GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Nonrelational databases, PG_00064003		
Field of study	Data Engineering, Data Engineering		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2028/2029
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	blended-learning
Year of study	3	Language of instruction	English
Semester of study	5	ECTS credits	6.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Software Engineering -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Teresa Zawadzka	
	Teachers	dr inż. Teresa Zawadzka dr inż. Grzegorz Gołaszewski	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	30.0	30.0	0.0	75

E-learning hours included: 15.0

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	75	5.0	70.0	150

Subject objectives

The aim of the course is to familiarize students with the basic types of non-relational databases.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U07] uses information technologies to improve the acquisition, analysis and processing of data in business applications	The student can design, in accordance with the given specification (based on usage scenarios and competency queries resulting from business applications), a document, graph, and key-value database. In addition, the student can formulate and execute queries in languages (formulas/functions) specific to a given type of non-relational database.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
[K6_W07] analyzes business processes in an advanced way in the technical, legal, economic, financial and social context	The student can select the appropriate type of non-relational database for a specific business application.	[SW1] Assessment of factual knowledge
[K6_W05] integrates data from multiple sources in order to analyze complex business problems	Student potrafi załadować dane do nierelacyjnej bazy danych.	[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge

Subject contents	Course content – lecture 1. Introduction to NoSQL databases - types of NoSQL databases - introduction to distributed databases - CAP - BASE 2. Document databases - MongoDB 3. Key-value databases - Redis 4. Graph databases - Neo4J Course content – laboratory Graph Databases: - practical examples of graph database design, - CYPHER language, - execution of graph analysis algorithms. Document databases: - JSON/BSON notation, - MongoDB Query Language (MQL), - Aggregation pipeline. Key-value databases: - Redis query language, - Data types available in Redis, - Pseudo-indices. Course content – project Document Databases: - Design of a database schema and database queries for a selected business case Key-Value Databases: - Design of a database schema and database queries for a selected business case Graph Databases: - Design and implementation of a graph database for a selected business case
Prerequisites and co-requisites	Completion of a course(s) in relational databases. Proven knowledge of: - ERD modeling, - building relational database schemas, - knowledge of SQL for CRUD operations. Completion of a course(s) in graph data structures. Proven knowledge of: - graph modeling, - basic graph algorithms.

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Project development</td><td>50.0%</td><td>35.0%</td></tr>
<tr><td>Tasks</td><td>50.0%</td><td>35.0%</td></tr>
<tr><td>Exam</td><td>50.0%</td><td>30.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. Professional NoSQL, Shashanki Tiwari, Wiley, 2011.
2. MongDB, The Definitive Guide, Kristina Chodorow, O'Reilly, 2013
3. Graph Databases: New Opportunities for Connected Data, Ian Robinson and Jim Webber, O'Reilly 2015.</td></tr>
<tr><td>Supplementary literature</td><td>Documentation of NoSQL databases.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">1. Model NoSQL database (key-value, document, graph)

2. Define and execute queries</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="2">Not applicable</td></tr>
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