

## COURSE SYLLABUS AND COURSE REQUIREMENTS

ACADEMIC YEAR 2025/2026 SEMESTER II.

<i>Course title</i>	<i>Databases 1.</i>
<i>Course Code</i>	<i>IVB112ANMI</i>
<i>Hours/Week: le/pr/lab</i>	<i>2/2/0</i>
<i>Credits</i>	<i>4</i>
<i>Degree Programme</i>	<i>Computer Science Engineering</i>
<i>Study Mode</i>	<i>full time course</i>
<i>Requirements</i>	<i>Exam</i>
<i>Teaching Period</i>	<i>Semester 2</i>
<i>Prerequisites</i>	<i>None</i>
<i>Department(s)</i>	<i>Department of Systems and Software Technologies</i>
<i>Course Director</i>	<i>Anett Lenart</i>
<i>Teaching Staff</i>	<i>Anett Lenart</i>

## COURSE DESCRIPTION

Structure of database systems. Database design and modelling. Semantic models. Creation of ER diagrams. The relational data model. Mapping semantic models to the relational model. Dependencies and dependency rules. Normal forms. Relational algebra. The SQL language. Query, data definition and data manipulation statements. Stored procedures. Triggers. Transaction management.

## SYLLABUS

### 1. GOALS AND OBJECTIVES

Within the framework of the course, students become familiar with the theoretical foundations of databases, the steps of database design, and the SQL query language. Students acquire the ability to create semantic and logical data models. They will be able to formulate simple and complex queries as well as data manipulation statements using SQL. Students also gain knowledge of creating stored procedures and managing transactions.

Students who successfully complete this course will have a solid knowledge of database modelling techniques and the SQL language.

### 2. COURSE CONTENT

#### TOPICS

LECTURE AND PRACTICE	TOPICS
	1. <i>Structure of database systems. Semantic models.</i>
	2. <i>Steps of data modelling. Creation of Entity–Relationship (ER) model.</i>
	3. <i>Fundamentals of the relational data model. Mapping the ER model to the relational data model. Keys in the relational model.</i>
	4. <i>Functional dependencies. Rules of functional dependencies.</i>
	5. <i>Normalisation and decomposition of relations. Normal forms.</i>
	6. <i>Normalisation: 1NF, 2NF, 3NF. Relational algebra.</i>
	7. <i>The SQL language. DML and DDL. Single-table and multi-table queries, query conditions.</i>
	8. <i>SQL: Grouping of data and specification of conditions for groups.</i>
	9. <i>SQL: Subqueries. Constraints. Views.</i>
	10. <i>SQL: Data definition and data manipulation operations.</i>
	11. <i>SQL: Indexes. Stored procedures.</i>
	12. <i>SQL: Triggers. Transaction management.</i>

## 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.	[1] 5-30; 115-150 [2]: a		
2.	Entity Relationship model.	[1] 115-150 [2]: b		
3.	Relational Data Model. Mapping ER model to a relational model.	[1] 162-180 [2]: c		
4.	Functional Dependencies. Armstrong's axioms. Normalization.	[1] 191-222 [2]: d.		
5.	Normalization. Normal forms. Relational algebra.	[1] 191-222 [2]: e.		
6.	<b>Midterm Test 1</b>			
7.	SQL language. SQL data types. Filtering and sorting data. Aggregate functions, groups.	[1] 237-292 [2]: f.		
8.	SQL: JOIN operation.	[1] 237-292 [2]: g		
9.	<b>Spring break.</b>			
10.	SQL: Subqueries. Built-in functions. Common Table Expression (CTE).	[1] 323-365 [2]: h		
11.	SQL: DML statements: INSERT, UPDATE DELETE. DDL statements: CREATE, ALTER, DROP. Constraints.	[1] 345- 399 [2]: i		
12.	SQL: Views. Stored Procedure.	[1] 455-481 [2]:j., k		
13.	<b>Midterm Test 2</b>	[1] 487- 510 [2]: l.		
14.	SQL: Triggers. Transactions.			

### PRACTICE, LABORATORY PRACTICE

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.	[2]: a.		
2.	Entity Relationship model.	[2]: b.		
3.	Relational Data Model. Mapping ER model to a relational model.	[2]: c		

4.	Functional Dependencies. Normalization.	[2]: d		
5.	Normalization.	[2] e.		
6.	<b>Midterm Test 1</b>	[2] e., f.,		
7.	SQL language. SQL data types. Filtering and sorting data. Aggregate functions, groups.	[2]: f., g.		
8.	SQL: JOIN operation.	[2]: h.		
9.	<b>Spring break.</b>			
10.	SQL: Subqueries. Built-in functions. Common Table Expression (CTE).	[2] i		
11.	SQL: DML statements: INSERT, UPDATE DELETE. DDL statements: CREATE, ALTER, DROP. Constraints.	[2]: i.		
12.	SQL: Views. Stored Procedure.	[2]: j.		
13.	<b>Midterm Test 2</b>	[2]: K.		
14.	SQL: Triggers. Transactions.			

### 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 at lectures is not compulsory; however, it is strongly recommended.

Students are required to attend at least 70% of the practical classes. Attendance does not influence the final grade; however, absences exceeding 30% will result in the refusal of the course signature.

Attendance is verified using an attendance sheet.

#### ASSESSMENT

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#### **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
<b>Midterm Test 1</b>	Successful from 40%	49%
<b>Midterm Test 2</b>	Successful from 40%	51%
<b>Answering two preliminary questions (a prerequisite for Test 1)</b>	Pass / fail	0% (prerequisite requirement)

Students are required to complete the midterm tests according to the schedule specified in the course syllabus. Test 1 will be held in Week 6, and Test 2 will be held in Week 13.

A prerequisite for Test 1 is the successful completion of two preliminary questions; the questions are available on the Teams interface. The preliminary questions will be completed during the 5th practical class.

If a student does not attend a midterm test, a failing grade will be assigned to the missed test, unless the absence is officially justified at the next practical lesson.

Each midterm test may be retaken once in the first week of the examination period.

#### **Requirements for the end-of-semester signature**

The requirement for obtaining the course signature is the fulfilment of the attendance requirements and achieving at least a passing grade (2) in the midterm tests.

#### **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.*

Both midterm tests may be retaken once during the first week of the examination period.

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

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

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

**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 on Teams platform:

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

**RECOMMENDED LITERATURE AND AVAILABILITY**

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

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

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