



POLYTECHNIC OF MEĐIMURJE IN ČAKOVEC

COURSE SYLLABUS

ACADEMIC YEAR: 2020/2021

1. GENERAL COURSE INFORMATION

1.1 Course name	Mathematics 1			
1.2 Study program/s	Undergraduate professional study of Computer Science			
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	1.		E-learning	
1.7 ECTS	7	1.7 Place and time of instruction	Polytechnic of Međimurje	

2. TEACHING STAFF

2.1 Course leader/s-title	Tibor Rodiger	contact	trodiger@mev.hr
	Drago Francišković	contact	dfranciskovic@mev.hr
2.2 Assistant/s- title		contact	
		contact	
2.3 Instruction held by- 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, potentiate and root complex numbers in trigonometric form</p> <p>I2 - Calculate expressions with matrices, determinant and vectors</p> <p>I3 - Solve the system of linear equations</p> <p>I4 - Develop an understanding of function definition, function composition and inverse function, classify functions and sketch graphs of basic functions without the help of derivations</p> <p>I5 - Understand the concept of limits, calculate the limits of a function</p> <p>I6 - Understand the concept of derivation, calculate the derivative of a function</p>									
3.4 Course content										
3.5 Types of coursework	x	Lectures	x	Exercises		Blended e-learning		Individual activities		Laboratory
		Seminars and workshops		Distant learning		Field classes		Multimedia and network		Mentorship
		Other								
3.6 Language of instruction										
3.7 Monitoring students' work (enter the	2.5	Class attendance			Seminars			Essay		
	1	Class activity			Project			Report/paper		

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)		Midterm exams		Practical task		Continuous knowledge check
	2.5	Written exam		Experimental work		
	1	Oral exam		Research		

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

Activity specification	Percent %	Points
Assessment during instruction		
Attendance	3%	3
Class activity	10%	10
Seminar/ project/ essay	0%	0
Midterm exam 1	35%	35
Midterm exam 2	35%	35
<i>Exam assessment for the students who failed to fulfil all the obligatory requirements during the semester</i>		
Written exam	70%	70
Oral exam	17%	17
Total:	100%	100

Written exam

The written exam is taken through two colloquia,

Oral exam

A student has the right to publicity during the oral exam. An assistant or another student must be present in the room. Exam questions must be written down to determine if all outcomes have been verified. The oral exam is mainly used as an upgrade to the written one

3.9 Assessment criteria – analysis per learning outcomes

Ways of evaluating learning outcomes						
	Attendance	Activity	Mid-term exam 1	Mid-term exam 2	Oral exam	Total
Outcome 1			5		2	7
Outcome 2			20		4	24
Outcome 3			10		2	12
Outcome 4				10	3	13
Outcome 5				10	3	13
Outcome 6				15	3	18
Outcome not-related	3	10				13
Total	3	10	35	35	17	100

Grading of outcomes (in order to pass the mid-term exam/exam the student must achieve at least 50% points for each learning outcome)

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

3.10 Specific features related with taking the course

If the student collects 40% of the points of each outcome and a total of 50% of the points from the colloquium, he directly takes the oral exam. Once won points in colloquia for each learning outcome are no longer deleted unless the student decides to correct the result for each learning outcome, whereby the points won until then are deleted and newly earned points for that learning outcome are entered.

	<p>Students who did not take the colloquium access the written part of the exam where all learning outcomes are checked.</p> <p>Points for teaching activity are awarded in lectures and exercises, depending on the student's activity.</p> <p>The final grade is obtained in the oral part of the exam.</p>										
3.11 Students obligations	<p>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.</p> <p>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.</p>										
3.12 Written assignments											
3.13 Required reading	<table border="1"> <tr> <td>1.</td> <td>P. Javor: Uvod u matematičku analizu, Školska knjiga, Zagreb, 1993.</td> </tr> <tr> <td>2.</td> <td>T. Rodiger: Derivacije – riješeni zadaci, MEV, Čakovec, 2015.</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </table>	1.	P. Javor: Uvod u matematičku analizu, Školska knjiga, Zagreb, 1993.	2.	T. Rodiger: Derivacije – riješeni zadaci, MEV, Čakovec, 2015.						
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3.14 Additional reading	<table border="1"> <tr> <td>1.</td> <td>B. P. Deminovič i suradnici: Zadaci i riješeni primjeri iz Matematičke analize, Golden marketing – Tehnička knjiga, Zagreb, 2003</td> </tr> <tr> <td>2.</td> <td>Ivan Slapničar: Matematika 1 i 2 digitalni udžbenik s interaktivnim animacijama i interaktivnom provjerom znanja, http://www.fesb.hr/mat2.</td> </tr> <tr> <td>3.</td> <td>T. Bradić, R. Roki, J. Pečarić, M. Strunje: Matematikazatehnološke fakultete, Element, Zagreb, 1998.</td> </tr> <tr> <td>4.</td> <td>B.Kovačić, L.Marohnić, T.Strmečki: Repetitorij matematike za studente elektrotehnike, TVZ, Zagreb, 2014</td> </tr> <tr> <td></td> <td></td> </tr> </table>	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, http://www.fesb.hr/mat2 .	3.	T. Bradić, R. Roki, J. Pečarić, M. Strunje: Matematikazatehnološke fakultete, Element, Zagreb, 1998.	4.	B.Kovačić, L.Marohnić, T.Strmečki: Repetitorij matematike za studente elektrotehnike, TVZ, Zagreb, 2014		
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4 ADDITIONAL COURSE INFORMATION											
4.1 Quality control	<p>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.</p>										
4.2 Contact the teacher	<p>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.</p>										
4.3 Information about the course	<p>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.</p>										

4.4 Course contribution to the study program	<p>Apply the acquired learning skills, basic knowledge of the profession and problem solving necessary for continuing studies at a higher level.</p> <p>Apply communication and professional ethics.</p> <p>Apply relevant mathematical and statistical methods in software engineering.</p>
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5. ANALYSIS OF COURSE TOPICS (the number of hours is equal to the number of lectures and exercises of the course)

LECTURES				
Hours	Topic and description	Method	Learning outcomes	Course outcome
1. 2.	Complex numbers	<ul style="list-style-type: none"> • Direct teaching (lecture, instruction, pp presentation) • Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes... 	Multiplication, division, exponentiation and rooting of complex numbers in trigonometric form.	O1
3. 4.	Matrices	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Addition, subtraction, scalar matrix multiplication, matrix multiplication, inverse matrix, matrix equations	O2
5. 6.	Matrices	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Addition, subtraction, scalar matrix multiplication, matrix multiplication, inverse matrix, matrix equations	O2
7. 8.	Determinant	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Determinant definition, determinant calculation, determinant properties, matrix rank, inverse matrix calculation using determinant	O2

9.				
10.	Determinant	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Determinant definition, determinant calculation, determinant properties, matrix rank, inverse matrix calculation using determinant	O2
11.				
12.	System of linear equations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	System solution, solution existence, Gauss-Jordan elimination method, system applications	O3
13.				
14.	System of linear equations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	System solution, solution existence, Gauss-Jordan elimination method, system applications	O3
15.				
16.	Vectors	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Definition and properties of vectors, operations with vectors, scalar, vector and mixed product, linear independence of vectors, vector space.	O2
17.				
18.	Vectors	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Definition and properties of vectors, operations with vectors, scalar, vector and mixed product, linear independence of vectors, vector space	O2
19.				
20	Real numbers and real functions of one variable	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Number sets, function definition, function assignment, function domain, properties of real functions, composition of	O4

			functions, inverse function	
21.	Real numbers and real functions of one variable	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Number sets, function definition, function assignment, function domain, properties of real functions, composition of functions, inverse function	O4
22.				
23.	Limit value and continuity of the function	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Limes, properties of limes, continuity of function, asymptotes	O5
24.				
25.	Limit value and continuity of the function	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Limes, properties of limes, continuity of function, asymptotes	O5
26.				
27.	Derivation of the function of one variable	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Concept and interpretation of derivation, derivation of elementary functions, derivation of sum, difference, product and quotient, derivation of complex function	O6
28.				
29.	Derivation of the function of one variable	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Concept and interpretation of derivation, derivation of elementary functions, derivation of sum, difference, product and quotient, derivation of complex function	O6
30.				
EXERCISES/ SEMINARS				
Hours	Topic and description	Method • Direct teaching (lecture, instruction, pp presentation)	Learning outcomes	Course outcome

		<ul style="list-style-type: none"> • Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes... 		
1.	Complex numbers	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Multiplication, division, exponentiation and rooting of complex numbers in trigonometric form.	O1
2.				
3.				
4.	Matrices	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Addition, subtraction, scalar matrix multiplication, matrix multiplication, inverse matrix, matrix equations	O2
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7.	Matrices	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Addition, subtraction, scalar matrix multiplication, matrix multiplication, inverse matrix, matrix equations	O2
8.				
9.				
10.	Determinant	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Determinant definition, determinant calculation, determinant properties, matrix rank, inverse matrix calculation using determinant	O2
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13.	Determinant	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Determinant definition, determinant calculation, determinant properties, matrix rank, inverse matrix calculation using determinant	O2
14.				
15.				
16.	System of linear equations	Direct teaching (presentation, pp	System solution, solution existence,	O3
17.				

18.		presentation), learning by discovery (independent, guided)	Gauss-Jordan elimination method, system applications	
19.	System of linear equations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	System solution, solution existence, Gauss-Jordan elimination method, system applications	O3
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22.	Vectors	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Definition and properties of vectors, operations with vectors, scalar, vector and mixed product, linear independence of vectors, vector space	O2
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25.	Vectors	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Definition and properties of vectors, operations with vectors, scalar, vector and mixed product, linear independence of vectors, vector space	O2
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27.				
28.	Real numbers and real functions of one variable	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Number sets, function definition, function assignment, function domain, properties of real functions, composition of functions, inverse function	O4
29.				
30.				
31.	Real numbers and real functions of one variable	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Number sets, function definition, function assignment, function domain, properties of real functions, composition of functions, inverse function	O4
32.				
33.				
34.				O5

35.	Limit value and continuity of the function	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Limes, properties of limes, continuity of function, asymptotes	
36.				
37.	Limit value and continuity of the function	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Limes, properties of limes, continuity of function, asymptotes	O5
38.				
39.				
40.	Derivation of the function of one variable	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Concept and interpretation of derivation, derivation of elementary functions, derivation of sum, difference, product and quotient, derivation of complex function	O6
41.				
42.				
43.	Derivation of the function of one variable	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Concept and interpretation of derivation, derivation of elementary functions, derivation of sum, difference, product and quotient, derivation of complex function	O6
44.				
45.				