

## COURSE SYLLABUS AND COURSE REQUIREMENTS

ACADEMIC YEAR 2023/2024 SEMESTER II.

<i>Course title</i>	<b>DATABASE SYSTEMS</b>
<i>Course Code</i>	IVM437ANMI
<i>Hours/Week: le/pr/lab</i>	2/2
<i>Credits</i>	4
<i>Degree Programme</i>	Computer Science Engineering MSC
<i>Study Mode</i>	full time
<i>Requirements</i>	exam
<i>Teaching Period</i>	Spring
<i>Prerequisites</i>	
<i>Department(s)</i>	System and Software Technology
<i>Course Director</i>	Etelka Szendrői Dr. (PhD)
<i>Teaching Staff</i>	Etelka Szendrői Dr. (PhD)

## COURSE DESCRIPTION

Application architectures, logical layers, tasks implemented in layers. Physical layers, data access model through layers, multi-layer architectures. Database connection standards: ODBC, ADO, OLEDB, ADO.NET. Developing ADO.NET Entity Framework Core applications in C#. Database models-NOSQL. Big Data. Decision support-Business intelligence. Data warehouses. Foundations of the Microsoft Power BI platform.

## SYLLABUS

### 1. GOALS AND OBJECTIVES

Providing theoretical and practical knowledge about various database architectures, developing database-based applications, building data connections. Transfer of basic knowledge in the field of Big Data, Business Intelligence, Data Warehouses, creation of data warehouse models, data analysis. The purpose of the course is also to introduce the basics of the Microsoft Power BI platform and to present and try out its possibilities in a practical way.

### 2. COURSE CONTENT

#### TOPICS

LECTURE AND PRACTICE	TOPICS
	<ol style="list-style-type: none"><li>1. Database systems. Data-driven applications. Multi-tier application architecture, the task of each layer. Accessing data sources from applications. Creating data connections (ODBC, OLEDB, ADO.NET). ADO.NET Entity Framework and ADO.NET Entity Framework Core technology. LINQ basics. Solving tasks in the C# programming language, using EF Core and LINQ.</li><li>2. Decision support - Business intelligence. Big Data. Database models (NoSQL). Data warehouses. Data warehouse models. Dimensional modeling. Dimension and fact tables. Impact of data changes on the data warehouse. ETL.</li><li>3. Microsoft Power BI platform basics. Analyse data in the Power BI platform.</li></ol>

## DETAILED SYLLABUS AND COURSE SCHEDULE

### LECTURE AND PRACTICE

week	Topic	Compulsory reading; page number (from ... to ...)	Required tasks (assignments, tests, etc.)	Completion date, due date
1.	Orientation. Requirements. Introduction. Review of Database basic knowledge.	...	...	...
2.	Database systems. Data-driven applications. Multi-tier architecture. Access data sources from C# applications. Data connections (ODBC, OLE, ADO.NET) Entity Framework			
3.	Application of Entity Framework Core technology. LINQ queries. Solving tasks.			
4.	Application of Entity Framework Core technology. Migration. CRUD operations.			
5.	ASP.NET Core and Entity Framework Core			
6.	Decision support. Business Intelligence. Big Data. Various data models (NOSQL, etc.)			
7.	Data Warehouses. Dimensional models. Fact and dimensional tables. Data modification in the Data Warehouse.		Each student chooses a topic for the last week's lecture, which he/she must present.	Last week's lecture.
8.	<b>ACADEMIC HOLIDAY</b>			
9.	<b>Midterm Test.</b> ETL processes. Transfer data from various sources.		<b>Midterm Test.</b>	On the Lecture.
10.	Fundamentals of Microsoft Power BI Platform.			
11.	Microsoft Power BI modules.			
12.	Microsoft Power BI data analyses.			
13.	Microsoft Power BI data analysis			
14.	Students' presentations			

### 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
Midterm Test	max. 100 %	50 %
Student's presentation	max. 15 points (100 %)	50 %

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

Participation in classes in accordance with the regulation of TVSZ.

Writing the midterm test and making a presentation. The weighted average of the midterm test and the presentation should be minimum 40 %. ( $0,5 * \text{Midterm test \%} + 0,5 * \text{Presentation \%} \geq 40\%$ ).

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

Retake of midterm test in 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))

The mid-term performance accounts for **50 %**, the performance at the exam accounts for **50 %** in the calculation of the final grade.

#### 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.] The lectures' and practices' materials (pdf files) in the Neptun Meet Street.
- [2.] Derek J. Rouleau, *Beginning Entity Framework Core 2.0*, 2018, Apress, ISBN: 978-1-4842-3374-0
- [3.] Eric Redmond, Jim R. Wilson, *Seven Databases in Seven Weeks*, The Pragmatic Programmers, LLC, 2012

### RECOMMENDED LITERATURE AND AVAILABILITY

- [4.] Joe Celko's, *Complete Guide to NoSQL*, Morgan Kaufmann, 2014
- [5] Mitchell Pearson, Brian Knight, Devin Knight, Manuel Quintana, *Pro Microsoft Power Platform*, Apress, 2020, ISBN 978-1-4842-6007-4