COURSE DESCRIPTION CARD - SYLLABUS

Course name
Methods of collecting and analyzing data and visualizing results [S2Elmob1-SSP>MGiAD1]

Course

Field of study
Electromobility

Year/Semester
1/2

Area of study (specialization)
Car Onboard Systems

Profile of study
general academic

Level of study
second-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

A student starting this course should have basic knowledge and skills in computer science, including programming and algorithmization. The student should be able to use the indicated literature sources. In the area of social competences, he should be ready to work in a project team.

Course objective

Getting to know the basic issues in the field of designing relational databases and using the SQL language to analyze and manipulate data. Obtaining the ability to analyze data and prepare reports, in accordance with the adopted guidelines, from data contained in relational databases.

Course-related learning outcomes

Knowledge:
1. Has basic knowledge of database structures.
2. Has knowledge about the construction of a relational database, knows their capabilities and limitations

Skills:

1. He can design and implement a relational model database in local and network environments.
2. Is able to obtain the necessary information from the relational database and present it in the form of clear reports with the given parameters.

Social competences:
1. Understands the need to implement team projects.
2. Knows the need to use the support of experts in the design of complex database systems.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The knowledge acquired during the lecture is verified during the written test. The test consists of 5-8 open questions scored depending on the level of difficulty. Examination issues are sent to the head of the group by e-mail using the university's e-mail system 2-3 weeks before the date of passing.
The skills acquired during the laboratory classes are verified on the basis of the assessment of three components: homework (max. 20% of points), practical colloquium at computers (during the last class) - SQL language (max. 30% of points) and submission of a team-developed database and reports on the topic indicated at the beginning of the semester (max. 50% of points).
Grading scale for the lecture and laboratory in accordance with the document "Good practices for academic teachers" adopted by the Academic Senate of Poznań University of Technology: (<0;50%) - 2.0 unsatisfactory, <50%;60%) - 3.0 satisfactory <60%;70%) - 3.5 sufficient plus, <70%;80%) - 4.0 good, <80%;90%) - 4.5 good plus, <90%; 100%> - 5.0 very good.

Programme content

Introduction to databases, conceptual modeling of databases, relational databases, SQL servers, data analysis using SQL.

Course topics

Lecture: introduction to database systems, database architecture, conceptual modeling: entities, entity sets, attributes, keys, relations, ERD entity relationship diagrams, transactionality and its role in data processing, transaction properties, application of multiprocessor platforms, relational model: relational algebra, relational tuple calculus, normalization of database logical schemes, designing real databases, basic physical data structures - implementation of databases in sample environments: MS Access, MySQL , MS SQL Server, methods of data analysis, SQL and Transact SQL languages, indexing, data presentation in text (views) and graphic form.
Lab: SQL language (data manipulation language (DML) and data definition language (DDL)), simple and advanced SELECT queries (DQL), data grouping, unions and collective operators, subqueries, advanced elements of SQL language (Transact SQL): conditional and selection statements, functions, procedures, triggers, views, database design and implementation carried out in teams.

Teaching methods

Lecture: multimedia presentation (including: drawings, photos, animations, videos) supplemented with examples given on the board and extensive comments. Analysis of selected issues with the participation of students.
Laboratory: multimedia presentation, individual student's work in the computer laboratory consisting in the implementation of given operations on databases, team implementation of the database.

Bibliography

Basic:
1. Pękala B., Bazy danych: teoria i praktyka, Wydawnictwo Uniwersytetu Rzeszowskiego, 2015.
2. Navathe E., Wprowadzenie do systemów baz danych, Helion, 2019.
3. Gębal G., Nowakowska M., Szczepańska M., Relacyjne bazy danych: elementy teorii i rozwiązania praktyczne, Wydawnictwo Politechniki Świętokrzyskiej, 2018.
4. Ben-Gan I., Podstawy języka T-SQL: Microsoft SQL Server 2022 i Azure SQL Database, APN Promise, 2023.

Additional:

1. Balter A., T-SQL dla każdego, Helion, 2016.
2. Czapla K., Bazy danych: podstawy projektowania i języka SQL, Helion, 2015.
3. Mendrala D., Szeliga M., Access 2013 PL : bazy danych? Z programem MS Access to nic trudnego, Helion, 2013.
4. Bednarek K., Jajczyk J., Nawrowski R., Pabian J., Tomczewski A.: Bazodanowy system obsługi dydaktyki
w jednostkach organizacyjnych uczelni wyższych, Konferencja Naukowo-Techniczna Zastosowania Komputerów w Elektrotechnice, Poznań - Kiekrz, kwiecień 2003, s. 695-698.

Breakdown of average student's workload

	Hours	ECTS
Total workload	55	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	25	1,00