

Subject card

Subject name and code	Discrete Mathematics, PG_00155246						
Field of study	Mathematical Modeling and Data Analysis						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
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 or english		
Semester of study	2		ECTS credits		5.0		
Learning profile	academic		Assessment form		exam		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Ewa Tyszkowska				
	Teachers						
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		5.0		60.0	125
Subject objectives	The aim of the course is to familiarize students with general methods of discrete mathematics, that is, mathematics dealing with finite (or at most countable) structures, and to develop the skills of abstract thinking and understanding problems in discrete mathematics. These skills are necessary for studying most branches of mathematics.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[MMiADL3_K09] is ready to critically evaluate arguments, find gaps in reasoning, and constructively criticise other people's reasoning	Students are prepared to critically evaluate arguments, identify gaps in reasoning, and provide constructive criticism of others' arguments	[SK1] oral statement/conversation/discussion
	[MMiADL3_K04] is ready to understand and appreciate the importance of intellectual honesty in own and other people's actions; is ready to act ethically	Students understand and appreciate the importance of intellectual honesty in their own actions and those of others; act ethically.	[SK8] observation of student's independent or team work
	[MMiADL3_K02] is ready to precisely formulate questions to deepen his/her own understanding of a given topic or to find missing elements of reasoning	Students are able to formulate questions precisely, aimed at deepening their own understanding of a given topic or identifying missing elements in their reasoning.	[SK1] oral statement/conversation/discussion
	[MMiADL3_W01] knows the basic concepts, methods and theorems of mathematical logic and set theory	Students know the fundamentals of discrete mathematics: basic algorithms in the fields of arithmetic in number systems with different bases, number theory, combinatorics, and graph theory; know selected data encryption methods; understand the concept of recursiveness and basic recursive algorithms; are familiar with fundamental inference methods.	[SW4] test/exam - oral or written
	[MMiADL3_K06] is ready to formulate opinions on basic mathematical issues	Students are able to formulate opinions on basic mathematical issues.	[SK1] oral statement/conversation/discussion
	[MMiADL3_K01] is ready to accept the limitations of his/her own knowledge and understands the need for further education	Students are aware of the limitations of their own knowledge and understand the need for further education	[SK8] observation of student's independent or team work
[MMiADL3_U01] correctly uses the learned concepts of mathematical logic and set theory	Students correctly apply the concepts of mathematical logic and set theory that they have learned.	[SU4] test/exam - oral or written	
Subject contents	1. Elements of logic and set theory: calculus of logical sentences,, equivalence relation, orders. 2. Elements of combinatorics: counting and generating combinatorial objects (sequences, permutations, subsets). 3. Arithmetic: counting systems.4.Boolean algebras: Boolean functions, Boolean expressions.5. Elements of number theory: divisibility of numbers, Euclid's algorithm. Application of number theory in cryptography.6. Simple data structures. Lists, stacks, queues, trees, binary trees, arithmetic expression trees. 7. Recursion: recursive functions, methods of solving recursive equations.8. Elements of graph theory: trees, graph isomorphism, Eulerian graphs and Hamiltonian graphs.		
Prerequisites and co-requisites	not required		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture grade: written exam result	51.0%	50.0%
	Assessment of exercises based on: test results, results obtained from homework, activity in classes.	51.0%	50.0%
Recommended reading	Basic literature	1. Andrzej Szepietowski, Matematyka dyskretna, Wyd. UG 2004. 2. Kenneth A. Ross, Charles R.B. Wright, Matematyka Dyskretna, Wydawnictwo Naukowe PWN, 1996. 3. Hanna Furmańczyk, Karol Horodecki, PAweł Żyliński, Matematyka dyskretna dla studentów kierunku Informatyka, Wydawnictwo Uniwersytetu Gdańskiego, 2010.	
	Supplementary literature	not required	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Assignments are presented in the script Discrete Mathematics for students of Computer Science		
Work placement	Not applicable		

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