

Subject card

Subject name and code	Mathematics for Informatics, PG_00143952						
Field of study	Informatics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	Master's 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	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		6.0		
Learning profile	academic		Assessment form				
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	30.0	0.0	30.0	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	The aim of the course is to introduce students to fundamental combinatorial objects, generating functions, and basic counting techniques. Familiarizing students with English terminology.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[INFMU2_U01] can apply mathematical knowledge to formulate, analyze and solve tasks related to computer science	Is familiar with basic combinatorial objects used for describing and analyzing the computational complexity of algorithms. Can derive formulas for the count of simple combinatorial objects such as sequences, permutations, combinations, variations, partitions of numbers, and partitions of sets.	[SU4] test/exam - oral or written
	[INFMU2_K01] knows the limits of his own knowledge and understands the need for further learning	Is aware of the limitations of their knowledge in combinatorics and understands the need for further learning.	[SK8] observation of student's independent or team work
	[INFMU2_U03] designs, analyzes for correctness and computational complexity, and builds algorithms using advanced programming techniques and data structures	Can utilize knowledge of combinatorics to analyze the computational complexity of algorithms.	[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	Is familiar with basic mathematical structures used to describe algorithms. Knows fundamental concepts and techniques used for analyzing the computational complexity of algorithms.	[SW4] test/exam - oral or written
	[INFMU2_U02] is able to formulate questions with precision, serving to deepen his/her own reasoning on a given topic or to find missing elements of reasoning	Can formulate precise questions regarding basic combinatorial techniques.	[SU8] observation of student's independent or team work
Subject contents	1. Counting combinatorial objects: sequences, subsets, permutations, derangements, set partitions, integer partitions, necklaces, arrangements of balls in boxes; 2. Principle of sum, product, pigeonhole, double counting; 3. Counting non-isomorphic objects, Burnside's lemma and Polya's theorem; 4. Generating functions, solving recurrences;		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	tests	51.0%	50.0%
	exam	51.0%	50.0%
Recommended reading	Basic literature	1. G. E. Martin, Counting: The Art of Enumerative Combinatorics, Springer 2001; 2. P. J. Cameron, Combinatorics, Cambridge University Press, 1994;	
	Supplementary literature	not applicable	
	eResources addresses		
Example issues/ example questions/ tasks being completed	not applicable		
Work placement	Not applicable		

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