SYLLABUS

1. Course title:

Mathematics II

2. Code:

3. Cycle of study:

I

4. ECTS credits:

6

5. Type of course:

Mandatory

6. Prerequisites:

None

7. Class restrictions:

None

8. Duration / semester(s):

I II

9. Weekly contact hours and student workload:

	Semester (1)	Semester (2)	(for two-semester courses)	Workload: (hours)	
9.1. Lectures	3		Classes:	56,3	
9.2. Seminars	2		Individual work:	117,2	
9.3. Laboratory / Practice classes	0		In total:	173,5	

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

Production engineering, Energy and thermo-fluid engineering, Mechatronics

12. Lecturer:

Dr. sci. Samra Sadiković, associate professor

13. Course aims:

-obtain needed knowledge from integral calculus of one variable functions with applications in geometry
-acquire elementary knowledge from the field of functions with more than one variable and the application of it on solving extremal problems

-obtain needed knowledge from integral calculus of function with more than one variable and develop a sense in students for logical and visual understanding of phenomena, problems and figures in space
-gain elementary knowledge about the theory of differential equations

14. Learning outcomes:

- calculating various forms of integrals of functions with one variable with applications in calculating the area of 2D figures, length of the arch of a curve, aswell as volume and complanation of rotating surfaces.
- solving various problems about determining extreme values of a function with more than one variable
- calculating the multiple integral and areas and volumes of various surfaces of the second order
- recognizing and solving various forms of differential equations of the first and second order
- examining the convergence of a numerical series and summing the series
- faster learning of knowledge from other subjects, mainly Mathematics III

15. Course content:

1. Numerical series. Basic criteria for convergency and the summability of numerical series.
2. General Cauchy convergence criterion for numerous series. Hyperharmonic series. Alternative series.
3. Integral calculus of functions with one variable with its applications (the concept of an indefinite integral, integration by substitution).
4. Integration by parts and the integration of rational functions.
5. Integration of irrational and trigonometric functions (I part).
6. Integration of trigonometric functions (II part). The definite integral and integration by substitution and by parts.
7. Applications of definite integral in geometry. Improper integral.
8. Test 1
9. Functions with more than one variable (limit values, continuity and differentiability). Partial derivatives.
10. Extrema of functions (solving extremal problems).
11. Multiple integrals (the definition of a multiple integral and properties of integrable functions). The concept of a double integral and two iterated integrals, calculating the double integral, the concept of Jacobian's determinant, integration by substitution in a double integral, application in calculating the areas of 2D figures and volumes of bodies.
12. The triple integral: concept, calculation, integration by substitution and applications in calculating the volume of a body.
13. Basic theories of differential equations (Solving linear differential equations of the first order. General theory of linear differential equations of the n-th order).
14. Solving linear differential equations of the second constant coefficients (homogeneous and inhomogeneous).
15. Test 2.

16. Learning methods:

The most significant methods of learning are:
- Lectures and the technique of active studying with active participation and discussion of students.
- Lectures with the use of multimedial devices.
- Theoretical lessons where students solve exercises problems independently or with the help of a teaching assistant.
- Consultations with the teacher and assistants.

17. Assessment methods:

After the first half of the semester students are taking Test 1 with tasks including the covered teaching material up to that time. It consists of 5 tasks by 5 points, a total of 25 points. At the end of the semester students are taking Test 2 with tasks including the covered teaching material from the second part of the semester. It consists of 5 tasks by 5 points, a total of 25 points. Both tests are taken by all students on the subject at the same time, to achive equality of the knowledge being tested and of the conditions in which the test is taken. Students take the final exam in writing form by answering four theoretical questions. The final exam carries a maximum of 50 points. Each of the three listed knowledge tests is considered passed if the student achieved 40 % of the maximum number of points that the appropriate knowledge assessment carries. Testing of all parts of the exam knowledge are accepted as a cumulative exam.
The exam is considered passed if the student wins at least 54 cumulative points. A student, who does not make the minimum points, takes the make-up exam, at which he/she can correct each of before mentioned parts of the exam. The make-up exam is considered passed if the student wins at least 54 cumulative points.

5 (five)	**"does not meet the minimum criteria"**	**"F,FX"**	**<54 points**
6 (six)	**"meets the minimum criteria"**	**"E"**	**54-64 points**
7 (seven)	**"generally good, but with significant shortcomings"**	**"D"**	**65-74 points**
8 (eight)	**"average, with noticeable errors"**	**"C"**	**75-84 points**
9 (nine)	**"above average, with some errors"**	**"B"**	**85-94 points**
10 (ten)	**"exceptional success with no errors or with minor errors"**	**"A"**	**95-100 points**

18. Assessment components:

The exam mark is based on the total amount of points the student has gained by doing pre-exam tasks and by doing the final exam, and also based on the quality of gained knowledge and skills. The grade contains a maximum of 100 points, and

it is determined based on the following rating scale:
-Test 1- from 0 to 25 points
-Test 2- from 0 to 25 points
-The final exam- from 0 to 50 points.
Total 100 points.

19. Mandatory reading list:

1. Dž. Burgić, E. Duvnjaković, Dž. Zečić, Matematika II, Univerzitet u Zenici, 2014. (pages 183 - 230)
2. F. Dedagić, Matematička analiza I dio, Univerzitet u Tuzli, 2005. (pages 195-217)
3. S. Drpljanin, Matematika, Univerzitet u Tuzli, 2000. (pages 256-372)

20. Additional reading list:

E. Duvnjaković, Dž. Burgić, Zbirka zadataka iz više matematike, Grin Gračanica, 1996. (pages 1-185)

21. Web sources:

22. Applicable from the academic year:

2025/2026.

23. Adopted in the Faculty/Academy session: