



## Subject card

Subject name and code	Graph Data Presentations, PG_00044134						
Field of study	Mathematics						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2024/2025		
Education level	second-cycle studies	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	1	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Zakład Równań Różniczkowych i Zastosowań Matematyki -> Instytut Matematyki Stosowanej -> 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: 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	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_W03] demonstrates knowledge advanced computation techniques, supporting the work of a mathematician and understand their limitations.		Student is able to use different packages for the graph presentation of data in the R environment and having programming itself using the above Tools.		[SW3] Assessment of knowledge contained in written work and projects		
	[K7_K03] works as a team; understands the necessity of systematic work on all projects that are long-term in nature, understands and appreciates the importance of intellectual honesty in one's own activities and the activities of other people; behaves ethically		Student can work in a group and exchange the necessary information with other students.		[SK1] Assessment of group work skills		
	[K7_U09] constructs mathematical models used in specific advanced applications of mathematics, can use stochastic processes as a tool for modeling phenomena and analyzing their evolution, constructs mathematical models used in specific advanced applications of mathematics, uses stochastic processes as a tool for modeling phenomena and analyzing their evolution, recognizes mathematical structures in physical theories		Student knows the basic graph algorithms and can use them. He can model certain phenomena using the Petri nets. Knows different types of trees used in computer science. Can present data on diagrams.		[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information		

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="456 748 794 779">Subject passing criteria</th> <th data-bbox="799 748 1137 779">Passing threshold</th> <th data-bbox="1142 748 1469 779">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 786 794 817">Final test</td> <td data-bbox="799 786 1137 817">50.0%</td> <td data-bbox="1142 786 1469 817">34.0%</td> </tr> <tr> <td data-bbox="456 824 794 855">Laboratory</td> <td data-bbox="799 824 1137 855">50.0%</td> <td data-bbox="1142 824 1469 855">33.0%</td> </tr> <tr> <td data-bbox="456 862 794 893">Project</td> <td data-bbox="799 862 1137 893">50.0%</td> <td data-bbox="1142 862 1469 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														

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