



Subject card

Subject name and code	Operational Research, PG_00037970						
Field of study	Management, Management						
Date of commencement of studies	February 2023		Academic year of realisation of subject		2023/2024		
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	Part-time studies (on-line)		Mode of delivery		blended-learning		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		4.0		
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	16.0	8.0	0.0	0.0	0.0	24
	E-learning hours included: 18.0						
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		5.0		71.0	100
Subject objectives	The aim of the course is the acquisition knowledge and analytical skills regarding the identification and formulation of decision-making problems in quantitative form and 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 about the classification of mathematical models to use it in practice and about methods and techniques for solving them.		[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. 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, 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	Sikora, W (red.). (2008). Badania operacyjne. Warszawa: PWE. Bernardelli M., Decewicz, A.Tomczyk, E. (2021). Ekonometria i badania operacyjne. Warszawa: Wydawnictwo Naukowe PWN. Gajda, J.B.,Jadczak, R. (2015). Badania operacyjne. Przykłady zastosowań. Łódź: Wydawnictwo Uniwersytetu Łódzkiego.	
	eResources addresses	Podstawowe https://www.journal-afe.pl/pl/1694/analiza-wrazliwosci-optimalnego-wyboru-asortymentu-produkcji-zakladu-odlewniczego.pdf - Sensitivity analysis of the linear programming model. Adresy na platformie eNauczanie: Badania operacyjne MSU nst. 2023/24 - online - Moodle ID: 31959 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=31959	
Example issues/ example questions/ tasks being completed	Construction of linear programming models. Critical path analysis using PERT method.		
Work placement	Not applicable		