



## Subject card

Subject name and code	Database Structures, PG_00047893						
Field of study	Informatics						
Date of commencement of studies	October 2021		Academic year of realisation of subject		2023/2024		
Education level	first-cycle studies		Subject group		Optional subject group 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	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Software Engineering -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Krzysztof Goczyla				
	Teachers		prof. dr hab. inż. Krzysztof Goczyla				
			dr inż. Grzegorz Gołaszewski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	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		6.0		14.0	50
Subject objectives	The purpose of the course is to deliver to students comprehensive knowledge about file structures used at the physical level of databases.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W04] Knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices		The student knows the basic and advanced file organizations used in database systems at the physical level.		[SW1] Assessment of factual knowledge		
	[K6_W03] Knows and understands, to an advanced extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum		The student knows how to define authorization rules for access to data.		[SW1] Assessment of factual knowledge		
Subject contents	1. Peculiarities of physical access to data on disks 2. Serial files 3. Sequential files organization, reorganization 4. Sorting sequential files by simple merge 5. Sorting sequential files by natural merge 6. Sorting sequential files by polyphase merge 7. Sorting sequential files with a large in-memory buffers 8. Indexed-sequential files organization 9. Indexed files organization, primary and secondary indexes 10. B-trees organization 11. Searching in B-trees 12. Inserting into B-trees 13. Deleting from B-trees 14. B+-trees as clustered indexes 15. Files with static hashing organization 16. Extendable hashing 17. Linear hashing 18. Bitmapped indexes 19. Multi-dimensional indexing: R-trees, Quadrees 20. RAID systems efficiency and reliability issues 21. Solid-state storage devices						

Prerequisites and co-requisites	A database systems course is required		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	50.0%	50.0%
	Project	50.0%	50.0%
Recommended reading	Basic literature	T. Pankowski. Podstawy baz danych. PWN, 1992 H. Garcia-Molina, J.D.Ullman, J. Widom Implementacja systemów baz danych. WNT 2003. N. Wirth. Algorytmy+Struktury danych=Programy. WNT 2004. K. Goczyła. "Struktury baz danych". Materiały do wykładu. Gdańsk, 2009.	
	Supplementary literature	No requirements	
	eResources addresses	Adresy na platformie eNauczanie: Struktury baz danych - 2023 - Moodle ID: 30716 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=30716">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=30716</a>	
Example issues/ example questions/ tasks being completed	1. Show graphically a B-tree with given parameters  2. Sort an exemplary file using a given method  3. What is clustered index?  4. Describe hashing for disk files  5. Explain the inverted file structure and usage for text files indexing  6. Show an exemplary B-tree transformations by a sequence of inserts/deletes.		
Work placement	Not applicable		