



## Subject card

Subject name and code	Operational Research, PG_00037181						
Field of study	Economic Analytics						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2023/2024		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Part-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish		
Semester of study	5	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Faculty of Management and Economics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Jolanta Łopatowska					
	Teachers	dr inż. Jolanta Łopatowska					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	8.0	16.0	0.0	0.0	0.0	24
	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	24		6.0		45.0	75
Subject objectives	The aim of the course is the acquisition knowledge and analytical skills regarding the identification and formulation of decision-making problems in quattitative form and methods of solving them.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U06] Can use the acquired knowledge of economic sciences and quantitative methods to identify, formulate and solve specific economic problems.		Solves problems using optymalizations methods (algoritm) in practice		[SU4] Assessment of ability to use methods and tools		
	[K6_W11] Knows quantitative methods to describe and analyse socio-economic processes; understands their conditions and consequences.		Defines of basic mathematical programming concepts. Presents basic models of solving problems of mathematical programming. Has knowledge about the classification of mathematical models to use it in practice, methods and techniques for solving them		[SW3] Assessment of knowledge contained in written work and projects		
Subject contents	The basic problems of operations research - the essential features and the structure of the decision situation. The general form of linear optimization model, interpretation and sensitivity analysis of the solution. Construction of linear optimization models - assortment selection model, cutting model, technological process optimization model, transport model, assignment model of mutually replaceable resources. Graphic method, simpleks algorithm. Dual linear optimization model. The integer numerical optimization model. Multi-criteria models. Elements of graph theory. Planned network - CPA, CPM, PERT, CCPM method. Ford-Fulkerson algorithm. Sequential issue. Elements of dynamic programming						
Prerequisites and co-requisites	Mathematics						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	exam	60.0%	50.0%
	coloquim	60.0%	50.0%
Recommended reading	Basic literature	Kukuła, K. (red.). (2020). Badania operacyjne w przykładach i zadaniach, Warszawa: Wydawnictwo Naukowe PWN. Zawadzka, L. (1996). Metody ilościowe w organizacji i zarządzaniu, cz. 1. Gdańsk: Wydawnictwo Politechniki Gdańskiej. Zawadzka, L. (1997). Metody ilościowe w organizacji i zarządzaniu, cz. 2. Gdańsk: Wydawnictwo Politechniki Gdańskiej. Goldratt, E.M. (2009). Łańcuch krytyczny. MINT Books.	
	Supplementary literature	Sikora, W (red.). (2008). Badania operacyjne. Warszawa: PWE. Bernardelli M., Decewicz, A.Tomczyk, E. (2021). Ekonometria i badania operacyjne. Warszawa: Wydawnictwo Naukowe PWN. Krawczyk S. (1996). Badania operacyjne dla menedżerów,. Wrocław. Wyd. AE we Wrocławiu.	
	eResources addresses	Adresy na platformie eNauczanie: Badania operacyjne AG nst. - 2023/24 - Moodle ID: 30531 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=30531">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=30531</a>	
Example issues/ example questions/ tasks being completed	Solving linear programming model using the simplex method. Critical path analysis using PERT method.		
Work placement	Not applicable		

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