STUDY MODULE DESCRIPTION FORM

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

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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.

Course update 2017: Case studies.

Laboratory:

Projects illustrating mechanisms and events in operating systems.

Teaching methods:

lectures - with multimedia presentation, additional topics included in Moodle course

laboratory - with multimedia presentation, additional topics included in Moodle course, used tools enable students to perform tasks at home

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

2. Madnick S.E., Donovan J.J., Systemy operacyjne, PWN 1983, transl. Bartoszek J. and others

Result of average student's workload

Activity	Time (working hours)
1. participation in lectures	30
2. participations in labs.	15
3. exam, consultation	5
4. project	30
5. report	5

Student's workload

Source of workload	hours	ECTS
Total workload	100	4
Contact hours	50	2
Practical activities	50	2