GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Operational Research, PG_00037132		
Field of study	Economic Analytics		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2022/2023
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 of lecturer (lecturers)	Subject supervisor	dr inż. Jolanta Łopatowska	
	Teachers	dr inż. Jolanta Łopatowska	

Lesson type and method of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	30.0	0.0	0.0	0.0	45

E-learning hours included: 0.0

badania operacyjne AG - st. 2022/23 - Moodle ID: 23478
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=23478

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	10.0	45.0	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
[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 the choice of algorithms in respect of the efficiency of use in practice criteria.	[SW3] Assessment of knowledge contained in written work and projects
[K6_U06] Can use the acquired knowledge of economic sciences and quantitative methods to identify, formulate and solve specific economic problems.	Solves problems using optymalizations methods (alghoritm) 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.
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

Prerequisites and co-requisites

Linear algebra

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	exam	60.0%	50.0%
	coloquim	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.	
	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		