



UNIVERSITY "UKSHIN HOTI" PRIZREN
FACULTY OF COMPUTER SCIENCE

PROGRAM: Software Design

SYLLABUS							
<i>Level of studies</i>	Bachelor	<i>Program</i>	SD	<i>Academic year</i>	2018/2019		
<i>SUBJECT</i>	Operating Systems and Management of Systems						
<i>Year</i>	1 st	<i>Status Of the subject</i>	Obligatory	<i>Code</i>		<i>ECTS credits</i>	6
<i>Semester</i>	II						
<i>Teaching weeks</i>	15		<i>Hours teaching</i>	60	<i>Lectures</i>	<i>Exercises</i>	
					2	2	
<i>Teaching Methodology</i>	Lectures, exercises, seminar papers, consultations, etc.						
<i>Consultations</i>	1 hr / week						
<i>Professor</i>	Prof. Ass. Dr. Arsim Susuri	<i>E-mail:</i>	arsim.susuri@uni-prizren.com				
		<i>Tel.:</i>					
<i>Assistant</i>	Elissa Mollakuqe, PhD. C.	<i>E-mail:</i>	elissamollakuqe@hotmail.com				
		<i>Tel.:</i>					

Study goal and table of content	Benefits of student
<p>Through this course it is possible for students to know the basic concepts, definitions and best practices of the operating system. In particular, students will gain knowledge about:</p> <ul style="list-style-type: none"> • Historical Perspective and evolution of operating systems in the last 50 years • Process Management (Processes, Threads, Scheduling Processors, Synchronization, and Blocking) • Memory management (segmentation, mapping, switching) • File systems 	<p>Upon completion of this course the student will be able to:</p> <ul style="list-style-type: none"> • Understand the functioning of the operating system • Analyze the roles of the relevant components of the operating system • Implement laboratory exercises that show the functioning of the respective operating system components • Distinguish between different types of operating systems • Experiment with timing of processes and other tasks of the operating system

Methodology for the implementation of educational topics:		
The course is a combination of lectures, discussions, discussions, numerical and laboratory exercises, the tasks are presented by the subject professor and assistant in the lab.		
Conditions for realization of educational topics:		
• Adequate literature, tables, computers, projectors and other IT tools for learning and exercises.		
Ways of assessing of the student (in %) :	Evaluation in%	Final grade
		51-60% - grade 6
		61-70 7
		71-80 8
		81-90 9
Total	100.00 %	91-100 10
Obligations of student:		
Lectures	Exercises	

The student should be regular in lectures and especially in exercises, make use of all learning opportunities, use compulsory and broader literature, be active and respect the rules on high school ethics in courtesy and cooperation.

The student should be active in the exercises and reflect the readiness and knowledge of initiatives, ideas and demonstrations of the knowledge acquired in the lectures.

Activities				Hour/ weeks	Days/Weeks	Total
Lectures				2	15	30
Laboratory exercises				2	15	30
Contacts with teachers / consultations				1	5	5
Practical work				1	2	2
Projects, presentations, etc.				1	2	2
Own study time				3	15	45
Preparation for final exam				5	6	30
Time spent in the assessment (tests, final exam, etc.)				2	3	6
Notice: 1 ECTS credits= 25 hour commitment, e.g. if the subject has 6 ECTS credits student must have 150 hours during the semester commitment.					Total load:	150
Week	Lectures		Hour	Exercises		
	Topic			Topic		
1	<ul style="list-style-type: none"> • Presentation of the syllabus • Introduction – Chapter 1 (excluding 1.2 and 1.10) • What operating systems do • Computer system architecture • Operating system structure and operations • Process, memory, and data storage management • Open source operating systems 		2	<ul style="list-style-type: none"> • • <p style="text-align: center;">Introduction Working with Linux</p>		2
2	<ul style="list-style-type: none"> • Operating system structures – Chapter 2 (excluding 2.6, 2.8, 2.9 and 2.10) • Operating system services • User Interface and Operating System • System calls • Design and Implementation of the Operating System • Operating system structure 		2	<ul style="list-style-type: none"> • <p style="text-align: center;">Shell scripting</p>		2
3	<ul style="list-style-type: none"> • Processes - Chapter 3 (excluding 3.6) • Concept of processes • Process Planning • Process operations • Communication between processes 		2	<ul style="list-style-type: none"> • Implementation of processor scheduling <ul style="list-style-type: none"> • Round Robin • SJF (Shortest Job First) • FCFS (First Come First Serve) • Priority 		2
4	<ul style="list-style-type: none"> • Threads - Chapter 4 (excluding 4.4) • Multiple Core Programming • Multifaceted models • Top issues • Examples of operating systems 		2	<ul style="list-style-type: none"> • <p style="text-align: center;">Implementation of strategies for file allocation</p>		2
5	<ul style="list-style-type: none"> • Synchronization of processes - Chapter 5 (excluding 5.3, 5.7 and 5.10) • The critical section problem • Synchronization hardware • Mutex locks • Semaphores 		2	<ul style="list-style-type: none"> • Implementation of semaphores 		2

	<ul style="list-style-type: none"> • Monitors • Examples of synchronization 			
6	<ul style="list-style-type: none"> • Scheduling of processors - Chapter 6 (excluding 6.4 and 6.9) • Basic concepts • Criterion for termination • Termination algorithms • Real time scheduling of processors • Evaluating algorithms 	2	<ul style="list-style-type: none"> • Implementation of techniques for organizing files 	2
7	<ul style="list-style-type: none"> • Deadlocks - Chapter 7 (excluding 7.5, 7.6, and 7.7) • System model • Deadlocks characterization • Methods for deadlock treatment • Blocking deadlocks 	2	<ul style="list-style-type: none"> • Implementation of Banker's algorithms for avoiding deadlocks 	2
8	Test 1	2	<ul style="list-style-type: none"> • Repetition of exercises • Reinforcement for the test 1 	2
9	<ul style="list-style-type: none"> • Main memory - Chapter 8 (excluding 8.6 and 8.7) • Background • Replacement • Distribution of non-continuous memory • Paging • Table layout of the pages 	2	<ul style="list-style-type: none"> • Implementation of an algorithm for detecting deadlocks 	2
10	<ul style="list-style-type: none"> • Virtual Memory - Chapter 9 (excluding 9.7, 9.8 and 9.9) • Background • Invoice requests • Copy-on-Write • Replacement of pages 	2	<ul style="list-style-type: none"> • Implementation of algorithms for page replacement <ul style="list-style-type: none"> • FIFO (First In First Out) • LRU (Least Recently Used) • LFU (Least Frequently Used) 	2
11	<ul style="list-style-type: none"> • Data storage structure - Chapter 10 (excluding 10.3, 10.7, 10.8 and 10.9) • Overview of the Data Retention Structure • The disk structure • Disk Planning and Management • Swap space management 	2	<ul style="list-style-type: none"> • Implementation of common memory and of IPC (Inter Process Communication) 	2
12	<ul style="list-style-type: none"> • File System Interface - Chapter 11 (excluding 11.3.3, 11.3.4, 11.5 and 11.6) • The concept of the files • Access methods • The directory and disk structure 	2	<ul style="list-style-type: none"> • Implementation of paging techniques for memory management 	2
13	<ul style="list-style-type: none"> • File System Implementation - Chapter 12 (excluding 12.2.3, 12.7, 12.8, and 12.9) • The structure of the file system • Implementation of the file system • Implementation of directories • Allocation Methods • Free space management • Efficiency and performance 	2	<ul style="list-style-type: none"> • Implementation of applications for threads and synchronization 	2
14	<ul style="list-style-type: none"> • I / O Systems - Chapter 13 (excluding 13.6) • Overview • I / O hardware • Application of the I / O interface 	2	<ul style="list-style-type: none"> • I/O system calls 	

	<ul style="list-style-type: none"> • I / O kernel subsystem • Transform I / O requirements into hardware operations 			
15	Test 2	2	<ul style="list-style-type: none"> • Repetition of exercises • Reinforcement for the test 2 	

LITERATURE:				
Main Literature:				
1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts, Tenth Edition, John Wiley & Sons, 2018.				
Additional literature:				
1. Andrew Tanenbaum and Herbert Bos, Modern Operating Systems, Fourth Edition, Pearson Prentice Hall, 2015.				
2. Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau, Operating Systems: Three Easy Pieces, version 0.90, 2015				
NOTICE:				
<p>In general, lecture presentations will be made through the PowerPoint system, the table, the use of materials and software and the Internet.</p> <ul style="list-style-type: none"> • Also additional resources (scientific papers, publications, national bulletins, and recent discoveries and research) will be provided by the professor. • In the absence of the opportunity for practical work to be organized weekly, in cooperation with the University's management, this activity will be organized on certain days in: organizations, companies, ltd, farms, manufacturing units. • During each session, dialogue and co-participation will be organized with the students. 				
Notice for the student:				
<p>Students are required to be regular in the lectures and exercises section.</p> <p>The contribution of students in the form of conversation and cooperation with students will be evaluated.</p> <p>Timely arrival in lectures and exercises is mandatory.</p>				