Institute of Cyber-physical Systems			2023/24/1 semester			
Name of the subject:	Code of the subject:	Credits:	Weekly hours:			
				lec	sem	lab
Databases	NIXAB0EBNE		full-time	2	0	2
Responsible person for the subject: Enikő Nagy PhD			Classification: associate professor			
Subject lecturer(s): Enikő Nagy PhD						
Prerequisites:						
Way of the assessment:	Term grade					

Course description	
Goal:	In the framework of the subject, students get acquainted with the theoretical foundations and implementation of database management systems, the database design process, and modern data management methods. Lab: The aim of the training is to apply the theory of relational database management systems in practice, and to introduce SQL through the use of a specific client-server type database management system (Oracle 12g).
Course description:	Topics: Lecture: Theory and use of the relational model. Anomalies. Normalization. Database design. Data modeling. ER diagram. Relational algebra. Role and use of indexes. Tasks of the database administrator. DDL. DML. DCL. Oracle analytical functions. Database architectures. Database management system structure. Data warehouses. Business intelligence. Laboratory: Basic concepts of relational database design (relations, relational operations), Normalization (0NF, 1NF, 2NF, 3NF), database anomalies. Queries using SQL SELECT statement, join tables, subqueries. DML instructions, database transactions. DDL statements, table creation, data types, constraints, view tables, top-N analysis. Authorization management, DCL instructions. Analytical functions in Oracle12gR2.

Lecture schedule		
Education week	Topic Lecture	Laboratory
1.	Introduction, Retrieving Data Using the SQL SELECT Statement	Simple SQL queries. (SELECT, WHERE, ORDER BY statement parts)
2.	Restricting and Sorting Data, Using Single-Row Functions to Customize Output	Single-Row and group functions. (GROUP BY, HAVING instruction parts)
3.	Using Conversion Functions and Conditional Expressions, Reporting Aggregated Data Using the Group Functions,	SQL joins
4.	Displaying Data from Multiple Tables Using Joins, Using Subqueries to Solve Queries	Multiple tables queries, views
5.	Using the Set Operators, Managing Tables Using DML Statements,	DML
6.	Introduction to Data Definition Language, Introduction - Oracle Database 12C: SQL Workshop II.	Lab test
7.	Introduction to Data Dictionary Views,	DDL+DCL
8.	Creating Sequences, Synonyms, and Indexes, Creating Views	Detailed grouping (GROUP BY ROLLUP, CUBE, GROUPING SETS statement parts)
9.	Managing Schema Objects,	Subqueries, Analytical functions I

	Retrieving Data by Using Subqueries	
10.	Manipulating Data by Using Subqueries, Controlling User Access	Analytical functions, (Rank, statistical and extreme functions)
11.	Controlling User Access	Histogram functions (WIDTH_BUCKET, NTILE)
12.	Manipulating Data, Managing Data in Different Time Zones	Practice
13.	Lecture test	Lab test
14.	Replacement test, Summary, Evaluation	Replacement test

Mid-term requirements

Conditions for obtaining a mid-term grade/signature	Attendance at the lab session is compulsory! The „TVSZ" applies to absences. Students write two tests (week 6 and 13) in the lab and in a lecture (week 13). With the laboratory test max. 60 points (30-30) can be obtained, with the lecture test 40. From the sum of these, the score obtained will be compiled and the grade will be formed. Writing tests is compulsory! If a student has not written a test or has not passed at least a 51% level, he / she may write a replacement test from the material of that test. The replacement test is successful if the student completes at least a 51% level. All tests can be replaced on a separate occasion in the 14th week of the study period or during the exam period. The condition for signing is to pass both tests at least 51% and attendance on labs. At the lecture, students write a test in the 13th week, with which max. they can get 40 points. In case of proven absence, the lecture test can be replaced at week 14.

Assessment schedule

Education week	Topic
6	Labor Test 1 (max 30 points)
13	Labor Test 2 (max 30 points), Lecture Test (max 40 points)
14	Replacement Labor Test, Lecture Test

Method used to calculate the *mid-term grade* (to be filled out only for subjects with mid-term grades)

The condition for signing is to pass all tests at least 51% and participation in the labor sessions.
The score consists of the sum of the following 2 items:
1. The result of the test written on the lecture (max. 40 points)
2. Score on the practical tests (max. 30-30 points)
51 points must be scored for a sufficient ticket, 63 points for a medium ticket, 74 points for a good ticket and 85 points for a distinguished ticket.
Lecture and lab practice are one subject, so they cannot be taken separately. Anyone who already has a signature on the subject can take the exam course. In the examination course, the grade is derived exclusively from the result of the test written on the examination (max. 100 points). 51 points must be scored for a sufficient ticket, 63 points for a medium ticket, 74 points for a good ticket and 85 points for a distinguished ticket.

Type of the replacement

Type of the replacement of written test/mid-term grade/signature	All tests can be replaced in the 14th week of the study period or during the exam period.
Type of the exam (to be filled out only for subjects with exams)	
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Calculation of the exam mark (to be filled only for subjects with exams)	
Final grade calculation methods:	
References	
Obligatory:	Ullman J.D., Widom J. :Database systems The complete book Second edition, Pearson International Edition
Recommended:	Abraham Silberschatz, Hank Korth, S. Sudarshan: Database System Concepts, McGraw-Hill, 2010. Ullman J.D., Widom J. : Adatbázisrendszerek; alapvetés, 2. kiadás, PANEM Kiadó, Budapest, 2008 Quittner Pál, Baksa-Haskó Gabriella: ADATBÁZISOK, ADATBÁZIS-KEZELŐ RENDSZEREK. http://miau.gau.hu/avir/intranet/debrecen_hallgatoi/tananyagok/jegyzet/25-Adatbazisok.pdf Halassy Béla: Az adatbázistervezés alapjai és titkai. 1994. http://mek.oszk.hu/11100/11123/11123.pdf
Other references:	*Kende M., Nagy I.:* Oracle Példatár (SQL, PL/SQL) titled [http://analog.nik.uni-obuda.hu/ , 1H-82h_AB_OktatasiAnyagok könyvtár 00_Tankonyvek.zip subfolder *Kende M., Nagy I.:* Internetes adatbázis-alkalmazások fejlesztése titled [http://analog.nik.uni-obuda.hu/ , 1H-82h_AB_OktatasiAnyagok könyvtár 00_Tankonyvek.zip subfolder *Oracle web:* http://apex.oracle.com