RTU Course "Operating Systems"

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General data

Code	DIP381
Course title	Operating Systems
Course status in the programme	Compulsory/Courses of Limited Choice
Responsible instructor	Imants Gorbāns
Academic staff	Marina Uhanova Igors Ščukins Vadims Žuravļovs
Volume of the course: parts and credits points	1 part, 3.0 Credit Points, 4.5 ECTS credits
Language of instruction	LV, EN
Annotation	Study course is to acquaint students in depth with the principles of Windows, Linux, and MacOS operating system (OS) principles, installation, configuration, implementation, possibilities. The study course consists of two parts. The first part looks at the current versions of Microsoft Windows desktop and Windows Server OS. The second part looks at Linux desktops and overviews the latest versions of Linux server operating systems and MacOS. The study course includes both theoretical material about the personal computer OS, their security features, and four practical works on the installation and configuration of various OS.
Goals and objectives of the course in terms of competences and skills	The aim of the study course is to provide advanced knowledge and competencies about computer operating system guidelines, their architecture, installation, configuration, maintenance in an IT company, office, home. Operating systems play an important role in ensuring the functioning of computer systems, therefore the most important tasks of the study course are to develop competencies in installing, configuring, administrating the latest versions of various OS; to create an understanding of the structure of an OS, the basic principles of OS operation, the operation principles of the most important OS subsystems.
Structure and tasks of independent studies	Work with literature, developer's help files on the web, four mandatory practical or laboratory works to be demonstrated and submitted in an e-learning environment. The exam has two parts: electronic tests and an oral exam.
Recommended literature	Obligātā/Obligatory: 1. Modern Operating Systems. 4th Edition by Andrew S. Tanenbaum. 2013. ISBN-13: 978-0133591620. 2. Operating Systems. Internals and Design Principles by William Stolling. 2004. ISBN 5-8459-0310-6, 0-1303-1999-6. 3. Operating System Comcepts. Abraham Silberschatz, Yale University. Peter Baer Galvin, Pluribus Networks. Greg Gagne, Westminster College. 9th Edition. Copyright©2013, 2012, JohnWiley&Sons, Inc. ISBN: 9781118063330 ISBNBRV: 9781118129388 Papildu/Additional: 4.The Linux Command Line: A Complete IntroductionJan 11, 2012. by William E. Shotts Jr. ISBN-13: 978-1593273897 ISBN-10: 9781593273897. 5. Windows Internals, Part 1: System architecture, processes, threads, memory management, and more. 7th Edition by Pavel Yosifovich, Mark E. Russinovich, David A. Solomon, Alex Ionescu. May 3, 2017. ISBN-13: 978-0735684188. ISBN-10: 9780735684188. 6. Windows 10: The Missing Manual: The book that should have been in the box. Jul 19, 2018 by David Pogue. ISBN-13: 978-1491981917. ISBN-10: 9781491981917. 7. Ed Bott. Introducing Windows 10 for IT Professionals. Technical Overview. Microsoft Press, A Division of Microsoft Corporation, One Microsoft Way, Redmond, Washington, 2016, ISBN: 978-0-7356-9697-6 (brīva e-grāmata PDF). 8. John McCabe with the Windows Server team. Introducing Windows Server 2016. Microsoft Press, A division of Microsoft Corporation, One Microsoft Way Redmond, Washington, 2016, ISBN: 978-0-7356-9774-4 (brīva e-grāmata PDF). 9. Dan Holme, Nelson Ruest, Danielle Ruest, Jason Kel. MCTS Configuring Windows Server 2008 Active Directory. Microsoft Press; Second Edition edition, 2011, ISBN 9780735651937. 10. Operetājsistēmu tiešsaistes dokumentacija: https://docs.microsoft.com/en-us/, https://help.ubuntu.com/, https://docs.centos.org/en-US/docs/, https://support.apple.com/.
Course prerequisites	Programming languages, data structures.

Course contents

Content	Full- and part-time intramural studies		Part time extramural studies	
	Contact Hours	Indep. work	Contact Hours	Indep. work
The concept of operating system. OS functions, resources, interfaces. OS components, services.	2	2	0	0
Windows workstations, the variety of their administration options. OS virtualization.	2	2	0	0
OS file systems. Users on Windows systems, folders and files NTFS permissions, shared resources.	2	2	0	0
Windows technical policies, their division into computer and user level Policy, security features.	2	2	0	0
PC computer hardware from the OS point of view, drivers, memory management, the concept of virtual memory.	2	2	0	0

Installing Windows Server for a Small Office. Active directory, users, groups, containers.	2	2	0	0
Types of remote connection to the server, server services. Folder and file permissions, sharing resources	4	4	0	0
Domain implementation in the organization, technical policies, web services. User rights hierarchy. Authentication, authorization, accounting.	2	2	0	0
Open source software. Linux structure, file systems, kernel, graphical environments.	2	2	0	0
Linux workstation installation, configuration. Users, folder and file permissions, sharing, backup options.	4	4	0	0
MacOS features, administration and maintenance tools. Comparison of different OS.	2	2	0	0
Setting up a small Linux server with web and local sharing services. Data centre software and physical security.	4	4	0	0
PowerShell and Bash scripts for OS administration.	2	2	0	0
Laboratory and practical works.	28	28	0	0
Total:	60	60	0	0

Learning outcomes and assessment

Learning outcomes	Assessment methods
Is able to apply and integrate knowledge and understanding in operating systems and other computer science disciplines to support studies and work in one's area of specialization.	Practical and laboratory works, tests, exam.
Is able to identify IT security risks, use computer network management and protection tools.	Practical and laboratory works, tests, exam.
Is able to install, tune, and use network operating systems Windows, Linux, MacOS, identify real environmental problems, analyse their complexity and assess the possibility of solving them with information technologies.	Practical and laboratory works, tests, exam.
Is competent to apply appropriate practical skills in operating system administration and programming for the creation and configuration of various computer programs and / or other computer artifacts, as well as to prepare a work report.	Practical and laboratory works, tests, exam.

Evaluation criteria of study results

Criterion	%
Four reports of practical or laboratory works	30
Four demonstration of practical or laboratory works	30
Electronic tests	20
Exam	20
Total:	100

Study subject structure

Part	CP	Hours			Tests		
		Lectures	Practical	Lab.	Test	Exam	Work
1.	3.0	2.0	0.0	1.0		*	