

Specification for the book of courses

Study program		Computing and Informatics		
Module		Computer Systems Security		
Type and level of studies		Master studies		
The name of the course		Virtualization		
Lecturer (for lectures)		Tošić B. Milorad		
Lecturer/associate (for exercises)		Tošić B. Milorad		
Lecturer/associate (for OFE)				
Number of ECTS	4	Course status (obligatory/elective)	Elective	
Prerequisites				
Course objectives	Introducing students to the fundamentals of virtualization, virtualization types and technologies for their implementation.			
Course outcomes	Upon completion of the course the student should be able to use the virtualization process in everyday practice, including the virtualization of servers, storage space, networks and applications.			
Course outline				
Theoretical teaching	What is virtualization: history, conceptualization and fundamental principles; Types of virtualization and technologies : Server virtualization, storage space virtualization, network virtualization, application virtualization; Operating system level virtualization; Containers; Virtual Network Functions; Virtual machines and hypervisors; Resource management systems in virtualized systems. Virtualized system architectures.			
Practical teaching (exercises, OFE, study and research)	Comparative analysis of the existing open-source software solutions for virtualizations; Virtualization software installation; Virtual machine creation; Virtual network creation; Connecting two virtual machines using LAN; Internal virtual machine routing and internet connection; Proof-of-concept implementation of application based on microservices and virtualized infrastructure.			
Textbooks/references				
1	Radez, Dan. OpenStack Essentials. Packt Publishing Ltd, 2015.			
2	Zhang, Ying. Network Function Virtualization: Concepts and Applicability in 5G Networks. John Wiley & Sons, 2017.			
3	Murugesan, San, and Irena Bojanova, eds. Encyclopedia of cloud computing. John Wiley & Sons, 2016.			
4				
5				
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	1	0		
Teaching methods	Auditive exercises; Laboratory exercises; Computer-based exercises; Consultations; Independent research activities; Oral presentations on selected topics; Active student participation via interactive course Website.			
Grade (maximum number of points 100)				
Pre-exam duties	Points	Final exam	Points	
Activity during lectures	30	Written exam		
Exercises	30	Oral exam	40	
Colloquia				
Projects				