NAME OF THE COURSE	Operating Systems					
Code	PMID70	Year of study				
Course teacher	doc.dr. sc. Željko Agić	Credits (ECTS)	5,0			
Associate teachers		Type of instruction (number of hours)	L	S	E	F
			30		30	
Status of the course		Percentage of application of e-learning				

COURSE DESCRIPTION	
Course objectives	Develop an understanding of the role of the operating system in the computer system that can be accomplished management resources to the best use of computing resources and create an environment for preparing and implementing the program.
Course enrolment requirements and entry competences required for the course	Admission requirements: none. Entry competences: basic knowledge of computer.
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	Students will be able to: 1. Explain the mechanisms of transmission of data between external units and systems 2. Understand and apply the synchronization mechanisms 3. Explain procedures management The storage space 4. Explanation of the functions and use the file system 5. Advanced use operating system UNIX 6. Develop and test multi-threaded programs
Course content broken down in detail by weekly class schedule (syllabus)	Introduction to the subject. The role of the operating system in the computer system. The hierarchical structure, historical development and the parts of the operating system. Exercises: Introduction to the exercise. Introduction to UNIX. Check-in and check-out operation. Model simple PC on which to base the study of the operating system. The role of the processor, tanks and outdoor units in the computer. The task, process and instructional threads. Changing context. Exercises: user directory. Working with directories and files. Input-output operations. Interrupt data transfer. Data transfer by direct memory access. Hardware for managing multiple breaks with priorities. Exercise: Balance system. Users. Viewing process. Setting process. The realization of tasks based on the multithreaded execution. The relationship between threads. Mutual exclusion two threads. Procedures Dekker and Peterson. Exercise: Redirecting standard input, standard output and output for errors. Chaining commands. Mutual exclusion larger number of threads. Lamport's protocol. Mutual exclusion is based in the control support. Exercise: Manage permissions. Links to the files. The structure of the data center. The descriptor for this thread and this thread transition state. Nuclear features of the monitor, binary and general traffic light. Exercises: Colloquium first Input-output operations and delay. Instant messaging between processes across an unlimited and limited tank and message queue. Exercises: The screen editor Vi. Swap files.

<table>
<tr><td></td><td>Synchronize threads. Necessary conditions deadlock. Strategy in relation to a complete standstill.
Problem five philosophers. Hoareov concept monitor.
Exercises: Shell Programming: Writing and executing shell file. Basic commands.
Time series analysis of computer systems. Basic models of stochastic models of tasks.
Exercises: Shell Programming: Branching instructions.
System analysis of the Poisson distribution of arrivals tasks and exponential distribution of their treatment. Types serving tasks.
Exercises: Shell Programming: repetition statements.
Preparation program for execution. The physical and logical address space. Assigning storage tank farm. Disc features like auxiliary tank. The problem of fragmentation.
Exercise: Regular expressions.
Virtual memory paging mechanism based on. Hardware support for paging.
Exercises: Colloquium second
Paging on demand. Strategy replacement page.
Exercises: Multithreaded Programming: Console applications.
File system. The descriptor file. The descriptor storage tank farm. The functions of the file system.
Exercises: Multithreaded Programming Windows applications.
Study of typical operating systems: Linux and Windows.
Exercises: Colloquium third</td></tr>
<tr><td>Format of instruction</td><td>☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☒ partial e-learning
☐ field work
☐ independent assignments
☐ multimedia
☐ laboratory
☐ work with mentor
☐ homework assignments</td></tr>
<tr><td>Student responsibilities</td><td>Lecture 70%, exercise attendance 70%, 3 colloquia, practical and oral examination. Students who are successful in the preliminary exams are released practical exam.</td></tr>
<tr><td>Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>
<table>
<tr><th>Name</th><th>Ects</th><th>Name</th><th>Ects</th><th>Name</th><th>Ects</th></tr>
<tr><td>Class attendance</td><td>1,5</td><td>Research</td><td></td><td>Experimental work</td><td></td></tr>
<tr><td>Oral exam</td><td>1,5</td><td>Report</td><td></td><td>Homework assignments</td><td></td></tr>
<tr><td>Seminar essay</td><td></td><td>Essay</td><td></td><td></td><td></td></tr>
<tr><td>Tests</td><td></td><td>Practical training</td><td>2</td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
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<tr><td>Grading and evaluating student work in class and at the final exam</td><td>Activity of students in exercises (presence, addressing the challenges of homework) (10%).
Practical exam (60%). During the semester are held three preliminary exams (25% + 25% + 10%). The student is successful in a colloquium if achieved half of the expected number of points, but in this case, released a practical exam.</td></tr>
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<tr><td></td><td colspan="3">Oral exam (30%) is compulsory for all students, while answering three questions randomly selected from a list of 50 questions divided into three categories.
The final grade is derived on the basis of all these ratings with weighting factors as indicated in parentheses for each form of assessment.</td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>1. Budin, L. Golub, M., Jakobović, D., Jelenković, L .: Operating Systems, Element, Zagreb, 2010 (16 copies in the library).</td><td>16</td><td></td></tr>
<tr><td>2. Mr Zagar: UNIX, and how to use it, University of Zagreb, Faculty of Electrical Engineering and Computer Science, 2007 (the first online edition)</td><td>0</td><td>yes</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3"></td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">Talk with students, student evaluation using the anonymous survey, the success of students in the exam, self-assessment.</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
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