GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Graph Algorithms, PG_00063910
Field of study	Algorytmy grafowe

Date of commencement of studies	February 2025	**Academic year of realisation of subject**	2025/2026
Education level	second-cycle studies	**Subject group**	Optional subject group Specialty 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	1	**Language of instruction**	Polish
Semester of study	2	**ECTS credits**	2.0
Learning profile	general academic profile	**Assessment form**	exam

Conducting unit	Department of Algorithms and Systems Modelling -> Faculty of Electronics Telecommunications and Informatics -> Wydziały Politechniki Gdańskiej

Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Dariusz Dereniowski				
	Teachers	prof. dr hab. inż. Dariusz Dereniowski				

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	15.0	30
	E-learning hours included: 0.0						
	eNauczanie source addresses: Moodle ID: 1351 Algorytmy grafowe https://enauczanie.pg.edu.pl/2025/course/view.php?id=1351						

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	30	4.0	16.0	50

Subject objectives	The aim of the course is learning skills in the area of analysis of graph algorithms. The analysis covers basic methods of algorithms design shown in selected examples.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W10] knows and understands, to an increased extent, the basic processes occurring in the life cycle of equipment, objects and technical systems, as well as methods of supporting processes and functions, specific to the field of study	Student gains ability to process and analyze scientific publications.	[SW2] Ocena wiedzy zawartej w prezentacji
	[K7_W01] knows and understands, to an increased extent, mathematics to the extent necessary to formulate and solve complex issues related to the field of study	Student learns mathematical tools for analysis of graph algorithms.	[SW1] Ocena wiedzy faktograficznej
	[K7_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study by: - appropriate selection of source information and its critical analysis, synthesis, creative interpretation and presentation, - application of appropriate methods and tools	Student learns to use the tools he or she learned to apply them in an analysis of a selected problem.	[SU5] Ocena umiejętności zaprezentowania wyników realizacji zadania
	[K7_U08] while identifying and formulating engineering tasks specifications and solving these tasks, can: - apply analytical, simulation and experimental methods, - notice their systemic and non-technical aspects, - make a preliminary economic assessment of suggested solutions and engineering work	Student uses selected tools during analysis of a given problem regarding graph algorithms.	[SU5] Ocena umiejętności zaprezentowania wyników realizacji zadania

Subject contents

Introduction

Introduction to graph theory

Search algorithms in graphs

Algorithms related to paths and trees

Basic properties of complex networks

Parameters in complex networks

Introduction to the graph coloring problem - definitions, models and applications

Generalization of the graph coloring problem

Some graph coloring algorithms

Prerequisites and co-requisites

Basic knowledge in the are of graph theory, discrete mathematics, foundations of analysis of algorithms and computational complexity.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Seminar	50.0%	60.0%
Exam	50.0%	40.0%

Recommended reading	Basic literature	T.H. Cormen, C.E. Leiserson, R.L. Rivest, Introduction to algorithms
		R.J. Wilson, Introduction to graph theory
		M.M. Sysło, N. Deo, J.S. Kowalik, Algorytmy optymalizacji dyskretnej, PWN
		M.Kubale (Ed.), Graph colorings, AMS
	Supplementary literature	None.
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Practical activites within the subject	Not applicable	

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