

Subject card

Subject name and code	Mathematical foundations of computer science, PG_00143986						
Field of study	Informatics						
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		
Semester of study	2		ECTS credits		2.0		
Learning profile	practical		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	15.0	15.0	0.0	0.0	0.0	30
	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	30		0.0		20.0	50
Subject objectives	The aim of the course is to introduce the basics of automata theory and formal languages, develop skills in working with regular expressions, using context-free grammars, and basic Turing machines. Familiarizing students with English terminology.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[INFL3_K02] can precisely formulate questions to deepen his/her own understanding of a given topic or to find missing elements of reasoning		Can formulate precise questions regarding the computational complexity of problems		[SK8] observation of student's independent or team work		
	[INFL3_W02] has ordered, theoretically founded general knowledge in artificial intelligence, formal languages, numerical methods		Has basic knowledge in the field of formal languages. Knows the definitions and examples of regular expressions, finite automata, context-free grammars, pushdown automata, and Turing machines. Understands the definition of time complexity for Turing machines.		[SW4] test/exam - oral or written		
	[INFL3_U01] can apply mathematical knowledge to formulate, analyse and solve tasks related to computer science, design and analyze algorithms in terms of their correctness and computational complexity		Can analyze simple problems in terms of computational complexity.		[SU4] test/exam - oral or written		
Subject contents	1. Finite automata, regular expressions, nondeterministic automata, determinization theorem, equivalence of finite automata and regular expressions theorem, pumping lemma. 2. Context-free grammars, pushdown automata, parse trees. 3. Turing machines.						

Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	test	51.0%	100.0%
Recommended reading	Basic literature	1. J. Jędrzejowicz, A. Szepietowski, Języki Automaty Złożoność Obliczeniowa, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk, 2008. 2. J. E. Hopcroft, J. D. Ulman, Introduction to automata theory, languages and computing, Addison-Wesley, 1979.	
	Supplementary literature	not applicable	
	eResources addresses		
Example issues/ example questions/ tasks being completed	not applicable		
Work placement	Not applicable		

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