

## Subject card

Subject name and code Field of study		<u> </u>						Operational Research, PG_00037132							
•	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	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	Faculty of Management and Economics														
Name and surname	Subject supervisor		dr inż. Jolanta Łopatowska												
of lecturer (lecturers)	Teachers		dr inż. Jolanta Łopatowska												
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM							
of instruction	Number of study hours	15.0	30.0	0.0	0.0	0.0		45							
	E-learning hours inclu	ided: 0.0													
Learning activity and number of study hours	Learning activity	Participation in classes include plan		Participation in consultation hours		Self-study SUM		SUM							
	Number of study hours	45		10.0		45.0 100		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 out	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.					[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 and about methods and techniques for solving them.			[SW3] Assessment of knowledge contained in written work and projects									
Prerequisites and co-requisites	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  mathematics														

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Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade		
and criteria	coloquim	60.0%	50.0%		
	exam	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.: Badania operacyjne dla menedżerów, Wyd. AE we Wrocławiu, Wrocław, 1996 Red. Ignasiak E.: Badania operacyjne, PWE, Warszawa, 2001, Trzaskalik T: Wprowadzenie do badań operacyjnych z komputerem, PWE, Warszawa 2003			
	eResources addresses	Adresy na platformie eNauczanie: badania operacyjne AG - st. 2023/24 - Moodle ID: 30532 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=30532			
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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