

Institute of Cyber-physical Systems			2025/26/2							
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 PhD, habil, Prof.			Classification: associate professor							
Subject lecturer(s): Attila Farkas										
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 basics
3.	OpenNebula administration
4.	Docker basics
5.	Docker basics #2
6.	Docker Swarm basics
7.	Distributed NoSQL database
8.	HOLIDAY - EASTER MONDAY
9.	MinIO – S3 object storage
10.	Cloud orchestration and reference architectures
11.	Configuration management tools
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.
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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:													
	<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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References													
Obligatory:	Materials published on the Moodle site of the subject.												
Recommended:	<ul style="list-style-type: none"> - 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:													