



Subject card

Subject name and code	Discrete Mathematics, PG_00036609						
Field of study	Mathematics						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2023/2024		
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			Polish		
Semester of study	2	ECTS credits			6.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Probability Theory and Biomathematics -> 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	30.0	0.0	0.0	0.0	60
	E-learning hours included: 0.0 Adresy na platformie eNauczanie: Matematyka Dyskretna 2024 - Moodle ID: 27966 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=27966						
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	85.0	150		
Subject objectives	Introduction to methods integrating various branches of mathematics.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_W04	The student knows the Chinese remainder theorem, the basic theorems of the graph theory, the theorem on the existence of a solution for some recursive equations.			[SW2] Assessment of knowledge contained in presentation		
	K6_U02	He can carry out easy proofs by induction method, he can formulate and solve simple recursive equations.			[SU4] Assessment of ability to use methods and tools		
	K6_U01	The student is able to formulate theorems and understands them.			[SU2] Assessment of ability to analyse information		
	K6_U10	He can model and solve discrete problems.			[SU2] Assessment of ability to analyse information		
	K6_W06	The student knows selected concepts and methods of mathematical logic, set theory and discrete mathematics contained in the foundations of other mathematical disciplines.			[SW2] Assessment of knowledge contained in presentation		

Subject contents	<p>Elements of combinatorics: a) Pigeonhole principle, switching on and off principle - 2 hours</p> <p>Recurrences: a) Fibonacci sequence, Hanoi towers, simple recursive equations - 2 hours b) recursive equations, prediction method - second and higher order equations - 4 hours c) recursive equations, the forming function method - 2 hours</p> <p>Number theory: a) integer division, divisibility of numbers, congruence relation, abstraction class, Z_m ring, the largest common divisor - 2 hours b) Euclid's algorithm, extended Euclid's algorithm, prime numbers and relatively prime numbers, reversible elements - 2 hours c) solving congruence equations, the Chinese remainder theorem, the Euler function, - 2 hours d) RSA algorithm - 2 hours</p> <p>Graphs</p> <p>basic definitions, types of graphs, graph complementation, graph isomorphism - 1 hour</p> <p>Eulerian and Hamiltonian graphs, Euler theorem, Ore theorem, finding the longest and shortest path, the problem of the Chinese postman, - 2 hours trees - 3 hours different versions of Hall's theorem - 2 hours planar graphics - 2 hours coloring of vertices and edges of graphs - 2 hours</p>											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="454 902 794 925">Subject passing criteria</th> <th data-bbox="799 902 1139 925">Passing threshold</th> <th data-bbox="1144 902 1482 925">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="454 931 794 954">Tests</td> <td data-bbox="799 931 1139 954">50.0%</td> <td data-bbox="1144 931 1482 954">60.0%</td> </tr> <tr> <td data-bbox="454 960 794 983">Exam</td> <td data-bbox="799 960 1139 983">50.0%</td> <td data-bbox="1144 960 1482 983">40.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Tests	50.0%	60.0%	Exam	50.0%	40.0%
Subject passing criteria	Passing threshold	Percentage of the final grade										
Tests	50.0%	60.0%										
Exam	50.0%	40.0%										
Recommended reading	Basic literature	<p>„Matematyka dyskretna” Andrzej Szepietowski</p> <p>„Matematyka dyskretna” Kenneth A. Ross, Charles R.B. Wright</p>										
	Supplementary literature	<p>http://mediawiki.ilab.pl/index.php/Matematyka_dyskretna_1</p> <p>„Teoria grafów” Robin Wilson</p>										
	eResources addresses	<p>Matematyka Dyskretna 2024 - Moodle ID: 27966 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=27966</p>										
Example issues/ example questions/ tasks being completed	<p>Solve the Fibonacci equation. Provide and prove the Chinese claim about the rest. Provide and prove the Euler-Hierholtz theorem. Provide and prove the claim of five colors. Solve the recursive equation. Solve the congruence system. Inductively prove that the $n-1$ edge is in the tree with n vertices.</p>											
Work placement	Not applicable											