

Subject card

Subject name and code	Combinatorial Algorithms, PG_00179257						
Field of study	Informatics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
Education level	Master's studies		Subject group		Obligatory subject group in the field of study Optional subject group Subject group related to scientific research in the field of study		
Mode of study	part-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		7.0		
Learning profile	academic		Assessment form		exam		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr Maciej Dziemiańczuk				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	0.0	20.0	0.0	0.0	40
	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	40		0.0		0.0	40
Subject objectives	The aim of the course is to introduce selected combinatorial algorithms, their properties, and applications, as well as to familiarize students with English terminology						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[INFMU2_U05] can apply known algorithms in specific situations, can effectively select the type of algorithm depending on the problem at hand		The student is able to select an appropriate combinatorial algorithm and implement it to solve various problems. They can apply selected techniques used in combinatorial algorithms to solve NP-hard problems.		[SU2] presentation/project/paper/report [SU4] test/exam - oral or written		
	[INFMU2_W01] has in-depth knowledge of the branches of mathematics necessary for the study of computer science; has a good understanding of the role and importance of the construction of mathematical reasoning		The student knows the basic algorithms and techniques used in combinatorial algorithms and understands their applications to solving other problems.		[SW4] test/exam - oral or written		
Subject contents	1. Properties of selected combinatorial objects: permutations, set partitions, integer partitions, compositions, derangements. 2. Generation of selected combinatorial objects. 3. Search-based algorithms. 4. Greedy and dynamic programming algorithms. 5. Selected graph algorithms. 6. Minimax topics.						
Prerequisites and co-requisites							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	project	51.0%	25.0%
	tests	51.0%	25.0%
	exam	51.0%	50.0%
Recommended reading	Basic literature	1. W. Lipski: Kombinatoryka dla programistów, WNT 2007 2. T. H. Cormen, Ch. E. Leiserson, R. L. Rivest: Wprowadzenie do algorytmów. WNT, 1998 3. W. Lipski, W. Marek: Analiza kombinatoryczna. PWN, 1986. 4. R.J. Wilson: Wprowadzenie do teorii grafów, PWN 2008	
	Supplementary literature	not applicable	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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