University of Gdańsk

Subject card

Subject name and code	Operating Systems, PG_00204167						
Field of study	Informatics						
Date of commencement of studies	October 2026		Academic year of realisation of subject	2027/2028			
Education level	Bachelor's studies		Subject group	Obligatory subject group in the field of study Subject group related to practical vocational preparation			
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	6.0			
Learning profile	practical		Assessment form	exam			
Conducting unit	Institute of Informatics -> Faculty of Mathematics, Physics and Informatics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		mgr Łukasz Mielewczyk				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	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	60		0.0		90.0	150
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
[INFPL3_K02] is ready to recognize the importance of knowledge in solving cognitive problems and practical and seeking opinions experts in case of difficulties with independent problem solving	is ready to use the technical documentation of the Linux operating system, professional literature and expert sources	[SK8] observation of student's independent or team work
[INFPL3_W06] knows and understands the theory and methods to an advanced degree in the field of operating systems, network technologies including basic web communication protocols; applies this knowledge to configure, optimize and secure systems	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
[INFPL3_U02] is able to obtain information from literature, the Internet and other sources, critically analyze and synthesize this information, and assess its credibility and draw conclusions; can learn effectively throughout life, independently acquiring new technical competences and adapting to technological changes	is able to use online documentation and tools, the Linux operating system for help and documentation on other commands and programs.	[SU8] observation of student's independent or team work
[INFPL3_U05] is able to perform tasks and solve complex and unusual problems in the area of advanced functionalities of operating systems, in particular related to network aspects, virtualization, containerization and other cloud technologies	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
[INFPL3_K01] is ready to critically assess the scope and quality of knowledge acquired and the content received, recognizing their limitations and the degree of credibility; demonstrates readiness to update one's own knowledge and confront it with various sources	is aware of the dynamic development of operating systems and the need to update knowledge in this area	[SK8] observation of student's independent or team work

Subject contents

1. Popular operating systems: features, types, organization, architecture, structure, operation, interoperabilit
2. Examples of components and tools offered by operating systems.
3. File systems: examples of file systems, file types, access methods, system directory structure, and the basics of file system management.
4. Shells: examples of shells, startup files, environment variables, command interpreters, and scripting.
5. Fundamentals of system administration: managing user accounts and authorization, logging, and tools for monitoring and managing events.
6. Management of computer system components: processor operation, computer memory and storage management, computer system bootup.
7. Processes and threads: the concept of a process, process behavior, interprocess communication, thread management, synchronization methods, and example problems.
8. Resource management: process and thread scheduling, deadlocks, and other example problems.
9. Fundamentals of systems programming: resource management, fundamentals of concurrent programming.
10. Security and Safety: principles of operating system and computer system security, techniques for attacking operating systems, and malware attack techniques.
11. Virtualization: virtualization techniques and how hypervisors work.

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 Python programming.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Laboratory exercises - tests	51.0%	50.0%
Lecture - exam	51.0%	50.0%

Recommended reading	Basic literature	1. A. S. Tanenbaum, *Systemy operacyjne. Wydanie IV*, tłumaczenie: R. Meryk; M Szczepaniak, Helion, Gliwice 2015. 2. R. Love, *Linux. Programowanie systemowe*. Wydanie II, tłumaczenie: J. Janusz, Helion, Gliwice 2014. 3. M. G. Sobell, *Linux. Programowanie w powłoce. Praktyczny przewodnik. Wydanie III*, tłumaczenie: R. Górczyński, Helion, Warszawa 2013. 4. A. Silberschatz; P. B. Galvin, *Podstawy systemów operacyjnych*, Wydawnictwa Naukowo-Techniczne, Warszawa 2006. 5. N. Matthew; R. Stones, *Linux Programowanie*, Wydawnictwo RM, Warszawa 1999. 6. M. Bach, *Budowa Systemu Operacyjnego UNIX*, Wydawnictwa Naukowo-Techniczne, Warszawa 1995
	Supplementary literature	1. E. Nemeth; G. Snyder; T. R. Hein; B. Whaley; D. Mackin , *Unix i Linux. Przewodnik administratora systemów. Wydanie V*, tłumaczenie: L. Sagalara, Helion, Gliwice 2018. 2. K. Kuźniar; K. Lal; T. Rak , *Programowanie w Linuksie. Ćwiczenia*, Helion, Gliwice 2012. 3. J. Fusco, *Linux. Niezbędnik programisty* , tłumaczenie: M. Szczepaniak, Helion, Gliwice 2009. 4. M. K. Johnson; E. W. Troan, *Oprogramowanie użytkowe w systemie Linux*, Wydawnictwa Naukowo-Techniczne, Warszawa 2000.
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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