addresses		

<p>Example issues/ example questions/ tasks being completed</p>	<p>Choose the correct statement regarding the Allowable range values interpretation in the Sensitivity analysis P-class problems can be defined as... Linear Programming problems can be put in a general form that consists of... Choose the statements that are incorrect for binding constraints... Mark all properly defined constraints in the Linear Programming problem Choose the statements that are correct to describe NP-hard problems Choose conditions under which any local optimal is guaranteed to be a global optimal Please give 2 examples of situations when a rational decision is made Please provide and explain the main steps of geometric solving of LP Please explain the meaning of the problem named P versus NP Please give an example of chromosomes encoding in a genetic (evolutionary) algorithm</p>
<p>Practical activities within the subject</p>	<p>Not applicable</p>

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