



## Subject card

Subject name and code	Elements of discrete mathematics, PG_00045294						
Field of study	Data Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2022/2023		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study 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			English		
Semester of study	2	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Algorithms and Systems Modelling -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Joanna Raczek					
	Teachers	dr inż. Joanna Raczek					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	0.0	0.0	30
	E-learning hours included: 0.0						
	Elements of Discrete Mathematics 2023 - Moodle ID: 27515 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=27515">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=27515</a>						
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	30	4.0		16.0		50
Subject objectives	Acquiring the ability to use a formal mathematical language. Acquiring the ability to express relationships, dependencies, configurations in a strict form. Understanding the essence of proof reasoning and construction.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W06] Knows the criteria and concepts of artificial intelligence, understands the operation of algorithms for intelligent computing, the concept of descriptive logic, combinatorial optimization algorithms, methods of construction, analysis and evaluation of algorithms, including discrete ones and problems of resolving conflicts in non-algorithmic decision making.	The student understands the difference between easy and difficult algorithmic problems. For the latter, he becomes familiar with possible approaches to find approximate solutions using heuristics.			[SW1] Assessment of factual knowledge		
	[K6_W01] has basic knowledge in the field of mathematics, including mathematical analysis, algebra, geometry, probability calculus, statistics and numerical methods, necessary to formulate and solve simple tasks in the field of IT	The student learns about the concepts of discrete mathematics used in other branches of mathematics and computer science. In addition, learns to solve problems.			[SW1] Assessment of factual knowledge		
	[K6_U03] analyses problems and creates appropriate models, data structures and algorithms (including heuristic and numerical ones), assesses their computational complexity, estimates errors of the received solutions	Student gets knowledge and abilities in graph theory and algorithms.			[SU1] Assessment of task fulfilment		

Subject contents	Review of mathematical logic. Set algebra. Propositional statements. Predicate calculus. Mathematical induction. Binary relations: equivalence relations, the principle of abstraction, orders. Graph theory - notation, basic concepts, Eulerian graphs, the Chinese postman problem, Hamiltonian graphs, the traveling salesman problem, tree properties, planarity, graph colourings. Dijkstra algorithm, algorithms for minimal spanning tree.		
Prerequisites and co-requisites	Basic mathematical skills		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Tests	50.0%	100.0%
	Activity in class	0.0%	0.0%
Recommended reading	Basic literature	K. H. Rosen, Discrete Mathematics and Its Applications  K. A. Ross, C. R. Wright, Discrete Mathematics	
	Supplementary literature	R.J. Wilson, Introduction to graph theory.  E.G. Goodaire, M. M. Parmenter, Discrete Mathematics with Graph Theory, Prentice Hall	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		