University of Gdańsk

Subject card

Subject name and code	Algorithms and Data Structures p.2, PG_00143482		
Field of study	Informatics		
Date of commencement of studies	October 2024	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	2	Language of instruction	Polish
Semester of study	4	ECTS credits	3.0
Learning profile	academic	Assessment form	credit
Conducting unit			
Name and surname of lecturer (lecturers)	Subject supervisor	dr Paweł Pączkowski	
	Teachers	dr Paweł Pączkowski dr hab. Paweł Żyliński	

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	[SU1] oral statement/conversation/ discussion [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	[SU8] observation of student's independent or team work

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

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%)	40.0%	50.0%
exam	40.0%	50.0%

Recommended reading

Basic literature	• T. H. Cormen, C. E. Leiserson , R. L. Rivest, C. Stein, Wprowadzenie do algorytmów, Wydawnistwo 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

to be given during lectures

Work placement

Not applicable

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