University of Gdańsk

Subject card

Subject name and code	Database Management (SQL), PG_00199349		
Field of study	Economics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	Master's studies	Subject group	Obligatory subject group in the field of study 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	1	Language of instruction	Polish
Semester of study	2	ECTS credits	2.0
Learning profile	academic	Assessment form	exam
Conducting unit	Division of Electronic Economy -> Department of Maritime Transport and Seaborne Trade -> Faculty of Economics -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Jacek Winiarski	
	Teachers		

Lesson types							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	15.0	0.0	45
	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	45	0.0	5.0	50

Subject objectives	The objective of this class is to introduce students to the fundamentals of designing, managing, and optimizing databases, as well as to develop practical skills in creating, modifying, and querying data using SQL. The class prepares students to address challenges related to data organization and analysis in various professional contexts, fostering competencies in working with relational databases and tools supporting their management.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[EKONMU2_K02] is aware of the level of their knowledge in the area of solving complex problems in economic,; understands the need to extend and update this knowledge throughout his/her life	The student is aware of their current level of knowledge in economics and database management using SQL. They understand the importance of continuously improving and updating their skills to keep pace with the dynamic changes in data analysis and economic practices.	[SK1] oral statement/conversation/ discussion [SK5] implementation of a problem task [SK6] demonstration of practical skills
[EKONMU2_K01] recognises the importance of knowledge in the field of economics in the process of identifying and solving economic problems and of consulting experts when having difficulties in solving them independently	The student recognizes the importance of economic knowledge in identifying and solving economic problems. They understand that effective use of SQL tools for data analysis may require consulting experts when independent problem-solving proves challenging.	[SK1] oral statement/conversation/ discussion [SK5] implementation of a problem task [SK6] demonstration of practical skills
[EKONMU2_U08] can independently analyse economic and social phenomena and processes, and can perform a theoretically deepened assessment of such phenomena, using appropriately selected research method	The student is capable of independently analyzing economic and social phenomena and processes, utilizing SQL tools for data processing and drawing conclusions. They have the ability to deepen their theoretical understanding and evaluate these phenomena using appropriately selected research methods tailored to the specific issue.	[SU1] oral statement/conversation/ discussion [SU5] implementation of a problem task
[EKONMU2_U01] can creatively interpret and explain economic and social phenomena and relations between them, using acquired knowledge of economics, finance and management sciences	The student is capable of creatively analyzing and interpreting economic and social phenomena as well as the relationships between them. They use SQL tools for data processing and analysis, integrating their knowledge of economics, finance, and management to draw conclusions that support economic decision-making.	[SU1] oral statement/conversation/ discussion [SU5] implementation of a problem task
[EKONMU2_U15] can independently expand and improve acquired knowledge and skills in economics; is open to new ideas and techniques; tends to learn using any accessible method and to interact with other participants of the learning process	The student is able to independently enhance and refine their skills and knowledge in economics, including database management using SQL. They are open to new techniques and ideas in data analysis and eager to learn new methods while collaborating with others in the learning process.	[SU1] oral statement/conversation/ discussion [SU5] implementation of a problem task
[EKONMU2_U04] can forecast and model complex economic and social processes using quantitative and qualitative methods and tools developed by economic sciences (including statistics and econometrics)	The student is proficient in using SQL tools to forecast and model complex economic and social processes. They effectively apply quantitative and qualitative methods, including statistics and econometrics, developed in economic sciences to analyze data and generate predictions about future trends.	[SU1] oral statement/conversation/ discussion [SU5] implementation of a problem task
[EKONMU2_U03] can analyse causes and course of economic and social processes and phenomena, formulate his/her own opinions on the subject, construct research hypotheses, and select and apply methods of their verification	The student is capable of analyzing the causes and dynamics of economic and social processes, using SQL tools for data processing and interpretation. They can formulate independent opinions based on collected data, propose research hypotheses, and select appropriate methods to analyze and verify these hypotheses using quantitative and qualitative approaches.	[SU1] oral statement/conversation/ discussion [SU5] implementation of a problem task

Course outcome	Subject outcome	Method of verification
[EKONMU2_W06] has an in-depth understanding of statistical and econometric methods and tools for describing and modelling macro- and microeconomic economic structures and public institutions, as well as the processes taking place within them.	The student has knowledge of statistical and econometric methods used to describe and model economic structures and public institutions. They can apply SQL tools to analyze macro- and microeconomic data and model economic processes occurring within these structures. The student, while gaining knowledge in the subject, can consult it during meetings with the tutor.	[SW1] oral statement/ conversation/discussion [SW5] implementation of a problem task

Subject contents

Lecture 1: Introduction to Databases and SQL (2 Hours)

- Fundamental concepts: database, table, record, key.
- Creating simple database structures.
- Basic SQL query syntax.
- Practice: Creating tables and inserting data using CREATE TABLE and INSERT INTO.

Lecture 2: Data Operations Selecting and Filtering (2 Hours)

- SELECT, WHERE, ORDER BY.
- Comparison and logical operators (=, >, <, AND, OR).
- Sorting results.
- Practice: Writing queries to select specific data based on conditions.

Lecture 3: Aggregation Functions and Data Grouping (2 Hours)

- Aggregation functions: COUNT, SUM, AVG, MAX, MIN.
- Grouping data using GROUP BY.
- Filtering groups with HAVING.
- Practice: Creating summary reports.

Lecture 4: Relationships Between Tables and Joining Data (JOIN) (2 Hours)

- Types of joins: INNER JOIN, LEFT JOIN, RIGHT JOIN, FULL OUTER JOIN.
- Foreign keys and relationships between tables.
- Practice: Joining data from two or more tables.

Lecture 5: Modifying Data in the Database (2 Hours)

- UPDATE and DELETE.
- Managing transactions: BEGIN, COMMIT, ROLLBACK.
- Practice: Editing data and recovering from errors using transactions.

Lecture 6: Subqueries and Complex Queries (3 Hours)

- Subqueries in SELECT, WHERE, FROM clauses.
- EXISTS and NOT EXISTS.
- Comparisons across queries (IN, ANY, ALL).
- Practice: Solving problems using subqueries.

Lecture 7: Creating and Managing Views, Indexes, and Users (2 Hours)

- Creating views: CREATE VIEW.
- Indexes: CREATE INDEX, their application, and impact on performance.
- User and permission management (GRANT, REVOKE).
- Practice: Implementing views and indexes, configuring user permissions.

To further develop the concepts discussed during the lectures, students may take advantage of consultation hours.

Prerequisites and co-requisites

No

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	50.0%	50.0%
	50.0%	50.0%

<table>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>Elmasri, R., & Navathe, S. B. (2019). Wprowadzenie do systemów baz danych (7th ed.). Helion.Connolly, T., & Begg, C. (2004). Systemy baz danych. RM.Ullman, J. D., & Widom, J. (2000). Podstawowy wykład z systemów baz danych. WNT.</td></tr>
<tr><td>Supplementary literature</td><td>Rockoff, L. (2017). Język SQL. Przyjazny podręcznik (2nd ed.). Helion.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Task 1: Creating and Managing Tables in a Database

Objective: Learn basic SQL commands for creating, modifying, and deleting tables.

1. Create a database named Company.
2. In this database, create a table Employees with the following columns:
• ID (integer, primary key, auto-increment),
• FirstName (text, max 50 characters),
• LastName (text, max 50 characters),
• Position (text, max 50 characters),
• Salary (floating-point number, not less than 0).
3. Modify the table by adding a column HireDate (type: date).

Task 2: Manipulating Data in the Database

Objective: Master inserting, updating, and deleting data in a table.

1. Add five employees with different positions and salaries to the Employees table.
2. Update the salary of all employees in the position "Developer" by increasing it by 10%.
3. Delete the employee with the lowest salary.
4. Insert a new record for an employee whose details are provided by the user (use a parameterized query).

Task 3: Complex Queries Filtering, Grouping, Sorting

Objective: Practice writing complex SQL queries using WHERE, GROUP BY, ORDER BY, and aggregate functions.

1. Display all employees whose salary is greater than the average salary in the table.
2. Sort the employees by position (alphabetically) and salary (in descending order).
3. Calculate the total salary for each position and display only those positions where the total salary exceeds 20,000.
4. Display the top three highest-paid employees, sorted in descending order of their salary.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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