



## Subject card

Subject name and code	Operational Research, PG_00037814						
Field of study	Management, Management						
Date of commencement of studies	February 2023		Academic year of realisation of subject		2022/2023		
Education level	second-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	Full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Katedra Inżynierii Zarządzania i Jakości -> 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	30.0	15.0	0.0	0.0	0.0	45
	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	45		5.0		50.0	100
Subject objectives	The aim of the course is to acquire analytical skills, identify and formulate decision problems in quantitative form and acquire knowledge of methods of solving them						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U04] models and forecasts socio-economic processes using advanced quantitative and qualitative methods		Solves problems using optymalization methods(algorithms)in practice.		[SU4] Assessment of ability to use methods and tools		
	[K7_W08] has an in-depth knowledge of selected methods and techniques supporting economic decision-making processes		Defines of basic mathematical programming concepts. Presents basic models of solving problems of mathematical programming. Has knowledge of the construction of mathematical models, their usefulness in economic practice as well as methods and techniques of solving.		[SW3] Assessment of knowledge contained in written work and projects		
	[K7_K04] acts in accordance with the principles of building relations and managing processes and projects, organizing them for the benefit of the company and anticipating the consequences of decisions made		Analyzes and joins technical and economical as well as organizational problems.		[SK5] Assessment of ability to solve problems that arise in practice		

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. Elements of nonlinear programming. 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	Algebra, Management		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exam	60.0%	50.0%
	Colloquium	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	Krawczyk, S.(1996). Badania operacyjne dla menedżerów. Wrocław: Wyd. AE we Wrocławiu. Ignasiak, E. (red.). (2001). Badania operacyjne. Warszawa: PWE, Warszawa. Gajda, J.B., Jadczyk, R. (2015). Badania operacyjne. Przykłady zastosowań. Łódź: Wydawnictwo Uniwersytetu Łódzkiego. Trzaskalik, T. (2003). Wprowadzenie do badań operacyjnych z komputerem. Warszawa: PWE.	
	eResources addresses	Adresy na platformie eNauczanie:  Badania operacyjne MSU3/ MSU4 stac. 2022/2023 - Moodle ID: 26763 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=26763">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=26763</a>	
Example issues/ example questions/ tasks being completed	Building models of linear programming. Critical path analysis using PERT method.		
Work placement	Not applicable		