GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Optimization Methods, PG_00042192		
Field of study	Power Engineering, Power Engineering, Power Engineering, Power Engineering, Power Engineering		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2022/2023
Education level	first-cycle studies	Subject group	Optional subject group 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	6	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Faculty of Electrical and Control Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Kazimierz Duzinkiewicz	
	Teachers	dr hab. inż. Kazimierz Duzinkiewicz dr inż. Bartosz Puchalski	

Lesson types and methods of instruction

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

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	45	5.0	25.0	75

Subject objectives

The course presents basic optimizatiom methods from the group of different optimization problems: static - dynamic, continuous - discrete, linear-nonlinear, with a single variable - with multiple variables, wiht constraints- without constraints, single objective- multiobjective. The lecture will present the results of modern single objective optimization methods, supplemented with the basic results of multi-criteria optimization. Laboratory will be focused on numerical method of optimization supplied by MATLAB environment.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W01	The student is able, by using the knowledge of mathematics, to define and solve selected optimisation problems.	[SW3] Assessment of knowledge contained in written work and projects
K6_U02	Students can design energy systems using optimisation methods.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject

Subject contents	1. Formulating optimization problems - examples from the energy sector. 2. Methods for of solving problems with a single variable. 3. Methods of of solving problems with many variables without constraints. 4. Methods for of solving problems with many variables with constraints - problems of linear programming. 5. Methods of of solving problems with many variables with constraints - problems of non-linear programming. 6. Multiobjective problems and the approaches for solving them.
Prerequisites and co-requisites	Basics of mathematical analysis - differential calculus

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Laboratory	0.0%	20.0%
Participation in the lecture	0.0%	7.5%
Written exam	50.0%	50.0%
Midterm colloquium	0.0%	22.5%

Recommended reading

Basic literature	1. Chong, E.P., Żak, S.H. (2001). An Introduction to Optimization. John Wiley & Sons, Inc. 2. Poler, R., Mula, J., Diaz-Madroñero, M. (2014). Operations Research Problems Statements and Solutions. Springer-Verlag London. 3. Jizhong, Z. (2014). Optimization of power system operation. The Institute of Electrical and Electronics Engineers, Inc.
Supplementary literature	1. Bakr, M. Nonlinear Optimization in Electrical Engineering with Applications in MATLAB® . The Institution of Engineering and Technology, London.
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	1. What is the method of Lagrange multipliers 2. What is the purpose of Simplex method?
Work placement	Not applicable