Institute of Cyber-physical Systems			2023/24/2			
Name of the subject:	Code of the subject:	Credits:	Weekly hours:			
				lec	sem	lab
Cloud computing services II	NIEFS2CBNE	2	full-time	0	0	2
Responsible person for the subject: Róbert Lovas Ph.D. habil.			Classification: associate professor			
Subject lecturer(s): Krisztián Póra						
Prerequisites:						
Way of the assessment:	Midterm grade					

Course description	
Goal:	The main aim of the subject is to get practical skills on cloud computing systems. Besides the public cloud computing services (e.g. Amazon Web Services), there is a special focus on setting up of platform services (e.g. Microsoft Azure) and their access through various interfaces. The students get familiar with the step-by-step deployment and operation of private Infrastructure-as-a-Service clouds particularly based on open-source solutions (e.g. OpenNebula and OpenStack). For demonstration purposes Big Data and IoT (Internet of Things) applications will be presented during the practices.
Course description:	Build, operate, and deploy OpenNebula private cloud solution. Build and use of S3 data storage. Cloud orchestration and reference architectures. Deploying and using Docker container technology and Docker Swarm cluster. Creating a distributed NoSQL database on Docker basis.

Lecture schedule	
Education week	Topic
1.	Introduction
2.	OpenNebula installation
3.	OpenNebula administration
4.	Docker basics
5.	Docker basics #2
6.	Docker Swarm basics
7.	Kubernetes basics
8.	**HOLIDAY - EASTER MONDAY**
9.	Cloud orchestration and reference architectures
10.	MinIO – S3 object storage
11.	Distributed NoSQL database
12.	Midterm test
13.	Midterm project presentation
14.	Replacement of midterm test or the 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
12	Midterm test
13	Presentation of project work
14	Replacement of midterm test or project work presentation

Method used to calculate the *mid-term grade* (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.

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:

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

References	
Obligatory:	Materials published on the Moodle site of the subject.
Recommended:	Barrie Sosinsky, Cloud Computing Bible, Wiley, ISBN: 9780470903568 Adrian Mouat, Using Docker, O'Reilly Media, ISBN: 9781491915912 Eben Hewitt, Jeff Carpenter, Cassandra: The Definitive Guide, O'Reilly Media, ISBN: 9781491933664
Other references:	