



## Subject card

Subject name and code	Graph Data Presentations, PG_00044134						
Field of study	Mathematics						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2022/2023		
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			blended-learning		
Year of study	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Probability Theory and Biomathematics -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Magdalena Lemańska					
	Teachers	dr inż. Magdalena Lemańska					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	15.0	0.0	60
	E-learning hours included: 3.0						
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	60		5.0		60.0	125
Subject objectives	The aim of the course is to familiarize students with the methods of data presentation using graph theory.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_U10	Student is able to make some proofs concerning graph theory using induction. He is able to write a given algorithm in various programming languages.			[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools		
	K7_W06	The student is able to use various programs (for example R) and the modules built into them, and program using the aforementioned tools.			[SW1] Assessment of factual knowledge		
	K7_K02	The student is able to work in a group and exchange necessary information with other students.			[SK4] Assessment of communication skills, including language correctness		
	K7_U09	Student knows the basic graph algorithms and is able to use them. He can model some phenomena using Petri nets. He knows the different types of trees used in computer science. Can present data using planar graphs.			[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools		

Subject contents	<p>1. How to save a graph in computer memory?</p> <p>2. Basic graph algorithms: Dijkstra algorithm, Floyd- Warshall algorithm, algorithms of flow in networks, traveling salesman problem, the problem of Chinese postman</p> <p>3. Petri nets.</p> <p>4 Graph isomorphism</p> <p>5. Planar graphs</p> <p>6. Different types of trees and their properties (spanning trees, decision trees, binary trees, arithmetics trees, algorithms concernig tres)</p>														
Prerequisites and co-requisites															
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="454 757 794 786">Subject passing criteria</th> <th data-bbox="799 757 1139 786">Passing threshold</th> <th data-bbox="1144 757 1473 786">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="454 792 794 822">Final test</td> <td data-bbox="799 792 1139 822">50.0%</td> <td data-bbox="1144 792 1473 822">34.0%</td> </tr> <tr> <td data-bbox="454 828 794 857">Laboratory</td> <td data-bbox="799 828 1139 857">50.0%</td> <td data-bbox="1144 828 1473 857">33.0%</td> </tr> <tr> <td data-bbox="454 864 794 893">Project</td> <td data-bbox="799 864 1139 893">50.0%</td> <td data-bbox="1144 864 1473 893">33.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Final test	50.0%	34.0%	Laboratory	50.0%	33.0%	Project	50.0%	33.0%
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Example issues/ example questions/ tasks being completed	<p>Find the minimum cut and the maximum flow in a given network.</p> <p>Apply the Dijkstra (Floyd Warshall) algorithm to a given graph.</p> <p>Prove that each planar graph can be colored with five colors.</p> <p>Decide whether graphs are isomorphic.</p> <p>Find the reachability graph for a given Petri net.</p>														
Work placement	Not applicable														