

<b>Cyberphysical Systems Insitute</b>			Semester of the curriculum 2025-26-2			
Name of the subject:	Code of the subject:	Credits:	Weekly hours:			
			lec	sem	lab	
<b>Operating Systems</b>	NKXOR1EBNF	5	Weekly	2	0	3
Responsible person for the subject: Prof. Dr. Lovas Róbert			Classification: professor			
Subjectr lecturer(s): Abdallah Benhamida, Géczy Imre						
Prerequisites:	NKXSH1EBNF	Computer Networks				
Way of the assesment:	Written Exam					
<b>Course description</b>						
Goal:	The aim of the course is to familiarize students with the theory, development, and purpose of operating systems, as well as modern operating systems and related technologies. The aim of the course is to provide students with practical experience in managing client and server operating systems, both command line and graphical interface systems, while reviewing their theoretical operation, and to familiarize them with and practice engineering processes in this field through the design, implementation, testing, and documentation of their own installed systems.					
Course description:	<p>During the lectures, students will learn about the main tasks of operating systems, the development of the components that perform each task, and the solutions used in currently popular operating systems (Windows, Unix versions, Linux).</p> <p>Topics: History of operating systems, Major operating systems, Architecture of operating systems, Main functions (purpose, design space, real-world examples): process and thread management, scheduling, memory management, I/O management – with a focus on file management and file systems, Virtualization from an operating system perspective.</p> <p>During the exercises, students review the user and administrative use of client and server operating systems, the automation of system tasks, and the management of server services. In addition, during the semester, they gain experience in installing, configuring, and testing systems and services by setting up their own virtualized server-client architecture.</p>					

<b>Lecture schedule</b>	
Education week	Topic
1.	Lecture: Introduction. Purpose of operating systems. A short history of operating systems. Features of today's operating systems Lab: Description of requirements, Operating system basics - Windows
2.	Lecture: A short introduction to Windows, Linux and Solaris operating systems. Lab: Operating systems basics - Linux
3.	Lecture: Processes Lab: File systems and permissions
4.	Lecture: Threads. The implementation models of operating system's kernel. Lab: Server basics
5.	Lecture: CPU scheduling Lab: Windows server basic services (DNS, DHCP, Web)
6.	Lecture: Interprocess Communications and synchronization. Race conditions. Deadlock situations. Lab: Semester assignment presentation and consultation

7.	Lecture: Memory management before the virtual memory era. Lab: Linux server basic services (DNS, DHCP, Web)
8.	Lecture: Virtual memory management. Managing the kernel's memory. Lab: File sharing and centralized user management, address books
9.	Lecture: I/O management Lab: Communication services, mail
10.	Lecture: Disk management, RAID Lab: Microservice-based server management
11.	Lecture: Break Lab: Linux script – basics, control mechanisms
12.	Lecture: File systems Lab: Linux script – text and file processing
13.	Lecture: Virtualisation Lab: Midterm exam
14.	Lecture: Retrospection Lab: Semester assignment presentation, retake midterm exam
<b>Mid-term requirements</b>	
Conditions for obtaining a mid-term grade/signature:	Participation at the online lessons is mandatory. to students who missed more than 30% of lessons. A successful test and semester assignment are mandatory to acquire grade.
<b>Assessment schedule</b>	
<b>Education week</b>	Topic
<b>13.</b>	Midterm exam – from the entire semester's practical curriculum
<b>14.</b>	Retake midterm exam – from the entire semester's practical curriculum
<b>Exam period</b>	Signature retake exam – from the entire semester's practical curriculum
<b>Type of the replacement</b>	
Type of the replacement of signature:	If the midterm exam score is below 50% or the exam was not taken, it is possible to take a retake midterm exam in week 15. If neither the midterm exam nor the retake exam scores reaches 50%, it is possible to take a signature retake exam during the exam period. The semester assignment (documentation and/or presentation) can be made up during the exam period, at the time of the signature retake exam, but the points available will be capped at 50%.
<b>Type of the exam</b>	
<b>Written</b>	
<b>Calculation of the exam mark</b>	

To complete the course, students must achieve a minimum score of 50% on the midterm exam, the semester assignment, and the final exam. If all these requirements are met, the final grade will be calculated on the total number of points earned.

Task	Maximum points
Midterm exam result	10
Semester assignment result	40
Exam result	50
Total	100

**Final grade calculation methods:**

Achieved result	Grade
0-49	Failed (1)
50-64	Pass (2)
65-79	Satisfactory (3)
80-89	Pass (4)
90-100	Excellent (5)

**References**

Obligatory:	– WILLIAM STALLINGS: Operating Systems: Internals and Design Principles, 9th ed, ISBN: 9352866711
Recommended:	– P. Yosifovich, M. Russinovich, A. Ionescu, D. Solomon: Windows Internals: System architecture, processes, threads, memory management, and more, 7th ed, ISBN: 9780735684188 – Kaiwan N Billimoria: Linux Kernel Programming: A comprehensive guide to kernel internals, writing kernel modules, and kernel synchronization, ISBN: 178995343X
Other references:	