

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Operating systems		Code 1010331531010330105
Field of study Information Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 3
Elective path/specialty -	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: 30 Classes: - Laboratory: 15 Project/seminars: -		No. of credits 4
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences		ECTS distribution (number and %) 4 100%
Responsible for subject / lecturer: dr Jerzy Bartoszek email: jerzy.bartoszek@put.poznan.pl tel. 61 665-3713, 61 665-2378 Wydział Elektryczny ul. Piotrowo 3A 60-965 Poznań		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Student has structured and theoretically founded knowledge of the basic algorithms and analysis techniques for designing algorithms, abstract data structures and their implementation.
2	Skills	Student is able to use programming environments and platforms to write, perform and test simple programs coded in imperative programming languages.
3	Social competencies	Student is aware of and understands the importance and impact of non-technical aspects of engineering activity and the associated responsibility for decisions.
Assumptions and objectives of the course: Description of the concepts that underlie operating systems with examples that pertain to the most popular operating systems, including: Unix, Linux and Windows.		
Study outcomes and reference to the educational results for a field of study		
Knowledge:		
1. Student knows the principles of operating systems. - [K_W06]		
Skills:		
1. Student is able to make a critical analysis of the way the operating system (or portion of it) works. - [K_U11]		
2. Student is able to use programming environments and platforms in programming modules of operating systems. - [K_U10]		
3. Student is able to assess the usefulness of routine methods and tools to solve simple engineering tasks and apply appropriate technologies. - [K_U22]		
Social competencies:		
1. Student is aware of and understands the importance and impact of non-technical aspects of engineering activity and the associated responsibility for decisions. - [K_K02]		
Assessment methods of study outcomes		
Lectures: written tests, pass criterion of 50.1% points.		
Laboratory: tests, evaluation of completed projects and reports		
Course description		

<p>Lectures: Operating-system structures. Process Concept. Threads and Concurrency. CPU scheduling: Scheduling Criteria, Scheduling Algorithms. Job scheduling. Process management and interprocess Communication. Process synchronization: The Critical-Section Problem, Synchronization Hardware, Semaphores, Regions and Monitors, Classic Problems of Synchronization. Deadlocks. Memory management: Contiguous Memory Allocation, Paging, Segmentation. Virtual memory. File management: File-System Structure, File-System Implementation, Allocation Methods, Free-Space Management. I/O systems: I/O Hardware, Transforming I/O Requests to Hardware Operations. Protection and security: Access Matrix, Access Control List, User Authentication. Case studies.</p> <p>Laboratory: Projects illustrating mechanisms and events in operating systems.</p>		
<p>Basic bibliography:</p> <ol style="list-style-type: none"> 1. Silberschatz A., Galvin P.B., Gagne G., Operating system concepts (Eight Edition), John Wiley & Sons, New York, 2008 2. Stallings W., Operating Systems: Internals and Design Principles (7th Edition), Prentice Hall, 2011) 		
<p>Additional bibliography:</p> <ol style="list-style-type: none"> 1. Silberschatz A., Galvin P.B., Gagne G., Operating System Concepts with Java, (Seventh Edition), John Wiley & Sons, New York, 2006 		
<p>Result of average student's workload</p>		
<p>Activity</p>	<p>Time (working hours)</p>	
1. participation in lectures	30	
2. participations in labs.	15	
3. exam, consultation	5	
4. project	30	
5. report	5	
<p>Student's workload</p>		
<p>Source of workload</p>	<p>hours</p>	<p>ECTS</p>
Total workload	100	4
Contact hours	50	2
Practical activities	50	2