

Subject card

Subject name and code	Mathematical foundations of computer science, PG_00143986						
Field of study	Informatics						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2024/2025		
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		
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		dr Maciej Dziemiańczuk dr inż. Monika Rosicka				
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.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[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.		[SU1] oral statement/conversation/discussion [SU4] test/exam - oral or written		
	[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 [SW1] oral statement/conversation/discussion		
	[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		[SK1] oral statement/conversation/discussion [SK8] observation of student's independent or team work		

Subject contents	1. Finite automata, regular expressions, nondeterministic automata, determinization theorem, equivalence of finite automata and regular expressions theorem, pumping lemma. 2. Chomsky grammars, context-free grammars, pushdown automata, parse trees. Parsers. Pumping lemma for context-free languages, context-sensitive grammars, linear-bounded automata. 3. Turing machines, recursively enumerable and recursively enumerable languages, decidability and undecidability problems, halting problem.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	class participation	0.0%	10.0%
	test	50.0%	90.0%
Recommended reading	Basic literature	1. J. Jędrzejowicz, A. Szepietowski, Języki Automaty Złożoność Obliczeniowa, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk, 2008. 2. J. E. Hopcroft, J. D. Ullman, Introduction to automata theory, languages and computing, Addison-Wesley, 1979.	
	Supplementary literature	not applicable	
	eResources addresses	Adresy na platformie eNauczenie:	
Example issues/ example questions/ tasks being completed	not applicable		
Work placement	Not applicable		

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