



# MEĐIMURSKO VELEUČILIŠTE U ČAKOVCU

## MEĐIMURJE UNIVERSITY OF APPLIED SCIENCES IN ČAKOVEC

### COURSE SYLLABUS

ACADEMIC YEAR: 2024/2025

#### 1. GENERAL COURSE INFORMATION

1.1 Course name	<b>Mathematics 1</b>			
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	I		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 STAFF

2.1 Course leader/s-title	Tibor Rodiger, senior lecturer	contact	trodiger@mev.hr
		contact	
2.2 Assistant/s- title		contact	
		contact	
2.3 Instruction held by- title	Tibor Rodiger, senior lecturer	contact	trodiger@mev.hr
2.4 Course leader/s-title		contact	

#### 3. COURSE DESCRIPTION

3.1. Course goals	The student should learn the chapters in mathematics necessary to solve engineering problems			
3.2 Prerequisites				
3.3 Course outcomes	<p>After successfully completing the course, students will be able to:</p> <p>I1 – Multiply, divide, exponentiate and root complex numbers in trigonometric form</p> <p>I2 – Calculate expressions with matrices, determinant and vectors</p> <p>I3 – Solve a system of linear equations</p> <p>I4 - Define a function, compositions of functions and inverse functions, classify functions and sketch graphs of basic functions without the help of derivatives</p> <p>I5 – Define and explain the term limes, calculate limes functions</p> <p>I6 – Define and explain the term derivative, calculate the derivative of a function</p>			
3.4 Contribution of the course to the study program	Apply relevant mathematical and statistical methods in software engineering.			
3.5 Course content	The course contains complex numbers, matrices and determinants, vectors, functions of real variables, limit value and derivatives.			
3.6 Types of coursework	x	Lectures	X	Exercises
			Blended e-learning	X
			Individual activities	
				Laboratory

		Seminars and workshops		Distant learning		Field classes		Multimedia and network		Mentorship																														
		Other																																						
<b>3.7 Language of instruction</b>	Croatian																																							
<b>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)</b>	1	Class attendance		Seminars		Research																																		
	5	Midterm exams/written exam		Project		Essay																																		
	1	Oral exam		Practical task																																				
	<table border="1"> <thead> <tr> <th>Activity specification</th> <th>Percent %</th> <th>Points</th> </tr> </thead> <tbody> <tr> <td colspan="3" style="text-align: center;">Assessment during instruction</td> </tr> <tr> <td>Lesson assignments</td> <td>10%</td> <td>10</td> </tr> <tr> <td>Midterm exam 1</td> <td>40%</td> <td>40</td> </tr> <tr> <td>Midterm exam 2</td> <td>40%</td> <td>40</td> </tr> <tr> <td>Oral exam</td> <td>10%</td> <td>10</td> </tr> <tr> <td colspan="3" style="text-align: center;"><i>Exam assessment for the students who failed to fulfil all the obligatory requirements during the semester</i></td> </tr> <tr> <td>Written exam</td> <td>80%</td> <td>80</td> </tr> <tr> <td>Oral exam</td> <td>10%</td> <td>10</td> </tr> <tr> <td><b>Total:</b></td> <td><b>100%</b></td> <td><b>100</b></td> </tr> </tbody> </table> <p><i>Points Grade</i>  89 – 100 excellent (5)  76 – 88 very good (4)  63 – 75 good (3)  50 – 62 pass (2)  0 – 49 fail (1)</p>											Activity specification	Percent %	Points	Assessment during instruction			Lesson assignments	10%	10	Midterm exam 1	40%	40	Midterm exam 2	40%	40	Oral exam	10%	10	<i>Exam assessment for the students who failed to fulfil all the obligatory requirements during the semester</i>			Written exam	80%	80	Oral exam	10%	10	<b>Total:</b>	<b>100%</b>
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<b>3.9 Specific features related to taking the course</b>	<p><i>If a student collects 50% of the points of each outcome he/she directly accesses the oral exam. If a student does not achieve a sufficient number of points on the midterm exam, he/she cannot take the next midterm exam, and has to take the written exam.</i></p> <p><i>If he/she passes the written exam, he/she will proceed to the oral part of the exam.</i></p> <p><i>The final grade is given on the oral part of the exam.</i></p>																																							
<b>3.10 Students obligations</b>	<ul style="list-style-type: none"> <li>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</li> <li>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</li> <li>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</li> <li>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</li> <li>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</li> </ul>																																							

	<p>by completing additional teaching activities in agreement with the course teacher</p> <ul style="list-style-type: none"> <li>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</li> </ul>	
<b>3.11 Written assignments</b>		
<b>3.12 Required reading</b>	1.	P. Javor: Uvod u matematičku analizu, Školska knjiga, Zagreb, 1993.
	2.	T. Rodiger: Derivacije – riješeni zadaci, drugo prošireno izdanje, MEV, Čakovec, 2023.
<b>3.13 Additional reading</b>	1.	B. P. Deminovič i suradnici: Zadaci i riješeni primjeri iz Matematičke analize, Golden marketing – Tehnička knjiga, Zagreb, 2003
	2.	Ivan Slapničar: Matematika 1 i 2, digitalni udžbenik s interaktivnim animacijama i interaktivnom provjerom znanja, <a href="http://www.fesb.hr/mat2">http://www.fesb.hr/mat2</a> .
	3.	T. Bradić, R. Roki, J. Pečarić, M. Strunje: Matematika za tehnološke fakultete, Element, Zagreb, 1998.
	4.	B.Kovačić, L.Marohnić, T.Strmečki: Repetitorij matematike za studente elektrotehnike, TVZ, Zagreb, 2014
<b>4. ADDITIONAL INFORMATION ABOUT THE COURSE</b>		
<b>4.1 Quality control</b>	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.	
<b>4.2 Contact the teacher</b>	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.	
<b>4.3 Information about the course</b>	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.	
<b>5. ELABORATION OF THEMATIC UNITS</b>		
Week	Topic	Course outcome
1.	Complex numbers: multiplication, division, exponentiation and rooting of complex numbers in trigonometric form.	I1
2.	Matrices: addition, subtraction, matrix multiplication by a scalar, matrix multiplication, matrix inverse, matrix equations	I2
3.	Matrices: addition, subtraction, matrix multiplication by a scalar, matrix multiplication, matrix inverse, matrix equations	I2
4.	Determinants: definition of determinant, calculation of determinant, properties of determinants, rank of matrix	I2
5.	Determinants: calculation of determinant, properties of determinants, rank of matrix, calculation of inverse matrix using determinant	I2
6.	System of linear equations: solution of the system, existence of solutions, Gauss-Jordan elimination method	I3
7.	System of linear equations: Gauss-Jordan elimination method, solving the system using determinants, applications of the system. Midterm exam 1	I3

8.	Vectors: definition and properties of vectors, operations with vectors, scalar, vector and mixed product, linear independence of vectors, vector space	12
9.	Vectors: operations with vectors, scalar, vector and mixed product, linear independence of vectors, vector space	12
10.	Real numbers and real functions of one variable: sets of numbers, function definition, assignment of a function, domain of a function, properties of real functions	14
11.	Real numbers and real functions of one variable: domain of a function, properties of real functions, composition of functions, inverse function of a function	14
12.	Limit value and continuity of a function: limits, properties of limits, continuity of a function	15
13.	Limit value and continuity of a function: continuity of a function, asymptotes	15
14.	Derivation of a function of one variable: Concept and interpretation of derivative, derivative of elementary functions, derivative of sum, difference, product and quotient	16
15.	Derivation of a function of one variable: derivative of a sum, difference, product and quotient, derivative of a complex function. Midterm exam 2	16