

Subject card

Subject name and code	Algorithms and Data Structures p.2, PG_00143482						
Field of study	Informatics						
Date of commencement of studies	October 2025		Academic year of realisation of subject			2026/2027	
Education level	Bachelor'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	4		ECTS credits			3.0	
Learning profile	academic		Assessment form				
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr Paweł Pączkowski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	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		45.0	75
Subject objectives	Familiarizing students with advanced classical algorithms and data structures used to effectively solve typical programming tasks, methods of implementing the studied algorithms, analysis of the time complexity of these algorithms and justification of their correctness						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[INFL3_W03] has structured, theoretically grounded general knowledge in the field of algorithms and data structures, formal languages, automata theory and computational complexity, and artificial intelligence	knows selected advanced data structures and operations on them knows examples of algorithms implementing strategies: divide and conquer, dynamic programming, greedy strategy knows facts about the time complexity of the studied algorithms	[SW4] test/exam - oral or written
	[INFL3_U03] can design and analyze algorithms for their correctness and computational complexity using appropriate algorithmic techniques and data structures	can illustrate on an example the operation of algorithms operating on various tree structures can provide definitions of selected advanced data structures can program the studied algorithms presented in the form of pseudocode	[SU4] test/exam - oral or written [SU5] implementation of a problem task
	[INFL3_U02] can precisely formulate questions to deepen one's understanding of a given topic or find missing elements of reasoning	can formulate statements about algorithms and data structures and understands the need for further education	[SU5] implementation of a problem task
Subject contents	- Advanced data structures: B-trees, data structures for families of disjoint sets - Methods of constructing effective algorithms: "divide and conquer" method, dynamic programming (longest common subsequence), greedy strategy (Huffman's algorithm). - Justification of the correctness and analysis of the time complexity of the discussed algorithms - Familiarizing students with the terminology in English		
Prerequisites and co-requisites	Discrete Mathematics, Programming Languages Programming skills, knowledge of mathematical apparatus at the level of a Discrete Mathematics lecture		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	programs (70%) and tests (30%)	51.0%	50.0%
	test with open questions	51.0%	50.0%
Recommended reading	Basic literature	T. H. Cormen, C. E. Leiserson , R. L. Rivest, C. Stein, Wprowadzenie do algorytmów, Wydawnictwo Naukowe PWN 2012. L. Banachowski, K. Diks, W. Rytter, Algorytmy i struktury danych, WNT 2011	
	Supplementary literature	no recommendations	
	eResources addresses		
Example issues/ example questions/ tasks being completed	- Provide the worst-case time complexity of the 'insert' operation in a B-tree, justify the given estimate. - Write and test a program that generates Huffman codes for a given text; print the code table.		
Work placement	Not applicable		

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