



POLYTECHNIC OF MEĐIMURJE IN ČAKOVEC

COURSE SYLLABUS

ACADEMIC YEAR: 2020/2021

1. GENERAL COURSE INFORMATION

1.1 Course name	Mathematics 2			
1.2 Study program/s	Undergraduate professional study of Sustainable Development			
1.3 Course status (O,E)	O	1.6 Mode of instruction (number of hours)	Lectures	30
1.4 Course code			Exercises	30
1.5 Course abbreviation			Seminars	
1.6 Semester	2.		E-learning	
1.7 ECTS	5	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	Prerequisite for enrollment: course Mathematics 1 Prerequisite for passing: passed course Mathematics 1							
3.3 Course outcomes	After successfully completing the course, students will be able to: I1 - Derive implicitly given functions I2 - Apply tangent derivation techniques, angle between curves, L'Hospital rule I3 - Examine the course of a function and draw a graph using monotonicity, convexity, extremes and asymptotes I4 - Calculate indefinite and definite integral I5 - Apply integration to surface, curve arc length and rotating body volume I6 - Solve differential equations							
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	Class attendance			Seminars			Essay
	0.5	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	Written exam		Experimental work																																																																								
	0.5	Oral exam		Research																																																																								
3.8 Assessment and evaluation of students' work during classes and at the final exam	<table border="1"> <thead> <tr> <th>Activity specification</th> <th>Percent %</th> <th>Points</th> </tr> </thead> <tbody> <tr> <td colspan="3">Assessment during instruction</td> </tr> <tr> <td>Attendance</td> <td>3%</td> <td>3</td> </tr> <tr> <td>Class activity</td> <td>10%</td> <td>10</td> </tr> <tr> <td>Seminar/ project/ essay</td> <td>0%</td> <td>0</td> </tr> <tr> <td>Midterm exam 1</td> <td>35%</td> <td>35</td> </tr> <tr> <td>Midterm exam 2</td> <td>35%</td> <td>35</td> </tr> <tr> <td colspan="3"><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>70%</td> <td>70</td> </tr> <tr> <td>Oral exam</td> <td>17%</td> <td>17</td> </tr> <tr> <td>Total:</td> <td>100%</td> <td>100</td> </tr> </tbody> </table>						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																																					
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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	<table border="1"> <thead> <tr> <th colspan="7">Ways of evaluating learning outcomes</th> </tr> <tr> <th></th> <th>Attendance</th> <th>Activity</th> <th>Mid-term exam 1</th> <th>Mid-term exam 2</th> <th>Oral exam</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Outcome 1</td> <td></td> <td></td> <td>5</td> <td></td> <td>2</td> <td>7</td> </tr> <tr> <td>Outcome 2</td> <td></td> <td></td> <td>20</td> <td></td> <td>4</td> <td>24</td> </tr> <tr> <td>Outcome 3</td> <td></td> <td></td> <td>10</td> <td></td> <td>2</td> <td>12</td> </tr> <tr> <td>Outcome 4</td> <td></td> <td></td> <td></td> <td>10</td> <td>3</td> <td>13</td> </tr> <tr> <td>Outcome 5</td> <td></td> <td></td> <td></td> <td>10</td> <td>3</td> <td>13</td> </tr> <tr> <td>Outcome 6</td> <td></td> <td></td> <td></td> <td>15</td> <td>3</td> <td>18</td> </tr> <tr> <td>Outcome not-related</td> <td>3</td> <td>10</td> <td></td> <td></td> <td></td> <td>13</td> </tr> <tr> <td>Total</td> <td>3</td> <td>10</td> <td>35</td> <td>35</td> <td>17</td> <td>100</td> </tr> </tbody> </table>						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
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	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)																																																																											
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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>T. Bradić, R. Roki, J. Pečarić, M. Strunje: Matematika za tehnološke fakultete, Element, Zagreb, 1998.</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> <tr> <td></td> <td></td> </tr> </table>	1.	T. Bradić, R. Roki, J. Pečarić, M. Strunje: Matematika za tehnološke fakultete, Element, Zagreb, 1998.	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>Ivan Slapničar: Matematika 1 i 2 digitalni udžbenik s interaktivnim animacijama i interaktivnom provjerom znanja, http://www.fesb.hr/mat2.</td> </tr> <tr> <td>2.</td> <td>P. Javor: Uvod u matematičku analizu, Školska knjiga, Zagreb, 1993.</td> </tr> <tr> <td>3.</td> <td>B. P. Deminovič i suradnici: Zadaci i riješeni primjeri iz Matematičke analize, Golden marketing – Tehnička knjiga, Zagreb, 2003</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.	Ivan Slapničar: Matematika 1 i 2 digitalni udžbenik s interaktivnim animacijama i interaktivnom provjerom znanja, http://www.fesb.hr/mat2 .	2.	P. Javor: Uvod u matematičku analizu, Školska knjiga, Zagreb, 1993.	3.	B. P. Deminovič i suradnici: Zadaci i riješeni primjeri iz Matematičke analize, Golden marketing – Tehnička knjiga, Zagreb, 2003	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	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	<ol style="list-style-type: none"> 1. Presentation of information, ideas, problems and solutions to professional and general audience 2. Adaptability to new technologies and techniques as part of the lifelong learning process 3. Ethical and moral approach to work 4. Critical evaluation of arguments, assumptions and data in order to form an opinion and contribute to solving the problem 5. Ability to apply knowledge of mathematics and physics to an engineering problem 6. Imagining and conducting experiments, analyzing and interpreting data
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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.	Application of derivations	<ul style="list-style-type: none"> • Direct teaching (lecture, instruction, pp presentation) • Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes... 	Logarithmic derivation, derivation of implicit function, derivations of higher order	O1
3. 4.	Application of derivations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Tangent and normal function, angle between curves, L'Hospital's rule	O2
5. 6.	Application of derivations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Rise and fall of function, extremes, convexity and concavity, points of inflection	O3
7. 8.	Graph of a function	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Examining the flow of a function and drawing a graph	O3
9. 10.	Graph of a function	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Examining the flow of a function and drawing a graph	O3
11.	Indefinite integral			O4

12.		Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Primitive function and indefinite integral	
13.	Indefinite integral	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Substitution method	O4
14.				
15.	Indefinite integral	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Partial integration method	O4
16.				
17.	Indefinite integral	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Integrals of rational functions, integration of trigonometric and irrational functions	O4
18.				
19.	Definite integral	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	A definite integral, the Newton-Leibnitz formula	O4
20.				
21.	Application of integrals	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Area	O5
22.				
23.	Application of integrals	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Area	O5
24.				
25.	Application of integrals	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Curve arc length, rotational body volume	O5
26.				
27.	Differential equations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Separation of variables	O6
28.				
29.	Differential equations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Homogeneous differential equations	O6
30.				
EXERCISES/ SEMINARS				

Hours	Topic and description	Method	Learning outcomes	Course outcome
		<ul style="list-style-type: none"> • Direct teaching (lecture, instruction, pp presentation) • Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes... 		
1. 2.	Application of derivations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Logarithmic derivation, derivation of implicit function, derivations of higher order	O1
3. 4.	Application of derivations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Tangent and normal function, angle between curves, L'Hospital's rule	O2
5. 6.	Application of derivations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Rise and fall of function, extremes, convexity and concavity, points of inflection	O3
7. 8.	Graph of a function	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Examining the flow of a function and drawing a graph	O3
9. 10.	Graph of a function	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Examining the flow of a function and drawing a graph	O3
11. 12.	Indefinite integral	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Primitive function and indefinite integral	O4
13. 14.	Indefinite integral	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Substitution method	O4
15. 16.	Indefinite integral	Direct teaching (presentation, pp presentation), learning	Partial integration method	O4

		by discovery (independent, guided)		
17.	Indefinite integral	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Integrals of rational functions, integration of trigonometric and irrational functions	O4
18.				
19.	Definite integral	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	A definite integral, the Newton- Leibnitz formula	O4
20.				
21.	Application of integrals	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Area	O5
22.				
23.	Application of integrals	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Area	O5
24.				
25.	Application of integrals	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Curve arc length, rotational body volume	O5
26.				
27.	Differential equations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Separation of variables	O6
28.				
29.	Differential equations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Homogeneous differential equations	O6
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