MEĐIMURSKO VELEUČILIŠTE U ČAKOVCU
MEĐIMURJE UNIVERSITY OF APPLIED SCIENCES IN ČAKOVEC

COURSE SYLLABUS

ACADEMIC YEAR: 2025/2026

1. GENERAL COURSE INFORMATION				
1.1 Course name	**Algorithms and data structures**			
1.2 Study program/s	Undergraduate Professional Study Programme Computer Engineering			
1.3 Course status (O,E)	O	**1.6 Mode of instruction (number of hours)**	**Lectures**	30
1.4 Course code			**Exercises**	45
1.5 Course abbreviation			**Seminars**	
1.6 Semester	III		**E-learning**	Merlin
1.7 ECTS	7	**1.7 Place and time of instruction**	The premises of the Međimurje University of Applied Sciences in Čakovec, according to the schedule published on the website	
2. TEACHING STAF.F				
2.1 Course leader/s-title	PhD, Bruno Trstenjak, prof.	**contact**	btrstenjak@mev.hr	
		contact		
2.2 Assistant/s- title		**contact**		
		contact		
2.3 Instruction held by-title	PhD, Bruno Trstenjak, prof.	**contact**	btrstenjak@mev.hr	
2.4 Course leader/s-title		**contact**		
3. COURSE DESCRIPTION				
3.1. Course goals	After completing the course, the student will be able to apply different data structures using different program algorithms. The student will be able to apply the acquired knowledge in the field of data structures and algorithms in the independent execution of program tasks.			
3.2 Prerequisites	Passed courses: Programming, Mathematics 1			
3.3 Course outcomes	After successfully completing the course, students will be able to: O1 - Explain the basic properties and characteristics of different data structures O2 - Explain how different simple and advanced programming algorithms work and recognize the complexity of the algorithm O3 - Make an analysis of the efficiency of individual algorithms in solving problem tasks O4 - Apply various data structures and algorithms in solving problem tasks O5 - Identify appropriate data structures and algorithms in solving specific problems			
3.4 Contribution of the course to the study program	IS8 Apply relevant mathematical and statistical methods in software engineering IS12 Choose ways of structuring data in program code, as well as recording techniques of complex program forms and use standard algorithms			
3.5 Course content	The content of the course continues the acquired knowledge from the course in the course Programming. The most widely used algorithms and data structures are processed. After dynamic memory allocation, memory allocation examples, and function call mechanism, the notion of algorithm complexity is introduced. Recursion is explained and illustrated. The search techniques are continued and			

	then all the important sorting algorithms follow. Dynamic data structures are introduced: single and multiple linked lists. Basic data structures such as hence and order are built. Then the diffuse addressing technique, binary trees and binary search tree are introduced. Application of data compression algorithms and search of character and numeric data strings.

3.6 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								

3.7 Language of instruction	Croatian

3.8 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)						
	2,5	Class attendance	0,5	Seminars		Research
	3,0	Midterm exams/written exam		Project		Essay
	1,0	Oral exam		Practical task		

Activity specification	**Percent %**	**Points**
Assessment during instruction		
Attendance	5%	5
Continuous assessment	20%	20
Seminar/ project/ essay	5%	5
Midterm exam 1	15%	15
Midterm exam 2	15%	15
Midterm exam 3	15%	15
Oral exam	25%	25
Exam assessment for the students who failed to fullfil all the obligatory requirements during the semester		
Written exam	*45%*	*45*
Total:	**100%**	**100**

Ways of evaluating learning outcomes								
	Attendance	**Continuous asse.**	**Mid-term exam 1**	**Mid-term exam 2**	**Mid-term exam 3**	**Seminar**	**Oral exam**	**Total**
Outcome 1			5				5	10
Outcome 2		5	10	5			5	25
Outcome 3		5		10			5	20
Outcome 4		5			5		5	15
Outcome 5		5			10		5	20
Outcome not-related	5					5		10
Total	5	20	15	15	15	5	25	100

Points Grade
89 – 100 excellent (5)
76 – 88 very good (4)
63 – 75 good (3)
50 – 62 pass (2)
0 – 49 fail (1)

3.9 Specific features related to taking the course	If a student collects 50% of the points of each outcome, he / she directly takes the exam, if he / she has submitted a seminar paper. A student cannot access the exam if he / she has not submitted a seminar paper. Seminar papers are prepared according to the instructions published on the Merlin system and are

	submitted by posting on the Merlin. The seminar paper should be submitted at least 3 days before the exam deadline.	
3.10 Students obligations	• a full-time student has the right to sit for the exam if he attends classes for a minimum of 70% of the total prescribed number of hours • a full-time student who attends classes from 50 to 70% of the total prescribed number of hours can exercise the right to take the exam by completing additional teaching activities in agreement with the course teacher • a full-time student who attends a certain course for less than 50% of the prescribed number of hours enrolls in the course the following academic year • a part-time student has the right to sit for the exam if he/she attends classes for a minimum of 30% of the total prescribed number of hours • a part-time student who attends classes for 20 to 30% of the total prescribed number of hours can exercise the right to sit for the exam by completing additional teaching activities in agreement with the course teacher • a part-time student who attends the classes of a certain course for less than 20% of the prescribed number of hours re-enrolls in the course the following academic year	
3.11 Written assignments		
3.12 Required reading	1.	Strukture podataka i algoritmi, R. Manger, M. Marušić, PMF Zagreb, 2009.
3.13 Additional reading	1.	Henry H Liu: Algorithms with Implementations in C: A Quantitative Approach, Independently published, 2019.

4. ADDITIONAL INFORMATION ABOUT THE COURSE	
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 Međimurje University of Applied Sciences in Čakovec.
4.2 Contact the teacher	Students can contact the teacher during the office hours and during classes. All other methods of communication are arranged with the teacher. 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 University at least 24 hours in advance.

5. ELABORATION OF THEMATIC UNITS

Week	Topic	Course outcome
1.	Introduction to the content of the course, method of teaching, evaluation of students' work during the semester Basic terms about the concept of data structure and algorithms	O1
2.	Basic concepts: data structures and algorithms (methods of measuring the success of algorithms)	O1
3.	Data structure: class/object	O1
4.	Linked Lists	O1, O2
5.	Queues and Stacks	O1, O2

6.	Midterm exam	
7.	Binary Trees, Binary Search Tree	O1, O2, O3
8.	Recursion	O2, O3
9.	Sorting	O2, O3
10.	Midterm exam	
11.	Graphs	O2,O3, O4
12.	Data Compression	O2,O3,O4
13.	Associative data containers	O2,O3,O4
14.	String Matching	O2,O3,O5
15.	Midterm exam	