Database Systems 1 - course description

General information

Course name	Database Systems 1
Course ID	11.3-WK-MATP-SBD1-Ć-S14_pNadGenONGCT
Faculty	Faculty of Mathematics, Computer Science and Econometrics
Field of study	Mathematics
Education profile	academic
Level of studies	First-cycle studies leading to Bachelor's degree
Beginning semester	winter term 2020/2021

Course information

Semester	6
ECTS credits to win	6
Course type	optional
Teaching language	polish
Author of syllabus	• prof. dr hab. Mieczysław Borowiecki • dr Anna Fiedorowicz

Classes forms

The class form	Hours per semester (full-time)	Hours per week (full-time)	Hours per semester (part-time)	Hours per week (part-time)	Form of assignment
Lecture	30	2	-	-	Exam
Class	15	1	-	-	Credit with grade
Laboratory	30	2	-	-	Credit with grade

Aim of the course

The course introduces basic notions, definitions and problems related to the relational models of databases. At the end of the course each student should be able to design and create both database and database application.

Prerequisites

Fundamentals of logic. Programming skills.

Scope

Lecture:

1. The basic notions and definitions related to the relational databases.
2. Operations on relation (union, difference, intersection, complement, projection, selection, join, division).
3. The functional dependencies and Armstrong’s axioms.
4. Relational schemes.
5. Decompositions.
6. Normalization through decomposition (1NF, 2NF, 3NF,B-CNF, 4NF, 5NF).
7. Multivalued dependencies.
8. Inference axiom for multivalued dependencies.

Class:

1. Operations on relation
2. Normalization through decomposition (2NF, 3NF,B-CNF).
3. Structured Query Language.

a. Data Manipulation Language,
b. Data Definition Language,
c. Data Control Language.
4. Creating the project of a database.
a. Data-Flow Diagram,
b. Entity-Relationship Diagrams,
c. Creating Database Scheme.

Laboratory:

1. The use of SQL.
2. Data types, expressions and operators, conditions, functions, procedures.
3. SELECT statement:
a. inner join,
b. outer join,
c. simple subqueries,
d. correlated subqueries,

e. grouping and aggregate functions.
4. Defining the database structure:
a. domain,
b. tables,
c. views,
d. indexes,
e. sequences/generators,
f. triggers,
g. referential integrity constraints.
5. Database user management and control of transactions.

Teaching methods

Lecture: Seminar lecture.
Class: Method problematic, brainstorming.
Laboratory: Computer laboratory exercises.

Learning outcomes and methods of theirs verification

Outcome description	Outcome symbols	Methods of verification	The class form
Students understand the basic concepts and knows the theoretical basis of relational databases; know the method of normalization of a scheme up to 2NF, 3NF and BCNF.	• K_W03	• a test • an exam - oral, descriptive, test and other • an observation and evaluation of activities during the classes	• Lecture • Laboratory • Class
Students are able to design a simple database schema and generate it using computer tools like CASE.	• K_U28	• a test • an exam - oral, descriptive, test and other • an observation and evaluation of activities during the classes	• Lecture • Laboratory • Class
Students know the basic syntax of SQL commands.	• K_W08	• a test • an exam - oral, descriptive, test and other • an observation and evaluation of activities during the classes	• Lecture • Laboratory • Class
Students are able to present the basic concepts and theorems related to the relational data model.	• K_U36	• a test • an exam - oral, descriptive, test and other • an observation and evaluation of activities during the classes	• Lecture • Laboratory • Class
Students are able to extract the information stored in the database using SQL commands, using joins, subqueries and grouping.	• K_U04	• a test • an exam - oral, descriptive, test and other • an observation and evaluation of activities during the classes	• Lecture • Laboratory • Class

Assignment conditions

Lecture: The exam consists of two parts, written and oral, access to the oral part is getting 30% of the points of the written part, 50% of the points from the written part guarantees a positive evaluation.
Class: condition pass is 50% of the points of the four planned tests or final test covering all the material processed.
Laboratory: condition pass is 50% of the points of the four planned tests or final test covering all the material processed.

Final evaluation of the course is the arithmetic mean of the lecture, class and laboratory. However, a prerequisite for a positive final assessment is to obtain positive evaluations of the lecture, class and laboratory.

Recommended reading

1. T. Pankowski, Podstawy baz danych, Wydawnictwo Naukowe PWN, W-wa, 1992.
2. D. Maier, The theory of relational databases, Computer Science Press, 1983.
3. M. Gruber, SQL, Helion, 1996.
4. M. Wybrańczyk, Delphi 7 i bazy danych, Helion, 2003.
5. G.Reese, Java. Aplikacje bazodanowe. Najlepsze rozwiązania, Helion, 2003.

Further reading

1. W. Kim, Wprowadzenie do obiektowych baz danych, WNT, Warszawa, 1996.

2. J.D. Ullman, Podstawowy wykład z systemów baz danych, WNT, Warszawa, 1999.
3. P. Neil Gawroński, InterBase dla ,,delfinów'', Helion, 2001.
4. Jakubowski: SQL w InterBase dla Windows i Linuksa, Helion, Gliwice 2001.
5. R. Barker, CASE* Method. Modelowanie związków encji, WNT, Warszawa 2005
6. M. Marzec, JBuilder i bazy danych, Helion, 2005.
7. Mościcki, I. Kruk, Oracle 10g i Delphi. Programowanie baz danych, Helion, 2006.

Notes

Modified by dr Alina Szelecka (last modification: 18-09-2020 13:45)