



Subject card

Subject name and code	OPERATIONAL RESEARCH, PG_00058517						
Field of study	Economic Analytics						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2024/2025		
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	Full-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish		
Semester of study	5	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	15.0	30.0	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		10.0		45.0	100
Subject objectives	Recognizes problems in the organization, formulating quantitative models allowing for making rational decisions.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U05] designs innovative solutions to complex problems obtaining economic and socially valuable results		Selects mathematical models, assessing their usefulness and effectiveness in business practice.		[SU4] Assessment of ability to use methods and tools		
	[K6_W05] integrates data from multiple sources to analyze complex economic problems		Solves problems using optimization tools, integrating data from many areas of the organization's operation.		[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. Elements of nonlinear programming. Multi-criteria models. Elements of graph theory. CPA, CPM, PERT, CCPM methods. 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%		
	midterm 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	Sikora, W (red.). (2008). Badania operacyjne. Warszawa: PWE. Bernardelli M., Decewicz, A.Tomczyk, E. (2022). Ekonometria i badania operacyjne. Warszawa: Wydawnictwo Naukowe PWN. Gajda, J.B.,Jadczyk, R. (2015). Badania operacyjne. Przykłady zastosowań. Łódź: Wydawnictwo Uniwersytetu Łódzkiego. http://www.afe.polsl.pl/index.php/pl/1694/analiza-wrazliwosci-optimalnego-wyboru-asortymentu-produkcji-zakladu-odlewniczego.pdf
	eResources addresses	
Example issues/ example questions/ tasks being completed	Application of linear programming to build and solve models of decision situations. Critical path analysis using PERT method.	
Work placement	Not applicable	