

Subject card

Subject name and code	Operating systems, PG_00143526						
Field of study	Informatics						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2025/2026		
Education level	Bachelor's studies	Subject group			Obligatory subject group in the field of study		
Mode of study	full-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			4.0		
Learning profile	academic	Assessment form			credit		
Conducting unit	Institute of Informatics -> Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		mgr Łukasz Mielewczyk				
	Teachers		mgr Radosław Ziemann mgr Łukasz Mielewczyk				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	45		0.0		55.0	100
Subject objectives	The purpose of the course is to familiarize students with the principles of operation and methods of operating systems and the basics of system programming.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[[INFL3_U02] can precisely formulate questions to deepen one's understanding of a given topic or find missing elements of reasoning		The student is able to use documentation online and tools, the Linux operating system for help and documentation on other commands and programs.		[SU8] observation of student's independent or team work		
	[[INFL3_U07] uses advanced functionalities of operating systems, especially related to network aspects		can use the Linux operating system from the command line and graphical interface.		[SU4] test/exam - oral or written [SU8] observation of student's independent or team work		
	[[INFL3_W08] has knowledge of network technologies, including basic communication protocols, security and construction of network applications		knows the commands that are used to execute system command and knows the main elements, related to the architecture of computer systems, and the principles of the operating system.		[SW4] test/exam - oral or written		
	[[INFL3_W07] is familiar with the most important elements of computer systems architecture and the principles of operating systems with particular emphasis on concurrency, task serialization and memory and process management		knows the commands that are used to execute system commands, the most important elements, related to the architecture of computer systems and the principles of the operating system.		[SW4] test/exam - oral or written		

Subject contents	<ol style="list-style-type: none"> 1. Functions of the operating system, organization and architecture of the operating system, structure and operation of the operating system, POSIX standard, structure of the operating system kernel. 2. Disk management: low-level formatting, high-level formatting, partitioning, defragmentation; management, arrays of independent disks (RAID). 3. Computer system boot: boot program, firmware responsible for initialization and management of the hardware. 4. Linux file system: file types, access methods, system directory structure, basics of file system management. 5. Bash shell: startup files, environment variables, command interpreter, script programming. 6. Managing user accounts and authorization in Linux: configuration files, PAM module 7. Processes and threads: process concept, process operation, inter-process communication; thread management basics of concurrent programming. 8. Process and thread synchronization: critical section, synchronization methods, classic synchronization problems. 9. Resource management: process scheduling, resource deadlock problems. 10. Protection and security: goals and principles of protection of operating systems and computer systems, techniques of attacks on operating systems, techniques of attacks via malicious software. 11. Virtualization: virtualization techniques, hypervisor operation methods. 											
Prerequisites and co-requisites	Passing the subjects: Wstęp do programowania (Introduction to programming), Warsztat programisty (Programmer's workshop). Ability to use a command interpreter and basic knowledge of C programming.											
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Subject passing criteria</th> <th style="width: 30%;">Passing threshold</th> <th style="width: 30%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Laboratory exercises - tests</td> <td>51.0%</td> <td>50.0%</td> </tr> <tr> <td>Lecture - test</td> <td>51.0%</td> <td>50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Laboratory exercises - tests	51.0%	50.0%	Lecture - test	51.0%	50.0%
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Laboratory exercises - tests	51.0%	50.0%										
Lecture - test	51.0%	50.0%										
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. A. S. Tanenbaum, <i>Systemy operacyjne. Wydanie IV</i>, tłumaczenie: R. Meryk; M Szczepaniak, Helion, Gliwice 2015. 2. R. Love, <i>Linux. Programowanie systemowe</i>. Wydanie II, tłumaczenie: J. Janusz, Helion, Gliwice 2014. 3. M. G. Sobell, <i>Linux. Programowanie w powłoce. Praktyczny przewodnik. Wydanie III</i>, tłumaczenie: R. Górczyński, Helion, Warszawa 2013. 4. A. Silberschatz; P. B. Galvin, <i>Podstawy systemów operacyjnych</i>, Wydawnictwa Naukowo-Techniczne, Warszawa 2006. 5. N. Matthew; R. Stones, <i>Linux Programowanie</i>, Wydawnictwo RM, Warszawa 1999. 6. M. Bach, <i>Budowa Systemu Operacyjnego UNIX</i>, Wydawnictwa Naukowo-Techniczne, Warszawa 1995 										
	Supplementary literature	<ol style="list-style-type: none"> 1. E. Nemeth; G. Snyder; T. R. Hein; B. Whaley; D. Mackin , <i>Unix i Linux. Przewodnik administratora systemów. Wydanie V</i>, tłumaczenie: L. Sagalara, Helion, Gliwice 2018. 2. K. Kuźniar; K. Lal; T. Rak , <i>Programowanie w Linuksie. Ćwiczenia</i>, Helion, Gliwice 2012. 3. J. Fusco, <i>Linux. Niezbędny programisty</i> , tłumaczenie: M. Szczepaniak, Helion, Gliwice 2009. 4. M. K. Johnson; E. W. Troan, <i>Oprogramowanie użytkowe w systemie Linux</i>, Wydawnictwa Naukowo-Techniczne, Warszawa 2000. 										
	eResources addresses											
Example issues/ example questions/ tasks being completed												
Work placement	Not applicable											

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