

Subject card

Subject name and code	Operations Research, PG_00157282						
Field of study	Information Science and Econometrics						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2024/2025		
Education level	postgraduate studies		Subject group		Obligatory subject group in the field of study		
Mode of study	part-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		2.0		
Learning profile	academic		Assessment form				
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr Lech Kujawski				
	Teachers		dr Lech Kujawski				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	9.0	0.0	0.0	0.0	0.0	9
	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	9		15.0		30.0	54
Subject objectives	Developing the ability to analyze decision-making situations in economic organizations, formalize them, and find solutions.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[liEMU2_W04] The student has an in-depth knowledge of advanced mathematical, statistical, econometric and IT methods that enable the acquisition, processing and analysis of data reflecting the functioning and growth of the national economy and its components, as well as the phenomena and processes occurring in their environment.	Is able to conduct sensitivity analysis.	[SW4] test/exam - oral or written
	[liEMU2_K03] The student is able to communicate freely with the public inside and outside the workplace, transfer his knowledge and share his skills through various media.	Is able to formulate a linear decision model.	[SK4] test/exam - oral or written
	[liEMU2_W02] The student has an in-depth knowledge of economic structures and institutions, the processes taking place in them, the connections between them and their dynamics, and has an in-depth knowledge of the phenomena and processes taking place in their environment.	Is able to solve a linear decision model using the graphical method and the simplex method.	[SW4] test/exam - oral or written
	[liEMU2_U05] The student is able to make a statistical description of basic and detailed economic categories at an advanced level, formulate and verify hypotheses about their formation.	Knows the theorems on duality and their implications.	[SU4] test/exam - oral or written
	[liEMU2_K01] The student understands the need for continuous completion and deepening of acquired knowledge. The student inspires and organizes others' learning processes.	Is familiar with the assignment problem and can solve the model for such a problem.	[SK4] test/exam - oral or written
	[liEMU2_U07] The student is able to build advanced formal models of complex economic phenomena and processes, estimate them, carry out their verification and apply them to modeling, forecasting and optimization of resources of economic institutions of varying degrees of complexity, their structure and the course of processes in them.	Is familiar with the transportation problem and can solve the model for such a problem.	[SU4] test/exam - oral or written
Subject contents	Linear Programming: assumptions and formal model structure, graphical solution, simplex method, theorem on duality and its implications, economic interpretation of dual variables, dual simplex method, sensitivity analysis. Practical application examples: production problems, diet, blending, cutting stock. Transportation Problem: classification, heuristic solution algorithms Northwest Corner Method, Minimum Cost Method, Vogels Approximation Method; transportation algorithm. Practical application examples in transportation. Assignment Problem: essence, formal model structure, solution algorithm Hungarian Method. Practical application examples in services.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final test for course completion	51.0%	100.0%

Recommended reading	Basic literature	A.C. Chiang, Podstawy ekonomii matematycznej. PWE, Warszawa 2005. K. Kukuła (red.), Badania operacyjne w przykładach i zadaniach. Wydawnictwo Naukowe PWN, Warszawa 2016. E. Ignasiak (red.), Badania operacyjne. PWE, Warszawa 2001.
	Supplementary literature	None
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. A production technology matrix is given. Construct a linear decision model and solve it using any method, then interpret the results. 2. A tariff-economic cost matrix is given. Construct a linear decision model and solve it using any method, then interpret the results. 3. The ability to formulate and solve linear decision models for production problems. 4. The ability to formulate and solve linear decision models for transportation problems. 5. The ability to formulate and solve linear decision models for assignment problems.	
Work placement	Not applicable	

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