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<br>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 | [SK4] test/exam - oral or written |
| [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 | [SU4] test/exam - oral or written |
| [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 | [SK4] test/exam - oral or written |
| [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 |

## 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.<br>2. R. Love, *Linux. Programowanie systemowe*. Wydanie II, tłumaczenie: J. Janusz, Helion, Gliwice 2014.<br>3. M. G. Sobell, *Linux. Programowanie w powłoce. Praktyczny przewodnik. Wydanie III*, tłumaczenie: R. Górczyński, Helion, Warszawa 2013.<br>4. A. Silberschatz; P. B. Galvin, *Podstawy systemów operacyjnych*, Wydawnictwa Naukowo-Techniczne, Warszawa 2006.<br>5. N. Matthew; R. Stones, *Linux Programowanie*, Wydawnictwo RM, Warszawa 1999.<br>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.<br>2. K. Kuźniar; K. Lal; T. Rak , *Programowanie w Linuksie. Ćwiczenia*, Helion, Gliwice 2012.<br>3. J. Fusco, *Linux. Niezbędnik programisty* , tłumaczenie: M. Szczepaniak, Helion, Gliwice 2009.<br>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 | |

Document generated electronically. Does not require a seal or signature.