

**Subject card**

<b>Subject name and code</b>	Automata, Languages and Computational Complexity, PG_00198008						
<b>Field of study</b>	Informatics						
<b>Date of commencement of studies</b>	October 2026	<b>Academic year of realisation of subject</b>			2027/2028		
<b>Education level</b>	Bachelor's studies	<b>Subject group</b>			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>			at the university		
<b>Year of study</b>	2	<b>Language of instruction</b>			Polish		
<b>Semester of study</b>	4	<b>ECTS credits</b>			5.0		
<b>Learning profile</b>	academic	<b>Assessment form</b>			exam		
<b>Conducting unit</b>							
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		prof. dr hab. Andrzej Szepietowski				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	30.0	30.0	0.0	0.0	0.0	60
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	60		0.0		65.0	125
<b>Subject objectives</b>	The aim of the course is to introduce the basics of automata theory and formal languages, develop skills in manipulating regular expressions, and using context-free grammars.						
<b>Learning outcomes</b>	<b>Course outcome</b>		<b>Subject outcome</b>			<b>Method of verification</b>	
	[[INFOL3_U06] can select and apply appropriate methods and IT tools to solve complex problems						
	[[INFOL3_U02] is able to use his/her knowledge of higher mathematics to model and solve complex problems						
	[[INFOL3_W03] knows and understands advanced concepts in the field of algorithms and data structures, formal languages, automata theory and computational complexity, and artificial intelligence		Is familiar with the basics 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	
<b>Subject contents</b>	1. Finite automata, regular expressions, nondeterministic automata, determinization theorem, equivalence theorem between finite automata and regular expressions, 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.						
<b>Prerequisites and co-requisites</b>							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	exam	51.0%	90.0%
	tests	51.0%	10.0%
Recommended reading	Basic literature	1. J. Hopcroft, J. Ullman - Wprowadzenie do teorii automatów, języków i obliczeń, PWN 1994; 2. J. Jędrzejowicz, A. Szepietowski Języki, automaty, złożoność obliczeniowa Wyd. UG 2008;	
	Supplementary literature	not applicable	
	eResources addresses		
Example issues/ example questions/ tasks being completed	not applicable		
Work placement	Not applicable		

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