POLYTECHNIC OF MEĐIMURJE IN ČAKOVEC

COURSE SYLLABUS

ACADEMIC YEAR:	2022/2023

1. GENERAL COURSE INFORMATION

1.1 Course name	Operating systems			
1.2 Study program/s	Undergraduate professional study of *Computer Science*			
1.3 Course status (O,E)	Mandatory	**1.6 Mode of instruction (number of hours)**	**Lectures**	30
1.4 Course code	5015		**Exercises**	30
1.5 Course abbreviation	OS		**Seminars**	
1.6 Semester	IV.		**E-learning**	
1.7 ECTS	5	**1.7 Place and time of instruction**	The premises of the Polytechnic of Međimurje in Čakovec, according to the schedule published on the website	

2. TEACHING STAFF

2.1 Course leader/s-title	PhD. Bruno Trstenjak, senior lecturer Dino Kalamari, lecturer	**contact**	btrstenjak@mev.hr dkalamari@mev.hr
		contact	
2.2 Assistant/s- title		**contact**	
		contact	
2.3 Instruction held by-title	Dino Kalamari, lecturer	**contact**	

3. COURSE DESCRIPTION

3.1 Course goals	The main thematic units of the course include knowledge in the following areas: (i) definition and role of the operating system, (ii) management of directories and files and reading and writing data, (iii) computer processes and multi-threaded parallel execution of program code, (iv) synchronization mechanisms. The primary goal of the course is to teach students about these four topics and them provide knowledge and skills from the above four thematic groups in order to be able to successfully master the defined learning outcomes
3.2 Prerequisites	To take the course, it is necessary to pass the course Programming and Object Oriented Programming 1.
3.3 Course outcomes	I1. Compare and evaluate the elements of the operating system with regard to their development and application in accordance with modern needs. I2. Generate program code that uses existing system calls. I3. Generate program code for managing files and directories. I4. Generate program code to write and read data to the file system. I5. Compare the computer process and the computer thread and justify the application of one or the other. I6. Generate process management program code. I7. Generate code for managing threads. I8. Compare synchronization mechanisms and justify the use of an individual with regard to the problem.

| 3.4 Course content | The course teaches knowledge in the field of file management, where students are explained in general the possibilities of system calls on examples of retrieving data about various parts of the operating system. The system calls for working with the file system, retrieving data related to the file system and the files themselves are displayed. The options for system calls, file management, and writing and reading data are displayed.

The following section introduces the concept of a computer process and a computer thread, and shows the system calls of the operating system for working with processes and threads, the display of the list of processes and process data. Examples of starting a tree are explained and the differences and similarities of a tree and a process are analyzed.

The last unit provides knowledge and skills related to synchronization mechanisms necessary in the conditions of parallel execution of program code. System calls by which the Monitor, Mutex and Semaphore synchronization mechanisms are realized are processed. The use of synchronization mechanisms on the problem of hungry philosophers, the problem of producers and consumers, and other examples. |
|---|---|

3.5 Types of coursework

x	Lectures	x	Exercises		Blended e-learning	x	Individual activities		Laboratory
	Seminars and workshops	x	Distant learning		Field classes		Multimedia and network		Mentorship
	Other								

3.6 Language of instruction

Croatia

3.7 Monitoring students' work (enter the number of ECTS credits for each activity so that the total number of ECTS credits is equal to the total ECTS value of the course, 1 ECTS = 30 hours)

2	Class attendance		Seminars		Essay
	Class activity		Project		Report/paper
1.5	Midterm exams	1.5	Practical task		Continuous knowledge check
	Written exam		Experimental work		
	Oral exam		Research		

3.8 Assessment and evaluation of students' work during classes and at the final exam

Assessment and evaluation of student work during the semester

The course has 8 defined learning outcomes, a passing grade is awarded if the student has met at least 50% on each of the learning outcomes.
A maximum of 200 points can be earned per course. Learning outcomes are scored and checked through the following methods:

First intermediate exam (M1): up to 40 points, of which 20 are achieved by a theoretical test and 20 by practical work.
Second intermediate exam (M2): up to 60 points, of which 30 are achieved by a theoretical test and 30 by practical work.
Third intermediate exam (M3): up to 100 points, of which 50 are achieved by a theoretical test and 50 by practical work.

The criterion for calculating the grade is expressed as follows:
  ● 100-125 Sufficient (2)

- 126-150 Good (3)
- 151-175 Very good (4)
- 176-200 Excellent (5)

Through additional work and commitment through homework and designing and creating their own projects during the semester, the student can earn an additional amount of points. All these activities must be agreed in advance with the lecturers on the course, and all such papers and projects must be designed, developed and submitted for evaluation by the end of the 14th week of classes in the semester.

Assessment and evaluation of student work on the exam

Students who do not achieve 100 or more points during the semester are required to take an exam that evaluates all learning outcomes defined in the course. The student must achieve at least 50% points on each of the learning outcomes.
The exam is conducted in the following ways:
- Solving a test on a computer within the e-learning system (Moodle / Loomen).
- Creating a software solution on a computer based on assigned tasks.
- Talk to the student about the software solution.

Of the exam methods defined in the list above, the exam will contain at least two elements. Each of the elements examines all defined learning outcomes, with some elements paying more attention to theoretical knowledge while others to practical skills and understanding of the subject.
To pass the exam, it is necessary to satisfy all learning outcomes with at least 50% points on each of the elements, and to achieve at least 50% points in total to access the next element of the exam. During the exam, a student can achieve a maximum of 100 points, and is entitled to a grade if he has 50 or more points.

The grade is awarded according to this criterion:
- 50 - 63: Sufficient (2)
- 64 - 75: Good (3)
- 76 - 88: Very good (4)
- 89 - 100: Excellent (5)

3.9 Assessment criteria – analysis per learning outcomes			M1	M2	M3	IN TOTAL
		Outcome 1	10		10	20
		Outcome 2	10		10	20
		Outcome 3	10		10	20
		Outcome 4	10		10	20
		Outcome 5		15	15	30
		Outcome 6		15	15	30
		Outcome 7		15	15	30
		Outcome 8		15	15	30
		In total	**40**	**60**	**100**	**200**

3.10 Specific features related with taking the course	During the semester, students will collect points in 3 midterm exams.
	As a rule, the first midterm exam is written after the first 4 weeks of classes and covers the learning outcomes covered in the first 4 weeks.
	The second midterm exam is written after the other 9 weeks of classes and in principle covers the learning outcomes processed up to the ninth week of classes, with more attention being paid to the outcomes from the previous 4 weeks.
	The third midterm exam is written after the second 14 weeks of teaching and covers the learning outcomes processed up to the 14th week of teaching, with more attention being paid to the outcomes processed in the 10th to 14th week of teaching.
	The type of questions is defined by the teacher, but all questions and tasks cover the course material or learning outcomes.
3.11 Students obligations	Full-time students are required to attend at least 70% of the total number of hours of lectures and exercises in order to exercise the right to take the exam. Part-time students are required to attend at least 30% of the total number of hours of lectures and exercises in order to exercise the right to take the exam. If the student has not fulfilled all the obligations set by the course, he is obliged to attend the lectures again and meet the conditions for taking the exam.
	Attendance can be offset by online tuition, organised webinars and added assignments given by teachers. One lesson lasts 45 minutes, and several hours form a teaching unit. Absence from one teaching unit is counted as one absence. Delays and apologies are recorded separately. In that case, if the student missed more than 50% of classes, and has a justifiable reason/apology, the request should be submitted to the Department Council, which then decides on the justification of student absences with the obligatory opinion of the course leader.
3.12 Written assignments	

3.13 Required reading	1.	Budin, Golub, Jakobović, Jelenković, Operating Systems, Element, Zagreb, 2011
	2.	

3.14 Additional reading	1.	Tanenbaum, Modern operating systems, 3rd ed, Prentice hall, 2007.
	2.	Silberschatz, S. Galvin, Operating System Concepts, Addison Wesley Publishing Company, Reading, Mass., 8th ed, 2008.
	3.	W. Kort: Programming in C #, Exam Ref 70-483, Microsoft Press
	4.	Lecture content for the course (PPT presentations) available on the Loomen system

4 ADDITIONAL COURSE INFORMATION

4.1 Quality control	The quality of the program, teaching process, teaching skills and level of mastery of the material will be established by conducting a written evaluation based on questionnaires, and in other standardised ways and in accordance with the by-laws of the Polytechnic of Međimurje in Čakovec.

4.2 Contact the teacher	Students can contact the teacher during the office hours and during classes, while for short questions and explanations they can contact him/her any day during working hours by coming in person or by landline. It is also possible to ask questions by e-mail, which will be answered in 48 hours at the latest. It is desirable for students to come as often as possible for any possible questions during the teacher's office hours.
4.3 Information about the course	It is the obligation of each student to be regularly informed about the course. All notifications about the classes or possible postponement of classes will be posted on the bulletin board and on the website of the Polytechnic at least 24 hours in advance.
4.4 Course contribution to the study program	Apply the acquired learning skills, basic knowledge of the profession and problem solving necessary for continuing studies at a higher level. Apply communication and professional ethics. Develop programming code in multiple programming languages using modern methods and tools. Identify the basic specifics of operating systems. Choose ways of structuring data in program code, as well as techniques for writing complex program forms and use standard algorithms. Install, configure, and manage specific operating systems and network services in complex network environments