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 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	2.		**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 Franciškovi ć	**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	2.5	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
Exam assessment for the students who failed to fullfil all the obligatory requirements during the semester		
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.

	Students who did not take the colloquium access the written part of the exam where all learning outcomes are checked. Points for teaching activity are awarded in lectures and exercises, depending on the student's activity. The final grade is obtained in the oral part of the exam.	
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.	**P. Javor: Uvod u matematičku analizu, Školska knjiga, Zagreb, 1993.**
	2.	**T. Rodiger: Derivacije – riješeni zadaci, MEV, Čakovec, 2015.**
3.14 Additional reading	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 2digitalni 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
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.

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** • Direct teaching (lecture, instruction, pp presentation) • Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes…	Learning outcomes	Course outcome
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	Primitive function and indefinite integral	O4

		by discovery (independent, guided)		
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 by discovery (independent, guided)	Partial integration method	O4
17. **18.**	Indefinite integral	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Integrals of rational functions, integration of trigonometric and irrational functions	O4
19. **20**	Definite integral	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	A definite integral, the Newton-Leibnitz formula	O4
21. **22.**	Application of integrals	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Area	O5
23. **24.**	Application of integrals	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Area	O5
25. **26.**	Application of integrals	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Curve arc length, rotational body volume	O5
27. **28.**	Differential equations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Separation of variables	O6
29. **30.**	Differential equations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Homogeneous differential equations	O6
EXERCISES/ SEMINARS				
Hours	**Topic and description**	**Method** • Direct teaching (lecture, instruction, pp presentation)	**Learning outcomes**	**Course outcome**

		• Discovery learning (individual, lead, discussion) • Group learning • Case study • Field classes…		
1. **2.** **3.**	Application of derivations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Logarithmic derivation, derivation of implicit function, derivations of higher order	O1
4. **5.** **6.**	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
7. **8.** **9.**	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
10. **11.** **12.**	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
13. **14.** **15.**	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
16. **17.** **18.**	Indefinite integral	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Primitive function and indefinite integral	O4
19. **20.** **21.**	Indefinite integral	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Substitution method	O4
22. **23.** **24.**	Indefinite integral	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Partial integration method	O4
25. **26.** **27.**	Indefinite integral	Direct teaching (presentation, pp presentation), learning	Integrals of rational functions, integration of	O4

		by discovery (independent, guided)	trigonometric and irrational functions	
28. **29.** **30.**	Definite integral	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	A definite integral, the Newton-Leibnitz formula	O4
31. **32.** **33.**	Application of integrals	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Area	O5
34. **35.** **36.**	Application of integrals	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Area	O5
37. **38.** **39.**	Application of integrals	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Curve arc length, rotational body volume	O5
40. **41.** **42.**	Differential equations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Separation of variables	O6
43. **44.** **45.**	Differential equations	Direct teaching (presentation, pp presentation), learning by discovery (independent, guided)	Homogeneous differential equations	O6