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

Learning a relational database system. In the practical part, the student will prepare his own database project, as well as master the SQL language, which is a standard in database systems. In the theoretical part, the student will learn about the foundations of database design, the concept of transactions, the principles of integration in a programming environment, the principles of security and confidentiality present 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		
[INFOL3_U02] is able to use his/her knowledge of higher mathematics to model and solve complex problems		
[INFOL3_W06] knows and understands advanced models of database systems, with particular emphasis on the relational model	has knowledge of database design based on the relational database model has knowledge of the use of various tools to work with the databases	[SW4] test/exam - oral or written [SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report

<table>
<tr><td>Subject contents</td><td>• Main concepts: data, database, database management system, properties of database systems.
• Data modeling: entity relationship model, entity relationship diagrams, binary relationship classification, normalization.
• Relational model: tables, relations vs. tables, relationship schemas, keys and other integrity constraints. Mapping the entity and relationship diagram into a relational model. Relational algebra: choice, projection, joins, set theoretic operations, aggregate functions. Calculus of tuples. Calculus of domains.
• SQL: defining data, operating on data, performing relational algebra operations, nested queries, NULL values, perspectives.
• Server-side programming, triggers. Client-side programming, access to a database via the Internet.
• Concurrency management: transactions, isolation levels, locks and other tools.
• Safety in databases.
• Complexity of operations in databases, indexes, query optimizer.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>test</td><td>51.0%</td><td>40.0%</td></tr>
<tr><td>project</td><td>51.0%</td><td>20.0%</td></tr>
<tr><td>exam</td><td>51.0%</td><td>40.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Andrzej Borzyszkowski, course materials available on a webpage</td></tr>
<tr><td>Supplementary literature</td><td>1. 1. Richard Stones, Neil Matthew: Bazy danych i PostgreSQL. ISBN: 83-7197-650-X, Helion 2002.
2. 2. Eric Johnson, Joshua Jones Modelowanie danych w SQL Server 2005 i 2008. Przewodnik. Helion 2009.
3. 3. R. Elmasri, S. Navathe, Fundamentals of Database Systems, Pearson 2007.
4. 4. Judith S. Bowman, Sandra L. Emerson, Marcy Darnovsky: Podręcznik języka SQL. ISBN: 83-204-2596-4, Wydawnictwa Naukowo-Techniczne 2001.
5. 5. C. J. Date, Wprowadzenie do systemów baz danych, WNT Warszawa, 2000.
6. 6. J. D. Ulman. Systemy baz danych. WNT, Warszawa, 1988.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table>
</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>What problems appear caused by a deletion in the presence of a foreign key? What are the solutions?

Give a few examples of the use of triggers.

What problems may cause a concurrent access to a database ?</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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