

Subject card

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| Subject name and code | Operating systems, PG_00143996 | | | | | | |
| 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 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 | mgr Łukasz Mielewczyk mgr Radosław Ziemann | | | | | |
| 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. | | | | | | |

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| Learning outcomes | Course outcome | Subject outcome | Method of verification |
| | [INFL3_K01] knows the limitations of their own knowledge and understands the need for further education | is able to use online documentation and tools, the Linux operating system for help and documentation on other commands and programs. | [SK8] observation of student's independent or team work |
| | [INFL3_U05] uses 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 |
| | [INFL3_W06] has knowledge of operating systems, network technologies including basic web communication protocols | 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 |
| | [INFL3_K02] can precisely formulate questions to deepen his/her own understanding of a given topic or to find missing elements of reasoning | is able to use online documentation and tools, the Linux operating system for help and documentation on other commands and programs. | [SK8] observation of student's independent or team work |
| [INFL3_U02] is able to obtain information from literature, knowledge bases, the Internet and other reliable sources, integrate them, interpret them and draw conclusions and formulate opinions | 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 | |
| Subject contents | <ol style="list-style-type: none"> 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. History of operating systems: the beginnings of computer systems and operating systems. Types of operating systems: multiprocessor systems, batch systems, real-time systems, Linux file system: individual files, access methods, system directory structure, basics of file management. Bash shell: startup files, environment variables, command interpreter, script programming. Managing user accounts and authorization in Linux: configuration files, PAM module. Processes and threads: process concept, process operation, inter-process communication; thread management basics of concurrent programming. Synchronization of processes and threads: critical section, methods of synchronization, classical synchronization problems. Basic components of computer systems: basic functions and elements of the processor, types and functions of computer memory. RAM storage: general and virtual memory, segmentation, descriptor table, paging, examples of memory management. Disk management: low-level formatting, high-level formatting, partitioning, defragmentation; management, variable disk arrays (RAID). Computer system boot: boot program, firmware responsible for initialization and management of the hardware. Resource management: basic scheduling, resource deadlock problems. Protection and security: goals and principles of protection of security systems and computer systems, techniques of attacks on operating systems, techniques of attacks using malicious software. Event monitoring and management: Linux log file logging, sample event monitoring and management tools. Virtualization: virtualization techniques, hypervisor operating systems. | | |
| 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 |
| | Lecture - exam | 51.0% | 50.0% |
| | Laboratory exercises - tests | 51.0% | 50.0% |
| Recommended reading | Basic literature | <ol style="list-style-type: none"> A. S. Tanenbaum, <i>Systemy operacyjne. Wydanie IV</i>, tłumaczenie: R. Meryk; M Szczepaniak, Helion, Gliwice 2015. R. Love, <i>Linux. Programowanie systemowe</i>. Wydanie II, tłumaczenie: J. Janusz, Helion, Gliwice 2014. M. G. Sobell, <i>Linux. Programowanie w powłoce. Praktyczny przewodnik. Wydanie III</i>, tłumaczenie: R. Górczyński, Helion, Warszawa 2013. A. Silberschatz; P. B. Galvin, <i>Podstawy systemów operacyjnych</i>, Wydawnictwa Naukowo-Techniczne, Warszawa 2006. N. Matthew; R. Stones, <i>Linux Programowanie</i>, Wydawnictwo RM, Warszawa 1999. M. Bach, <i>Budowa Systemu Operacyjnego UNIX</i>, Wydawnictwa Naukowo-Techniczne, Warszawa 1995 | |

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| | 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. Niezbędnik 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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