POZNAN UNIVERSITY OF TECHNOLOGY

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Introduction to Databases [S1DSwB1>WdBD]

Course

Field of study	Year/Semester
Data Science in Business	1/2

Area of study (specialization)	Profile of study
–	general academic

Level of study	Course offered in
first-cycle	Polish

Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other
30	0	0

Tutorials	Projects/seminars	
30	0	

Number of credit points

5,00

Coordinators	Lecturers
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Prerequisites

Knowledge and skills regarding the use of spreadsheets, in particular operating on various data formats.

Course objective

The aim of the course is to provide knowledge in the field of data modeling, designing relational and non-relational databases and their practical applications.

Course-related learning outcomes

Knowledge:
Characterizes basic concepts of database systems and data modeling methods [DSB1_W01].
Describes techniques for designing and managing relational databases [DSB1_W03].
Explains the principles of data integrity, normalization, and the construction of relational schemas [DSB1_W05].
Recognizes the differences between relational and non-relational databases and their applications [DSB1_W05].

Skills:

Creates structures for relational databases using SQL, defining tables, keys, and relationships between data [DSB1_U02].
Designs and implements SQL queries, queries, and views for efficient searching, processing, and analyzing data [DSB1_U03].
Normalizes databases to ensure their optimal structure and the correctness of data storage and processing [DSB1_U07].
Applies basic database management and administration techniques, including access control, indexing, and query optimization [DSB1_U09].
Manages non-relational databases (NoSQL), comparing their applications with classic relational systems [DSB1_U10].
Selects sources and information related to the design, implementation, and administration of databases, analyzing documentation for database management systems and specifications for SQL and NoSQL languages [DSB1_U01].

Social competences:
Collaborates in project teams on the creation and optimization of database systems, applying best practices in data management [DSB1_K03].
Considers data security and protection principles in the process of designing and administering databases [DSB1_K05].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Summative grade for the lecture is based on the percentage result from the test. Questions and tasks checking understanding of the topics. Passing threshold - 50%.
Formative laboratory assessment consists of grades that the student receives for completing individual tasks during classes. The summary grade from the laboratory is given as the average of these grades. The assessment takes into account the correctness and completeness of the results achieved.

Programme content

Lecture: Basics of databases. Data modeling and schemas, entity relationship diagrams, defining attributes and relationships. Creating a relational database using SQL. Database integrity and normalization. Characteristics and support of non-relational NoSQL databases. Database management and administration.
Labs: Practical learning of SQL, including building a database structure, preparing and entering data, formatting data, building relationships, creating queries and views. Learning how to build forms and reports. Database normalization. Principles of administration of database systems.

Course topics

1. Database basics.
2. Data modeling and relationship schemas.
3. Creating a relational database using SQL.
4. Data integrity and database normalization.
5. Characteristics and use of NoSQL Databases.
6. Database Management Systems.
7. Database administration.

Teaching methods

Lectures: informative lecture, multimedia presentation, problem-based lecture.
Laboratories: laboratory method, case study method, workshop method.

Bibliography

Basic:
Elmasri R., Navathe S.B., Fundamentals of Database Systems (7th Edition), Pearson 2015.
Database Design for Mere Mortals: A Hands-On Guide to Relational Database Design, Addison-Wesley Professional, 2013.
Ben-Gan I., T-SQL Fundamentals (Developer Reference) 3rd Edition, Microsoft Press, 2016.

Sadalage P.J., Martin Fowler M., NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot, Addison-Wesley Professional, 2012.

Additional:
Tanimura C., SQL for Data Analysis. Advanced Techniques for Transforming Data into Insights, O'Reilly Media, 2021.
Connoly T., Begg C., Database Systems: A Practical Approach to Design, Implementation, and Management, Pearson, 2014.

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	65	2,50