



Subject card

Subject name and code	Operational Research, PG_00037814						
Field of study	Management, Management						
Date of commencement of studies	February 2022	Academic year of realisation of subject			2021/2022		
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						
Badania operacyjne MSU3/ MSU4 stac. 2021/2022 - Moodle ID: 17181 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=17181							
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_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		
	[K7_U04] models and forecasts socio-economic processes using advanced quantitative and qualitative methods		Solves problems using optimization methods(algorithms)in practice.		[SU4] Assessment of ability to use methods and tools		
Subject contents	The basic problems of operations research (OR). The essential features of OR and the structure of the decision situation. Linear programming (LP). The general form of linear optimization model, construction of linear optimization models. Model of optimal assortment of industrial production. Cutting optimization model. Optimization model of technological process. Optimization model of classical transportation issue. Model of the problem of selection of mutually replaceable resources. Graphic method. Simpleks algorithm. The integer model. Dual linear optimization model. Multicriteria models. Elements of graph theory. Planning Network. CPM method, PERT method. CCPM method. Elements of nonlinear programming.Ford-Fulkerson algorithm. Sequential issue. Elements od dynamic programming.						
Prerequisites and co-requisites	Linear algebra, Management						

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	Zawadzka L.: Metody ilościowe w organizacji i zarządzaniu, cz. I, Wyd. PG, Gdańsk 1996 Zawadzka L.: Metody ilościowe w organizacji i zarządzaniu cz. II, Wyd. PG, Gdańsk 1997 Kukuła K (red.): Badania operacyjne w przykładach i zadaniach, PWN, Warszawa, 2011	
	Supplementary literature	Krawczyk S.: Badania operacyjne dla menedżerów, Wyd. AE we Wrocławiu, Wrocław, 1996 Ignasiak E. (red.) : Badania operacyjne, PWE, Warszawa, 2001, Trzaskalik T: Wprowadzenie do badań operacyjnych z komputerem, PWE, Warszawa 2003 Sikora W.: Badania operacyjne, PWE, 2008, 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	Solving linear programming model using the simplex method. Critical path analysis using PERT method.		
Work placement	Not applicable		