COURSE SYLLABUS AND COURSE REQUIREMENTS
ACADEMIC YEAR 2023/2024 SEMESTER I.

Course title	*Databases I*
Course Code	*IVB009ANMI and IVB334ANMI*
Hours/Week: le/pr/lab	2/2/0
Credits	5
Degree Programme	***Computer Science Engineering***
Study Mode	*full time course*
Requirements	Exam
Teaching Period	Autumn
Prerequisites	None
Department(s)	System and Software Technology
Course Director	Etelka Szendrői Dr. (PhD)
Teaching Staff	*Etelka Szendrői Dr. (PhD)*

COURSE DESCRIPTION

The Databases I course provides the students with an introduction to the core concepts in databases. It is focused on the core skills of identifying organizational information requirements, modelling them using conceptual data modelling techniques, converting the conceptual data models into relational data models and verifying their structural characteristics with normalization techniques. The subject includes database building practice in MS SQL Server environment and writing queries in SQL language. Students will also have hands on experience in SQL programming, writing stored procedures and user defined functions.

SYLLABUS

1. GOALS AND OBJECTIVES

Course goals:

- To provide enough knowledge to create data models according to the business goals.
- To provide the ability to map conceptual level models into a relational model and design relational databases so they are at least in 3NF.
- To provide skills in writing SQL queries, stored procedures, user defined functions and triggers.

Learning Objectives:
Students who successfully complete this course will have a strong knowledge of database modelling technics and the SQL language.

2. COURSE CONTENT

	TOPICS
LECTURE AND PRACTICE	1. *Introducing Database Concepts. DBMS system architecture* 2. *Semantic modelling. Entity Relationship (ER) Data Model* 3. *Relational data model. Mapping ER model into a Relational Model* 4. *Functional Dependency. Armstrong axioms. Closure of attribute sets.* 5. *Normalization process. (2NF, 3NF, Boyce Codd normal forms). Multivalued Dependency. 4NF* 6. *Relational Algebra* 7. *SQL language. Simple queries. Join operation. Sub queries. Common table Expression (CTE). The Case statement.* 8. *Data manipulation: Insert, Update, Delete operation.* 9. *Data definition: CREATE, ALTER, DROP statement. Constraints. Indexes.* 10. *SQL programming: Stored Procedure, User Defined Functions. Triggers.* 11. *Transactions*

DETAILED SYLLABUS AND COURSE SCHEDULE

ACADEMIC HOLIDAYS INCLUDED

LECTURE

week	**Topic**	**Compulsory reading; page number (from … to …)**	**Required tasks (assignments, tests, etc.)**	**Completion date, due date**
1.	Course introduction, orientation. The main components of database systems Entity Relationship model	[1] 5-30; 115-150 [2]: a		
2.	Database design process. Entity Relationship model. Attributes, relations, cardinality. Strong and weak entities.	[1] 115-150 [2]: b		
3.	Extended Entity model. Relational Data Model. Mapping ER and EER model to a relational model.	[1] 162-180 [2]: c		
4.	Functional Dependencies. Armstrong's axioms. Closure of Set of attributes. Normalization	[1] 191-222 [2]: d.		
5.	Multivalued dependency. Fourth normal form (4NF). Relational algebra	[1] 191-222 [2]: e.		
6.	**Midterm Test 1**		**Test 1**	**13th march**
7.	SQL language. SQL data types. Filtering and sorting data. Built-in functions, aggregate functions.	[1] 237-292 [2]: f.		
8.	JOIN operation. SET operations. Subqueries. CASE structure	[1] 237-292 [2]: g		
9.	Common Table Expression (CTE). Views. DML statements INSERT, UPDATE DELETE).	[1] 323-365 [2]: h		
10.	DDL statements. (CREATE, ALTER, DROP). Constraints. T-SQL programming. User Defined functions. Stored Peocedure	[1] 345- 399 [2]: i		
11.	**Midterm Test 2**		**Test 2**	**17th April**
12.	Triggers. Transactions. Temporary tables. Special Data types (Geography and geometry data types).	[1] 455-481 [2]:j.., k		
13.	**HOLIDAY (1st May)**			
14.	Indexes. Physical data storage on SQL server. Execution plan of statements .	[1] 487- 510 [2]: l.		

PRACTICE, LABORATORY PRACTICE

week	**Topic**	**Compulsory reading; page number (from … to …)**	**Required tasks (assignments, tests, etc.)**	**Completion date, due date**
1.	Entity relationship model. ER Diagram.	[2]: a.	homework 1	At the beginning of class week 2
2.	Entity Relationship Diagram. Symbols. Chen model. Crow's foot model.	[2]: b.	homework 2	At the beginning of class week 3
3.	EER diagram. Relational model. Mapping ER diagram into a relational model.	[2]: c	homework 3	At the beginning of class week 4
4.	Functional dependencies. Normal forms. Normalization process	[2]: d	homework 4	At the beginning of class week 5
5.	Multivalued dependency. Fourth normal form (4NF). Relational algebra.	[2] e.	homework 5	At the beginning of class week 6
6.	Relational algebra. SQL language	[2] e., f.,		
7.	Filtering grouping and sorting data. Built-in functions, aggregate functions.	[2]: f., g.	homework 6	At the beginning of class week 8
8.	JOIN operation. SET operation. Subqueries. CASE structure..	[2]: h.	homework 7	At the beginning of class week 9
9.	Common Table Expression (CTE) Views. DML statements (INSERT, UPDATE DELETE).	[2] i		
10.	DDL statements. (CREATE, ALTER, DROP). Constraints.	[2]: i.	homework 8	At the beginning of class week 11
11.	T-SQL programming. User Defined functions. Stored Procedure.	[2]: j.	homework 9	At the beginning of class week 12
12.	Stored procedures, triggers.	[2]: k		
13.	**HOLIDAY (1st May)**			
14.	Transactions. Temporary tables. Indexes.	[2]: K.		

3. ASSESSMENT AND EVALUATION

ATTENDANCE

*In accordance with the Code of Studies and Examinations of the University of Pécs, Article 45 (2) and Annex 9. (Article 3) a student may be refused a grade or qualification in the given full-time course if the number of class absences exceeds **30% of the contact hours** stipulated in the course description.*

Method for monitoring attendance *(e.g.: attendance sheet / online test/ register, etc.)*

attendance sheet

ASSESSMENT

Course-unit with final examination

Mid-term assessments, performance evaluation and their weighting as a pre-requisite for taking the final exam

Type	**Assessment**	***Weighting as a proportion of the pre-requisite for taking the exam***
1. ***Midterm Test 1***	*max. 100%*	*45 %*
2. ***Midterm Test 2***	*max 100%*	*55 %*

Requirements for the end-of-semester signature

The weighted average of MIDTERM TEST 1 and MIDTERM TEST 2 result is greater than or equal with 40%, and the number of class absences not exceed the 30% of the contact hours. Formula: 0,45*Midterm Test1%+0,55*Midterm Test2%>=40%

Re-takes for the end-of-semester signature (PTE TVSz 50§(2))

The specific regulations for grade betterment and re-take must be read and applied according to the general Code of Studies and Examinations. E.g.: all the tests and the records to be submitted can be repeated/improved each at least once every semester, and the tests and home assignments can be repeated/improved at least once in the first two weeks of the examination period.

Retaking the midterm TEST 1 and/or Midterm Test 2 in the last week of the semester on a given date. If retaking is needing the semester signature requirement will be calculated according to the next formula: 0,45*(Midterm Test1%+Retake Test1%)/2+0,55*(Midterm Test2%+RetakeTest2%)/2>=40%. If this new value is smaller than 40%, there is another opportunity to write a semester retake test in the first week of the exam period. After it the final semester result calculation formula: (Semester result%+ Semester retake test %)/2 >= 40%

Type of examination *(written, oral):* ***written exam.***

The exam is successful if the result is minimum 40 %.

Calculation of the grade *(TVSz 47§ (3))*

The mid-term performance accounts for **40** %, the performance at the exam accounts for ***60*** % in the calculation of the final grade. The final grade formula: 0,4*Semester result%+0,6*Exam result%

Calculation of the final grade based on aggregate performance in percentage.

Course grade	Performance in %
excellent (5)	85 % …
good (4)	70 % ... 85 %
satisfactory (3)	55 % ... 70 %
pass (2)	40 % ... 55 %
fail (1)	below 40 %

The lower limit given at each grade belongs to that grade.

4. SPECIFIED LITERATURE

COMPULSORY READING AND AVAILABILITY

[1 Coronel / Morris: Database Systems Design, Implementation and Management (11th edition)

[2.] Subject Materials in Neptun Meet Street platform:

a.	Lecture_1.pptx	Practice_1.pdf
b.	Lecture_2.pptx	Practice_2.pdf
c.	Lecture_3.pptx	Practice_3.pdf
d.	Lecture_4.pptx	Practice_4.pdf
e.	Lecture_5.pptx	Practice_5.pdf
f.	Lecture_6.pptx	Practice_6.pdf
g.	Lecture_7.pptx	Practice_7.pdf
h.	Lecture_8.pptx	Practice_8.pdf
i.	Lecture_9.pptx	Practice_9.pdf
j.	Lecture_10.pptx	Practice_10.pdf
k.	Lecture_11.pptx	Practice_11.pdf

RECOMMENDED LITERATURE AND AVAILABILITY

[3.] Ramez Elmasri, Shamkant B. Navathe: Fundamentals of Database Systems (7th Edition)

[4.] Jeffry D. Ulmann: Principles of Database and Knowledge-base Systems Volume I. Computer Science Press, 1989