

Institute of Cyber-physical Systems			2023/24/2			
Name of the subject:	Code of the subject:	Credits:	Weekly hours:			
				lec	sem	lab
Cloud based IoT and Big Data platforms	NKXCB1EMNF	4	full-time	2	0	2
Responsible person for the subject: Róbert Lovas Ph.D. habil.			Classification: associate professor			
Subject lecturer(s): Róbert Lovas Ph.D. habil., Márk Emődi						
Prerequisites:						
Way of the assessment:	Midterm grade					
Course description						
Goal:	The course will introduce students to the main BigData and IoT (Internet of Things) platforms. The course presents distributed/parallel architectures, operational mechanisms, technologies used and cloud services for different IT platforms with the main objective of serving Big Data and IoT application areas.					
Course description:	The first part of the course will discuss the evolution and characteristics of Big Data solutions, including Hadoop, SPARK, Hana and noSQL databases, and some related Platform-as-a-Service (PaaS) services. The course will also cover the theoretical and practical background of management and orchestration solutions (Ambari / CloudBreak / Occopus / Terraform / Kubernetes) in the cloud Big Data application domains. In addition to learning about IoT and related frameworks, the course will also introduce students to the various applications of data collection, including in the medical and agricultural fields. Expanding the theoretical background, students will be exposed to Lambda, Kappa and other architectural approaches, as well as practical solutions from Azure, AWS, Cloudera.					

Lecture schedule	
Education week	Topic
1.	The basics of Big Data and Hadoop
2.	Database scaling and noSQL basics
3.	Document and graph databases
4.	Column-oriented and in-memory databases
5.	Hadoop orchestration on cloud computing
6.	Hadoop orchestration on cloud computing II
7.	Cloud-based IoT in healthcare
8.	HOLIDAY - EASTER MONDAY
9.	IoT and Big Data processing on Azure
10.	Guest Lecturer
11.	Cloud-based IoT back-end
12.	AWS IoT
13.	Midterm exam, midterm assignment presentation
14.	Midterm exam retake, midterm assignment presentation
Mid-term requirements	
Conditions for obtaining a mid-term grade/signature	Successful completion of the midterm and documentation and presentation of the midterm assignment.
Assessment schedule	
Education week	Topic
13.	Midterm exam, midterm assignment
14.	Midterm exam retake, midterm assignment

Method used to calculate the <i>mid-term grade</i> (to be filled out only for subjects with mid-term grades)													
The completed project work will modify the final result with -1/0/+1 grade.													
<table border="1"> <thead> <tr> <th>Achieved result</th> <th>Grade</th> </tr> </thead> <tbody> <tr> <td>89%-100%</td> <td>excellent (5)</td> </tr> <tr> <td>76%-88<%</td> <td>good (4)</td> </tr> <tr> <td>63%-75<%</td> <td>satisfactory (3)</td> </tr> <tr> <td>51%-62<%</td> <td>pass (2)</td> </tr> <tr> <td>0%-50<%</td> <td>fail (1)</td> </tr> </tbody> </table>		Achieved result	Grade	89%-100%	excellent (5)	76%-88<%	good (4)	63%-75<%	satisfactory (3)	51%-62<%	pass (2)	0%-50<%	fail (1)
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Type of the replacement													
Type of the replacement of written test/mid-term grade/signature	In week 14 it is possible to retake the midterm exam or present the mid-term assignment.												
Type of the exam (to be filled out only for subjects with exams)													
Calculation of the exam mark (to be filled only for subjects with exams)													
Final grade calculation methods:													
References													
Obligatory:	Materials published on the Moodle site of the subject.												
Recommended:	Guy Harrison: Next Generation Databases - NoSQL, NewSQL, and Big Data, Apress, 2015 ISBN 978-1-4842-1330-8 Zoiner Tejada: Mastering Azure Analytics, O'Reilly, 2017 ISBN 978-1491956656												
Other references:													