GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Graph Algorithms, PG_00063910		
Field of study	Informatics		
Date of commencement of studies	February 2026	Academic year of realisation of subject	2026/2027
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 -> Faculties of Gdańsk University of Technology		
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						

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_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] 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: - 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] Assessment of ability to present the results of task
[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_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] Assessment of knowledge contained in presentation

Subject contents

Course content – lecture
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

Course content – seminar
The seminar i conducted by researching a selected graph theory topic. The research is done by analysis of a given graph theory text which should result in preparing a presentation. The particular topics are individually selected for each student.

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
Exam	50.0%	40.0%
Seminar	50.0%	60.0%

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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