University of Gdańsk

Subject card

Subject name and code	Databases, PG_00197994						
Field of study	Informatics						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2026/2027		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study 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	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		5.0		
Learning profile	academic		Assessment form		exam		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr Andrzej Borzyszkowski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	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	60		0.0		65.0	125
Subject objectives	Theoretical and practical introduction to relational database systems. In the theoretical component, students will learn the theoretical foundations of database design, the concept of transactions, the principles of integrating databases into a broader programming environment, and the security and confidentiality measures supported by database systems. In the practical component, students will develop their own database project and master SQL, the standard language used in database systems.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[INFOL3_U06] is able to select and apply appropriate IT methods and tools to solve complex problems, is able to use acquired knowledge by appropriately selecting sources and information derived from them, and perform evaluation, critical analysis, and synthesis of this information	Designs and analyzes data structures for correctness. Uses established formats for representing various types of data as appropriate to the situation (entity-relationship diagrams—ERDs).	[SU2] presentation/project/paper/report [SU4] test/exam - oral or written
[INFOL3_U02] is able to use his/her knowledge of higher mathematics to model and solve complex problems	Will design a database in the form of an entity-relationship diagram, Create a test database based on the design, and develop a set of stored procedures and SQL queries that demonstrate the ability to use the designed database schema.	[SU2] presentation/project/paper/report [SU4] test/exam - oral or written
[INFOL3_W06] knows and understands advanced models of database systems, with particular emphasis on the relational model	Has a well-organized, theoretically grounded general knowledge of databases and software engineering, particularly in the area of database design, and is familiar with entity-relationship diagrams (ERDs) and the principles of normalization. He has knowledge of information management using relational databases and is familiar with SQL for defining data structures and manipulating data.	[SW4] test/exam - oral or written [SW2] presentation/project/paper/report

Subject contents

- Key concepts: data, database, database management system, features of database systems.
- Data modeling: entity-relationship model, entity-relationship diagrams, classification of binary relationships, normalization.
- Relational model: tables, relations vs tables, relation schemas, keys, and other integrity constraints. Mapping the entity-relationship model to the relational model. Relational algebra: truncation, projection, joins, set-theoretic operations, aggregate functions. Tuple calculus. Domain calculus.
- SQL: defining data, manipulating data, performing relational algebra operations, nesting, NULL values, views.
- Server-side programming, triggers. Client-side programming, database access via the Internet.
- Concurrency control: transactions, isolation levels, locks, and other tools.
- Database security.
- Complexity of database operations, indexes, and the query optimizer.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
exam	51.0%	40.0%
project	51.0%	20.0%
test	51.0%	40.0%

Recommended reading

Basic literature	course materials available on a webpage
Supplementary literature	1. Richard Stones, Neil Matthew: Bazy danych i PostgreSQL. ISBN: 83-7197-650-X, Helion 2002. 2. Eric Johnson, Joshua Jones Modelowanie danych w SQL Server 2005 i 2008. Przewodnik. Helion 2009. 3. R. Elmasri, S. Navathe, Fundamentals of Database Systems, Pearson 2007. 4. Judith S. Bowman, Sandra L. Emerson, Marcy Darnovsky: Podręcznik języka SQL. ISBN: 83-204-2596-4, Wydawnictwa Naukowo-Techniczne 2001. 5. C. J. Date, Wprowadzenie do systemów baz danych, WNT Warszawa, 2000. 6. J. D. Ulman. Systemy baz danych. WNT, Warszawa, 1988.
eResources addresses	

Example issues/ example questions/ tasks being completed

- What problems appear caused by a deletion in the presence of a foreign key? What are the solutions?
- How does SQL implement a multivalued relationship?
- What is the highest normal form to which a database design can always be reduced without losing functional dependencies? Which normal form might not be achievable? What solution do we use in that case?
- Give a few examples of the use of triggers.
- What problems can arise from concurrent access to a database?

Work placement

Not applicable

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