

Óbuda University John von Neumann Faculty of Informatics			Institute for Cyber-Physical Systems		
Name and code: Cloud based IoT and Big Data platforms (NIXFIBPMNE)					Credits: 5
Computer Science and Engineering MSc			2021/22 year II. semester		
Subject lecturers: Róbert Lovas Ph.D. habil., Attila Farkas					
Prerequisites (with code):		Sensory Modalities (NBISZ1EONE)			
Weekly hours:	Lecture: 2	Seminar.: 0	Lab. hours: 2	Consultation: 0	
Way of assessment:	Exam				
Course description:					
Goal: Get familiar with the main Big Data and IoT platforms.					
Course description: The course introduces the distributed/parallel architectures, the operational mechanisms, the applied technologies and the offered cloud based services concerning various IT platforms with the main aim to serve Big Data and IoT (Internet of Things) application areas. In the first 4 topics, the course discusses the evolution and characteristics of Big Data solutions, including Hadoop, SPARK, Hana and noSQL databases (including some related Platform-as-a-Service offerings) that are widely adopted in the typical research and industrial environments. In Topics 5 and 6, the course covers the theoretical and practical backgrounds of management and orchestration solutions (Ambari/CloudBreak/Occopus) for cloud based Big Data application areas. From Topic 7, the focus has been shifting to IoT and related back-ends for processing the ingested data with more use cases including medical and agriculture areas. The theoretical background is extended with Lambda, Kappa and other approaches in Topic 8, and more practical information from Amazon in Topic 10. By the end of the course, the students are to improve their problem solving and model creation/architecture design skills concerning large-scale parallel and distributed computing by applying typical Big Data/IoT platform engineering approaches together with the most advanced Big Data/IoT platforms (from Microsoft, Amazon, Hortonworks, etc.), and methods in the appropriate way for addressing medical and other application areas. A special research seminar on “reference architectures” will be held on the 7 <sup>th</sup> week.					
Lecture schedule					
Education week	Topic				
1.	Big Data and Hadoop basics				
2.	Database scaling and noSQL basics				
3.	Document and Graph databases				
4.	Column-oriented and in-memory databases				
5.	Hadoop orchestration on Clouds				
6.	National holiday				
7.	Hadoop orchestration on Clouds II (Special research seminar on “reference architectures”)				
8.	Cloud based IoT in healthcare				
9.	IoT and Big Data processing on Azure				
10.	Cloud based IoT back-end				
11.	Spring break				
12.	Midterm test				
13.	Presentation of project work				
14.	Replacement of midterm test or project work presentation				

<b>Midterm requirements</b>													
The midterm test has to be passed, and the project work has to be documented and presented.													
<b>Midterm tests</b>													
Education week	Topic												
12	Midterm test												
13	Presentation of project work												
14	Replacement of midterm test or project work presentation												
<b>Final grade calculation methods</b>													
<p>Digital education mode: Oral midterm test on MS Teams platform.</p> <p>Traditional education mode: Written midterm test.</p> <p>In both cases, the completed project work will modify the final result with -1/0/+1 grade.</p> <table> <tr> <th>Achieved result</th><th>Grade</th></tr> <tr> <td>89%-100%</td><td>excellent (5)</td></tr> <tr> <td>76%-88&lt;%</td><td>good (4)</td></tr> <tr> <td>63%-75&lt;%</td><td>average (3)</td></tr> <tr> <td>51%-62&lt;%</td><td>satisfactory (2)</td></tr> <tr> <td>0%-50&lt;%</td><td>failed (1)</td></tr> </table>		Achieved result	Grade	89%-100%	excellent (5)	76%-88<%	good (4)	63%-75<%	average (3)	51%-62<%	satisfactory (2)	0%-50<%	failed (1)
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<b>Type of replacement</b>													
In the 14 <sup>th</sup> week for the written midterm test / project presentation.													
<b>Type of exam</b>													
Oral exam													
<b>Exam grade calculation method</b>													
<p>Based on the semester results an offered grade can be obtained.</p> <p>OR</p> <p>Based on the oral exam.</p>													
<b>References</b>													
Mandatory:													
The published student material in the Moodle page of the subject													
Recommended:													
<p>Guy Harrison: Next Generation Databases - NoSQL, NewSQL, and Big Data, Apress, 2015 ISBN 978-1-4842-1330-8</p> <p>Zoiner Tejada: Mastering Azure Analytics, O'Reilly, 2017 ISBN 978-1491956656</p>													