

GDAŃSK UNIVERSITY

Subject card

Subject name and code	Database Structures, PG_00047893							
Field of study	Informatics							
Date of commencement of studies	October 2024		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	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 Softwa	partment of Software Engineering -> Faculty of Electronics, Telecommunications and Inforr				ons and Information	atics	
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. ir	nż. Krzysztof G	oczyła			
	Teachers prof. dr hab. inż. Krzysztof Goczyła							
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	ect Seminar		SUM
of instruction	Number of study hours	15.0	0.0	0.0	15.0		0.0	30
	E-learning hours inclu	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in classes includ plan	n didactic ed in study	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_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		
	[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		
Subject contents	 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, Quadtrees 20. RAID systems efficiency and reliability issues 21. Solid-state storage devices A database systems course is required 							
Prerequisites	reorganization 4. Sor Sorting sequential file Indexed-sequential file trees organization 11 as clustered indexes 18. Bitmapped indexe reliability issues 21. S A database systems	ting sequential es by polyphase les organizatior . Searching in E 15. Files with s es 19. Multi-dim Solid-state stora course is requir	files by simple e merge 7. Sort 9. Indexed file 8-trees 12. Inse tatic hashing o lensional index ge devices red	merge 5. Sortii ting sequential es organization erting into B-tre rganization 16. ting: R-trees, Q	ng sequ files wit , primar es 13. I Extenc uadtree	iential fi h a larg y and s Deleting lable ha es 20. R	les by natural r e in-memory b econdary inde: from B-trees shing 17. Line: AID systems e	nerge 6. uffers 8. kes 10. B- I4. B+-trees ar hashing fficiency and

Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Project	50.0%	50.0%				
	Midterm colloquium	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:					
Example issues/ example questions/ tasks being completed	1. Show graphically a B-tree with giv	ren 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 transormations by a sequence of inserts/deletes.						
Work placement	Not applicable						

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