

<b>Cyberphysical Systems Institute</b>			Semester 2 of the curriculum 2025-26-2			
Name of the subject:	Code of the subject:	Credits:	Weekly hours:			
				lec	sem	lab
<b>Data visualization and business intelligence</b>	NKXAV1EMNF	5	full-time	2	1	2
Responsible person for the subject: Dr. Rita Fleiner			Classification: associate professor			
Subject lecturer(s): Attila Rusznák, Eszter Lukács						
Prerequisites:						
Way of the assessment: Midterm						
<b>Course description</b>						
Goal:	The aim of the course is to introduce students to the fundamentals and practical applications of data visualization and business intelligence. The course seeks to help students understand how data and analytical results can be transformed into business information and how this information can be communicated effectively. Special emphasis is placed on data visualization and the creation of dashboards. By the end of the course, students should understand how data visualization and business intelligence can be effectively applied in business decision-making and how organizational performance can be improved through data analysis and business intelligence.					
Course description:	<p>Within the framework of the course, students become familiar with the methods of loading and cleaning source data, the tasks of data modeling, and the fundamentals of data visualization, and they gain in-depth insight into the use of Microsoft Power BI.</p> <p>The course covers loading data into Power BI from various data sources, data cleaning, and an introduction to the capabilities of Microsoft Fabric. Topics include data modeling, the star schema model, linking data tables, the use of fact and dimension tables, applying basic DAX functions, organizing measures, and understanding different types of visualizations. Students also learn dashboard development, the use of visual elements, different types of filters, theme settings, interactive report creation, and the design of user-friendly interfaces.</p> <p>Advanced Power BI topics are also addressed, including Python visualizations, the use of the Selection Pane, design modernization, and creating an application-like look and feel.</p>					

<b>Lecture schedule</b>	
Education week	Topic
1.	Business Intelligence and Data Visualization: Core Concepts
2.	From Raw Data to Data Modelling
3.	Data Visualization and Calculations
4.	Functions and Dashboard Design
5.	Analytical Techniques and Python-Enhanced Visualization
6.	From Models to Decisions: Machine Learning and BI Best Practices
7.	Getting Started with Power Query
8.	Easter holiday
9.	Power Query deep dive

10.	Designing BI Data Models												
11.	DAX Basics: Measures and Calculations												
12.	DAX Basics: Thinking in DAX												
13.	Building Interactive Reports and Dashboards												
14.	Late submission of the assignments												
<b>Mid-term requirements</b>													
Conditions for obtaining a mid-term grade/signature	There are 10 homework assignments in the course. In assignments 1–6, students can earn a total of 20 points. In assignments 7–10, students can earn 20 points for each assignment. The weekly assignments must be submitted by midnight on the following Wednesday. In the final week, missing or incomplete assignments may still be submitted with a 20% penalty deduction.												
<b>Assessment schedule</b>													
<b>Education week</b>	<b>Topic</b>												
14.	Late submission of the assignments												
<b>Method used to calculate the <i>mid-term grade</i> (to be filled out only for subjects with mid-term grades)</b>													
The mid-term grade is calculated based on the total number of points earned from the assignments.													
<b>Type of the replacement</b>													
Type of the replacement of written test/mid-term grade/signature	In the final week, missing or incomplete assignments may still be submitted with a 20% penalty deduction.												
<b>Type of the exam (to be filled out only for subjects with exams)</b>													
-													
<b>Calculation of the exam mark (to be filled only for subjects with exams)</b>													
-													
<b>Final grade calculation methods:</b>													
The final grade will be calculated using the following scale:													
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Achieved result</th> <th>Grade</th> </tr> </thead> <tbody> <tr> <td>88% - 100%</td> <td>excellent (5)</td> </tr> <tr> <td>76%- 87%</td> <td>good (4)</td> </tr> <tr> <td>66% -75%</td> <td>satisfactory (3)</td> </tr> <tr> <td>51% - 65%</td> <td>pass (2)</td> </tr> <tr> <td>0 - 50 %</td> <td>failed (1)</td> </tr> </tbody> </table>		Achieved result	Grade	88% - 100%	excellent (5)	76%- 87%	good (4)	66% -75%	satisfactory (3)	51% - 65%	pass (2)	0 - 50 %	failed (1)
Achieved result	Grade												
88% - 100%	excellent (5)												
76%- 87%	good (4)												
66% -75%	satisfactory (3)												
51% - 65%	pass (2)												
0 - 50 %	failed (1)												
<b>References</b>													
Obligatory:	Online teaching materials available on the elearning.uni-obuda.hu educational portal.												
Recommended:	<ul style="list-style-type: none"> <li>– Ralph Kimball: The Data Warehouse Toolkit (3rd Edition)</li> <li>– William H. Inmon: Building the Data Warehouse (4th Edition)</li> <li>– Hastie, T., Tibshirani, R., Friedman, J. (2009). The elements of statistical learning: data mining, inference and prediction. (<a href="https://web.stanford.edu/~hastie/ElemStatLearn/">https://web.stanford.edu/~hastie/ElemStatLearn/</a>)</li> </ul>												

	- Cole Nussbaumer Knaflic: Storytelling With Data: A Data Visualization Guide for Business Professionals
Other references:	- <a href="https://learn.microsoft.com/hu-hu/training/powerplatform/power-bi?WT.mc_id=sitertzn_learnlab_guidedlearning-card-powerbi">https://learn.microsoft.com/hu-hu/training/powerplatform/power-bi?WT.mc_id=sitertzn_learnlab_guidedlearning-card-powerbi</a>