GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Operational Research, PG_00037970		
Field of study	Management, Management		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2022/2023
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	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: 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	5.0	71.0	100

Subject objectives

The aim of the course is the acquisition of analytical skills, identify and formulate problems in a quantitative form and methods of solving them together with examples of their applications

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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_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 the choice of algorithms in respect of use in practice criteria.	[SW3] Assessment of knowledge contained in written work and projects
[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

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. 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
Prerequisites and co-requisites	Mathematics, Management

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Colloquium	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.(1996). Badania operacyjne dla menedżerów. Wrocław: Wyd. AE we Wrocławiu. Ignasiak, E. (red.). (2001). Badania operacyjne. Warszawa: PWE, Warszawa. Trzaskalik, T (2003). Wprowadzenie do badań operacyjnych z komputerem. Warszawa: PWE. Sikora, W (red.). (2008). Badania operacyjne. Warszawa: PWE. http://www.afe.polsl.pl/index.php/pl/1694/analiza-wrazliwosci-optymalnego-wyboru-asortymentu-produkcji-zakladu-odlewniczego.pdf.
eResources addresses	Adresy na platformie eNauczanie: Badania operacyjne MSU nst. 2022/23 - Moodle ID: 23488 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23488

Example issues/ example questions/ tasks being completed	Construction of linear programming models. Critical path analysis using PERT method.
Work placement	Not applicable