GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	OPERATIONAL RESEARCH, PG_00060997		
Field of study	Management, Management		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
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	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. Elwira Brodnicka 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: 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	24	7.0	69.0	100

Subject objectives

Solves complex problems in the organization by formulating quantitative models that allow making rational decisions

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W04] analyzes complex management problems in an in-depth way on the basis of reliable data and properly selected methods, obtaining logical solutions	solves problems using optimization tools, integrating data from many areas of the organization's operation	[SW1] Assessment of factual knowledge
[K7_U04] prepares and presents convincing, professional presentations of the results of its activities, with their in-depth interpretation	interprets in an in-depth way the results of the activities carried out	[SU3] Assessment of ability to use knowledge gained from the subject

Subject contents

Basic issues of operations research - essential features and structure of decision-making situations
General form of the 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, model of mutually replaceable resources allocation
Graphic method, simplex algorithm
Dual linear optimization model
Integer optimization model
Elements of non-linear programming
Multi-criteria models
Elements of graph theory
Planned network - CPA, CPM, PERT, CCPM methods
Ford-Fulkerson algorithm
Sequence problem
Elements of dynamic programming

Prerequisites and co-requisites

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Exam</td><td>60.0%</td><td>50.0%</td></tr>
<tr><td>Test</td><td>60.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>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, 2020</td></tr>
<tr><td>Supplementary literature</td><td>Ignasiak E. (red.): Badania operacyjne, PWE, Warszawa, 2001
Trzaskalik T: Wprowadzenie do badań operacyjnych z komputerem, PWE, Warszawa 2003
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.,Jadczak, R. (2015). Badania operacyjne. Przykłady zastosowań. Łódź: Wydawnictwo Uniwersytetu Łódzkiego.
Gruszczyński M., Kuszewski T. , Podgórska M. (red.) (2017). Ekonometria i badania operacyjne. Warszawa: Wydawnictwo Naukowe PWN</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:
Badania operacyjne MSU nst. 2024/25 - Moodle ID: 38619
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=38619</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Analysis of the linear programming model solution.
Critical path analysis using the PERT method</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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