

**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
Course level	Undergraduate Studies
Course type	Academic
Field of study	Computer Science
Responsible instructor	Eleonora Latiševa
Academic staff	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 includes profound theoretical materials about computer operating systems (OS) foundations with concentration on OS principles that are common for different OS. Conception of operating system, main OS components and their functionality principles are characterized. Main OS subsystems work - management of processes, memory, input/output and files is analyzed. Modern OS survey is presented.
Goals and objectives of the course in terms of competences and skills	To obtain profound knowledge about computer operating systems (OS) foundations with concentration on OS principles that are common for different OS. OS play essential role in ensuring the functionality of computer systems, and therefore the most important tasks are: to give notions about OS structure, OS important components and their functionality principles, to understand OS main subsystems working - processes, memory, input/output and file management.
Structure and tasks of independent studies	Literature research on the Web, laboratory works in a computer class elaborating various types of software that characterize functioning of operating systems components.
Recommended literature	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 Concepts. 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 4. The Linux Command Line: A Complete Introduction Jan 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.
Course prerequisites	Programming languages, data structures

**Course outline**

Theme	Hours
System software. Operating system definition, functions, resources, interfaces. Service systems.	2
OS structure's models. OS components and components characteristics.	2
OS modules functionality: kernel and additional modules, OS mobility.	2
One task OS: definition, structure's components, interrupt system, command execution.	2
OS file system: functions, devices, FAT characteristic.	2
Memory management aims and tasks. Memory types. CMA functionality.	2
Concurrent processes. Semaphore definition. Banker algorithm.	2
OS kernel components and their functioning.	2
Memory management: virtual memory definition, paging, segmentation, allocation strategies.	4
OS: input and output system organization.	4
OS: file management.	4
OS: resource allocation and planning.	2
Modern OS survey.	2
Laboratory works.	16

**Learning outcomes and assessment**

Learning outcomes	Assessment methods
Know and can explain operating systems functionality principles and processes interaction.	Practical laboratory work, homework, test, exam.
Is able to use different operating systems, elaborate scripts.	Practical laboratory work, homework, test, exam.
Is able to install different operating systems and service systems.	Practical laboratory work, homework, test, exam.
Is able to elaborate Windows command files and UNIX and Ubuntu scripts.	Practical laboratory work, homework, test, exam.

***Study subject structure***

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