GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Graph Algorithms, PG_00048245
Field of study	Informatics

Date of commencement of studies	February 2024	Academic year of realisation of subject	2024/2025
Education level	second-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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	exam

Conducting unit	Department of Algorithms and Systems Modelling -> Faculty of Electronics, Telecommunications and Informatics

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

Lesson types and methods of instruction	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						

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	6.0	39.0	75

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_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] Assessment of factual knowledge
	[K7_W05] Knows and understands, to an increased extent, methods of process and function support, specific to the field of study.	Student learns methods of modeling selected systems.	[SW2] Assessment of knowledge contained in presentation
	[K7_U08] while identifying and formulating engineering tasks specifications and solving these tasks, can:n- apply analytical, simulation and experimental methods,n- notice their systemic and non-technical aspects,n- make a preliminary economic assessment of suggested solutions and engineering workn	Student uses selected tools during analysis of a given problem regarding graph algorithms.	[SU5] Assessment of ability to present the results of task
	[K7_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study by:n- appropriate selection of source information and its critical analysis, synthesis, creative interpretation and presentation,n- application of appropriate methods and toolsn	Student learns to use the tools he or she learned to apply them in an analysis of a selected problem.	[SU5] Assessment of ability to present the results of task
	[K7_U41] can select methods of modelling and analysis of information systems and applications using selected elements of theoretical computer science and modern programming tools	Student learns examples of using graph-theoretic methods for moeling exemplary systems.	[SU4] Assessment of ability to use methods and tools

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	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	