

(faculty stamp)

COURSE DESCRIPTION

1. Course title: ADVANCED OPERATING SYSTEMS		2. Course code: AOS		
3. Validity of course description: 2017/2018				
4. Level of studies: Master (graduate)				
5. Mode of studies: INTRAMURAL STUDIES				
6. Field of study: Macrofaculty				
7. Profile of studies: general academic				
8. Programme: COMPUTER SCIENCE				
9. Semester: VI				
10. Faculty teaching the course: Faculty of Automatic Control, Electronics and Computer Science				
11. Course instructor: dr inż Przemysław Skurowski				
12. Course classification: specialization courses				
13. Course status: obligatory				
14. Language of instruction: English				
15. Pre-requisite qualifications: Operating systems				
16. Course objectives: The goal of a course is to present advanced concepts of operating systems to the participants. During the course students will get knowledge about design of modern network and distributed OS and about real-time operating systems. The practical part of a course focuses on the configuration and administration of operating systems in a network environment.				
17. Description of learning outcomes:				
Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
1	Student acquires extended knowledge on operating systems with emphasis on the networked and distributed environments	Exam	Lecture	K2A_W07, K2A_W10
2	Student acquires practical knowledge on Linux and Windows operating systems in networked environments	Exam	Lecture	K2A_U06, K2A_U14, K2A_U18
3	Student acquires knowledge and basic skills in installation and configuring distributed elements in operating systems	Laboratory tasks	Laboratory	K2A_U06, K2A_U14, K2A_U18
4	Student acquires knowledge and basic skills in administering and managing distributed elements in operating systems	Laboratory tasks	Laboratory	K2A_U06, K2A_U14, K2A_U18
5	Student acquires knowledge and basic skills in reading reference literature and technical documentation	Laboratory tasks	Laboratory	K2A_U03, K2A_U04
18. Teaching modes and hours Lecture / BA /MA Seminar / Class / Project / Laboratory 30/ - / - / - / - / 30				
19. Syllabus description: Lectures:				

Topics cover a network and distributed aspects of operating systems. These are following:

1. Basic concepts in network and distributed systems. Architectures of a network and distributed systems. The concept of reliability.
2. Networked and distributed file systems. Design, access and buffering techniques. Exemplary systems NFS, CIFS, CODA
3. Distributed block devices (DRBD)
4. Inter process communication, synchronization and coordination in distributed environment. Concurrency control. Distributed locks and synchronization. Coordinator election. The problem of a reliability of a communication in a control of an execution of concurrent processes.
5. Distributed Inter process communication
6. Techniques and algorithms of access control and protection in multi-user systems. User-superuser, ring and matrix designs of a control system
7. Realtime system. Scheduling of RT processes, system request delay estimation. Examples of designs: bus organization of a RTOS with microkernel (QNX), Solaris, RTLinux.
8. Network directory services. Examples of LDAP and Active directory
9. Windows browser as an example of distributed coordination.
10. High availability systems

Laboratory:

1. Active Directory 1 - logical infrastructure
2. Group Policy Objects
3. Active Directory 2 - physical infrastructure
4. Windows RAID
5. WSUS
6. Windows Security
7. Samba
8. ACL
9. Software management
10. Xwindow
11. Linux kernel
12. Shell programming

20. Examination: yes (written)

21. Primary sources:

1. A. Silberschatz, J.L. Peterson, G. Gagne, Operating Systems Concepts, Wiley
2. W. Stallings, Operating Systems. Pearson
3. A. S. Tanenbaum, Modern Operating Systems. ed 2, Prentice-Hall Inc., 2001.
4. A.S. Tanenbaum, M. van Steen: Distributed Systems: Principles and Paradigms, Prentice-Hall
5. W. R. Stevens, Advanced Programming in the UNIX Environment, Addison-Wesley, 1992

22. Secondary sources:

- A. Silberschatz et al.: Podstawy systemów operacyjnych WNT
 A. Frisch: UNIX System Administration. O’Reilly

23. Total workload required to achieve learning outcomes

Lp.	Teaching mode :	Contact hours / Student workload hours
1	Lecture	30/30
2	Classes	
3	Laboratory	30/30
4	Project	
5	BA/ MA Seminar	
6	Other	15/15
	Total number of hours	75/75

24. Total hours: 150

25. Number of ECTS credits: 5
26. Number of ECTS credits allocated for contact hours: 3
27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 2
26. Comments:

Approved:

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(date, Instructor's signature)

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(date, the Director of the Faculty Unit signature)