

Subject card

Subject name and code	Discrete mathematics p.2, PG_00155313						
Field of study	Informatics						
Date of commencement of studies	October 2024		Academic year of realisation of subject			2024/2025	
Education level	Bachelor's studies		Subject group			Obligatory subject group 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 polish	
Semester of study	2		ECTS credits			6.0	
Learning profile	academic		Assessment form			exam	
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. Andrzej Szepietowski				
	Teachers		dr Andrzej Borzyszkowski				
			prof. dr hab. Andrzej Szepietowski				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	0.0	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		0.0		90.0	150
Subject objectives	Familiarization with the basics of discrete mathematics in accordance with the needs of computer science.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[INFL3_U03] can design and analyze algorithms for their correctness and computational complexity using appropriate algorithmic techniques and data structures	is able to design and analyze algorithms in terms of their correctness and computational complexity	[SU1] oral statement/conversation/discussion [SU4] test/exam - oral or written
	[INFL3_U02] can precisely formulate questions to deepen one's understanding of a given topic or find missing elements of reasoning	the student is able to estimate the complexity of algorithms using recursive equations	[SU1] oral statement/conversation/discussion [SU4] test/exam - oral or written
	[INFL3_W02] has knowledge of discrete mathematics and probabilistic methods and statistics	the student has basic knowledge of discrete mathematics (number theory, recursion, graph theory) the student knows the basic algorithms (Euclidean, fast exponentiation, graph search, merge-sort, primality tests, shortest path search) and heuristics (divide and conquer) the student knows the mechanism of recursion and methods of solving recursive equations knows the mechanisms of encryption with a private key, electronic signature, and data security knows basic data structures (binary trees, binary search trees, stacks, queues)	[SW4] test/exam - oral or written [SW1] oral statement/conversation/discussion
Subject contents	Number theory: divisibility of numbers, greatest common divisor, Euclid's algorithm, congruence relation, prime numbers and prime number distribution theorems, prime number recognition, Euler's theorem, Chinese remainder theorems, fast exponentiation algorithm, linear and RSA ciphers. Recursions, examples of recursive algorithms, Towers of Hanoi, solving linear recursions, generating functions and their applications. Data structures: queue stacks, trees, tree search algorithms, arithmetic expression representation, binary search, merge sort. Undirected and directed graphs, trees, tree counting, Euler cycles and paths, searching Euler cycles, Hamilton graphs, associations in graphs, shortest path search, planarity of graphs, graph coloring.		
Prerequisites and co-requisites	Knowledge of mathematics in secondary school.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	exam	50.0%	90.0%
	tests	50.0%	10.0%
Recommended reading	Basic literature	1. A. Szepietowski, Matematyka dyskretna, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2004. 2. V. Bryant, Aspekty kombinatoryki, Wydawnictwa Naukowo-Techniczne, Warszawa 2007. 3. J. Jaworski, Z. Palka, J. Szymański, Matematyka dyskretna dla informatyków, Wydawnictwo Naukowe UAM, Poznań 2007.	
	Supplementary literature	1. R.J. Wilson, Wprowadzenie do teorii grafów, Państwowe Wydawnictwo Naukowe, Warszawa 2012. 2. Materiały do matematyki dyskretnej znajdujące się pod adresem wazniak.mimuw.edu.pl.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	not applicable		
Work placement	Not applicable		

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