

Óbuda University John von Neumann Faculty of Informatics		Institute for Cyber-Physical Systems		
Name and code: Cloud computing systems (NIXCCIEMNE)			Credits: 4	
Computer Science and Engineering MSc			2022/23 year I. semester	
Subject lecturers: Róbert Lovas Ph.D. habil., Márk Emődi				
Prerequisites (with code):		Parallel programming (NIXPERVMNE)		
Weekly hours:	Lecture: 2	Seminar.: 0	Lab. hours: 2	Consultation: 0
Way of assessment:	Written exam			
Course description:				
Goal: The advanced level course concentrates on the system level theory, the design challenges, and the most significant practical realisations of computational clouds, as a middleware, particularly based on open-source practices (OpenStack) and focusing on the Infrastructure-as-a-Service solutions.				
Course description: The course provides a short overview on theoretical and practical knowledge concerning public, private, and hybrid clouds from the aspects of users, system engineers, and operators. The students get acquainted with the types of services (IaaS/PaaS/SaaS) offered by clouds, and the main characteristics of their implementations, as well as their typical solutions. Some selected components of cloud, as a middleware, are discussed in details; starting from the block and object stores (e.g. Cinder/Swift), through the components responsible for the authentication (e.g. Keystone), ending with the telemetry and orchestration tools (e.g. Ceilometer/Heat). In the field of platform services, the students get a short overview on the cloud-based deployments and use cases of Big Data tools.				
Lecture schedule				
Education week	Topic			
1.	Introduction			
2.	OpenStack basics			
3.	Keystone			
4.	Glance			
5.	Nova			
6.	Neutron			
7.	Cinder			
8.	Swift			
9.	HOLIDAY			
10.	AWS – EC2, S3 (IaaS)			
11.	Midterm test			
12.	HOLIDAY			
13.	Presentation of midterm project			
14.	Replacement of midterm test or midterm project presentation			

Midterm requirements													
- Successful written midterm test - Implemented midterm project has to be documented and presented													
Midterm tests													
Education week	Topic												
12	Midterm test												
13	Presentation of midterm project												
14	Replacement of midterm test or project work presentation												
Final grade calculation methods													
-													
Type of replacement													
In the 14 th week for the midterm test or midterm project presentation.													
Type of exam													
Written exam													
Exam grade calculation method													
Based on the midterm test result an offered grade can be obtained. OR Based on the exam result. In both cases, the completed midterm project will modify the exam result with -1/0/+1 grade.													
<table> <tr> <th>Achieved result</th><th>Grade</th></tr> <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>average (3)</td></tr> <tr> <td>51%-62<%</td><td>satisfactory (2)</td></tr> <tr> <td>0%-50<%</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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References													
Mandatory:													
The published student material in the Moodle page of the subject.													
Recommended:													
Matt Dorn: Preparing for the Certified OpenStack Administrator Exam, Packt, 2017 Anne Gentle, Diane Fleming, Everett Toews, Joe Topjian, Jonathan Proulx, Lorin Hochstein, Tom Fifield: OpenStack Operations Guide. O`Reilly, 2014 (electronic notes) Scott Adkins, John Belamaric, Vincent Giersch, Denys Makogon, Jason E. Robinson: OpenStack Cloud Application Development. Wiley, 2016 (electronic notes)													