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	*2020/21 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 7th 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.	Spring break
10.	IoT and Big Data processing on Azure
11.	Cloud based IoT back-end
12.	Midterm test
13.	Presentation of project work

14.	Replacement of midterm test or project work presentation

Midterm requirements
The midterm test has to be passed, and the project work has to be documented and presented.

Midterm tests	
Education week	Topic
12	Midterm test
13	Presentation of project work
14	Replacement of midterm test or project work presentation

Final grade calculation methods
Digital education mode: The midterm test will be a Moodle test, after the successful test, there will be an oral part which will modify the test result with -1/0/+1 grade. Traditional education mode: Written midterm test. In both cases, the completed project work will modify the final result with -1/0/+1 grade.

Achieved result	Grade
89%-100%	excellent (5)
76%-88<%	good (4)
63%-75<%	average (3)
51%-62<%	satisfactory (2)
0%-50<%	failed (1)

Type of replacement
In the 14th week for the written midterm test / project presentation.

Type of exam
Oral exam

Exam grade calculation method
Based on the semester results an offered grade can be obtained. OR Based on the oral exam.

References
Mandatory:
The published student material in the Moodle page 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