University of Gdańsk

Subject card

Subject name and code	Operating Systems, PG_00198496		
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
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	5.0
Learning profile	academic	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	65.0	125

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
[INFOL3_W08] knows and understands advanced concepts in the field of network technologies, including 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
[INFOL3_U06] is able to select and apply appropriate IT methods and tools to solve complex problems, is able to use acquired knowledge by appropriately selecting sources and information derived from them, and perform evaluation, critical analysis, and synthesis of this information	is able to use technical documentation for the Linux operating system, technical literature, and expert sources	[SU4] test/exam - oral or written
[INFOL3_U02] is able to use his/her knowledge of higher mathematics to model and solve complex problems	can use the Linux operating system from the command line and graphical interface	[SU4] test/exam - oral or written
[INFOL3_W07] knows and understands 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

<table>
<tr><td>Subject contents</td><td>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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>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.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Lecture: exam</td><td>51.0%</td><td>50.0%</td></tr>
<tr><td>Laboratory exercises: tests</td><td>51.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>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</td></tr>
<tr><td>Supplementary literature</td><td>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.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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