



Subject card

Subject name and code	Decision analysis, PG_00045316						
Field of study	Data Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2025/2026		
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	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						
	eNauczanie source addresses: Moodle ID: 46765 Decisions Analysis 2025/2026 https://enauzanie.pg.edu.pl/moodle/course/view.php?id=46765						
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 prepare students to make well-grounded and ethical decisions in complex problem situations, based on knowledge of models and methods supporting the decision-making process, including risk analysis, uncertainty, and multi-criteria decision making. It also aims to develop attitudes related to responsibility, critical thinking, and openness to the use of modern analytical tools in the context of managing organizations and addressing economic and social problems.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_K02] is aware of the role of a technical university graduate in the society; reflects on ethical, scientific and social aspects of the performed work; understands the necessity of participation in social projects and complies with copyright law, taking into account economic, legal and technical aspects.	The student is able to apply decision support approaches and models in an organizational environment, using legal norms as well as ethical and cognitive rules to acquire and interpret information under conditions of risk and uncertainty, and subsequently to formulate multi-criteria, well-founded decisions	[SK5] Assessment of ability to solve problems that arise in practice [SK2] Assessment of progress of work
	[K6_W06] Knows the criteria and concepts of artificial intelligence, understands the operation of algorithms for intelligent computing, the concept of descriptive logic, combinatorial optimization algorithms, methods of construction, analysis and evaluation of algorithms, including discrete ones and problems of resolving conflicts in non-algorithmic decision making.	The student is able to consciously make well-founded and ethical decisions that take into account economic, social, and environmental consequences, particularly through reflection on the impacts of actions and participation in teamwork on decision-making projects	[SW3] Assessment of knowledge contained in written work and projects
	[K6_U10] correctly uses legal norms as well as ethical and cognitive rules in solving specific socio-economic problems.	The student possesses knowledge of approaches and methods supporting the decision-making process, including optimization algorithms, heuristics, and risk analysis tools. They know the methods of acquiring and interpreting information and understand their application to solving complex problems involving multiple variables, limited data, and decision conflicts	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
Subject contents	<p>Course content – lecture</p> <ul style="list-style-type: none"> • Decision making vs problem solving • Models in decision-making process • Deterministic models • 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> <ul style="list-style-type: none"> • Decision-making theory: Data preprocessing case • Linear programming (LP) geometric approach • Linear programming (LP) using SOLVER • Linear programming (LP) for integer models • Binary and mixed variables models • Non-linear problems • Network problems • Decisions under risk and uncertainty • Decision trees • Expected value. Utility value and risk premium 		
Prerequisites and co-requisites	No requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Group project (assignment) with presentation	60.0%	50.0%
	Laboratorium komputerowe	60.0%	10.0%
	Closed open-problem based questions (final test)	60.0%	40.0%

Recommended reading	Basic literature	<p>Goodwin P., Wright G. Decision analysis for management judgment. John Wiley & Sons, 2014</p> <p>Wisniewski M. Quantitative methods for decision makers. Pearson Education, 2009.</p> <p>Howard, R. A., and Ali E. Abbas. "Foundations of Decision Analysis, global edition." <i>Harlow, England: Pearson Education Limited</i> (2016).</p> <p>Parnell G. S. et al. Handbook of decision analysis. John Wiley & Sons, 2025.</p>
	Supplementary literature	<p>Wexler S. The Big Picture: How to Use Data Visualization to Make Better Decisions Faster. McGraw Hill Professional, 2021.</p> <p>Daellenbach H., McNickle D., Dye S. Management science: decision-making through systems thinking. Bloomsbury Publishing, 2017.</p> <p>Camm J. D. et al. Business analytics: Data analysis & decision making. 2018.</p>
	eResources addresses	
Example issues/ example questions/ tasks being completed	<p>Analysis of study executive in terms of location and construction of an industrial facility.</p> <p>Simulation game for settlement of commercial contracts. Decision rules construction.</p> <p>Building the knowledge base for health care facilities.</p>	
Practical activities within the subject	Not applicable	

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