GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Algorithms and Data Structures, PG_00058919						
Field of study	Informatics						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2026/2027			
Education level	first-cycle studies		Subject group	Optional subject group Subject group related to scientific research in the field of study			
Mode of study	Part-time studies		Mode of delivery	at the university			
Year of study	1		Language of instruction	Polish			
Semester of study	2		ECTS credits	8.0			
Learning profile	general academic profile		Assessment form	exam			
Conducting unit	Department of Algorithms and Systems Modelling -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Marcin Jurkiewicz				
	Teachers		dr Marcin Jurkiewicz				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	15.0	0.0	45
	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	45		8.0	147.0		200
Subject objectives	The aim of the course is to introduce the participant to the topic of algorithms and data structures.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study	can analyze a problem and, based on that, select appropriate algorithms and data structures to solve it	[SU1] Assessment of task fulfilment
[K6_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment	is able to analyze an algorithm and use it to solve a given problem	[SU1] Assessment of task fulfilment
[K6_W44] knows and understands, to an advanced extent, architecture, design principles and methods of hardware and software support for local and distributed information systems, including computing systems, databases, computer networks and information applications, as well as the principles of human-computer interaction, the operation and evaluation criteria of data processing, storage and transfer methods, including computational algorithms, artificial intelligence and data mining as well as standards and methods of IT systems administration, monitoring of processes and robustness to undesirable phenomena and activities	knows and understands how algorithms work and can evaluate their properties	[SW1] Assessment of factual knowledge
[K6_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study and perform tasks, in an innovative way, in not entirely predictable conditions, by:n- appropriate selection of sources and information obtained from them, assessment, critical analysis and synthesis of this information,n- selection and application of appropriate methods and toolsn	knows the concept of exact and approximate algorithms, is able to adapt an algorithm to the considered conditions of a problem (e.g., time)	[SU1] Assessment of task fulfilment

Subject contents

Course content – lecture
Concept of algorithms and data structures; formal representation of computational problems and the definition of input size.
Fundamental data structures (dictionaries, stacks, queues, lists, hash tables, trees, etc.).
Sorting algorithms.
Exhaustive search algorithms and greedy algorithms.
Heuristics and approximation methods.
Graph algorithms.
Dynamic programming.
Real-world complex networks.
Big-O notation, fundamentals of computational complexity analysis, and the theory of NP-completeness.

Course content – project
Tasks to be completed based on the topics presented in the lecture.

Prerequisites and co-requisites

basic knowledge of C language

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Lecture	50.0%	50.0%
Project	50.0%	50.0%

Recommended reading	Basic literature	T.Cormen i in. "Introduction to data structures
	Supplementary literature	M.Kubale "Introduction to computational complexity and algorithmic graph coloring"
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Practical activites within the subject	Not applicable	

Document generated electronically. Does not require a seal or signature.