STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Operating systems		**1010334431010330105**

Field of study	Profile of study (general academic, practical)	Year /Semester
Information Engineering	**(brak)**	**2 / 3**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
First-cycle studies	**part-time**

No. of hours					No. of credits
Lecture: **16**	Classes: **-**	Laboratory: **8**	Project/seminars: **-**		**4**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**4 100%**

Responsible for subject / lecturer:

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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

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.

Laboratory:

Projects illustrating mechanisms and events in operating systems.

Basic bibliography:

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)

Additional bibliography:

1. Silberschatz A., Galvin P.B., Gagne G., Operating System Concepts with Java, (Seventh Edition), John Wiley & Sons, New York, 2006

Result of average student's workload

Activity	Time (working hours)
1. participation in lectures	16
2. participations in labs.	8
3. exam, consultation	6
4. project	40
5. report	5
6. studying additional problems mentioned in the lectures	25

Student's workload

Source of workload	hours	ECTS
Total workload	100	4
Contact hours	30	1
Practical activities	53	2