SYLLABUS

1. Course title:

Mathematics III

2. Code:

3. Cycle of study:

1

4. ECTS credits:

5

5. Type of course:

(•) Mandatory ( ) Elective

6. Prerequisites:

7. Class restrictions:

8. Duration / semester:

1 3

9. Weekly contact hours:

9.1. Lectures:	2
9.2. Seminars:	2
9.3. Laboratory/Practice classes:	0

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

all

12. Lecturer:

dr.sc.Sanela Halilović, assistant professor

13. Lecturer's e-mail:

sanela.halilovic@untz.ba

14. Web site:

www.mf.untz.ba; www.pmf.untz.ba

15. Course aims:

- to enable students to gain basic knowledge from areas of graduate mathematics which are notificated in a course content and extend the knowledge from the previous courses of mathematics
- develop the feeling for logic and visual comprehending various phenomena, problems and figures in space
- extending knowledge from the ordinary differential equations by passing on the systems of differential equations
- adopting the notions and issues from the basics of differential geometry
- adopting the notion of surface integrals as a generalization of multiple integrals to integration over surfaces.
- gaining the knowledge from the theory of vector fields
- gaining the knowledge about the functions of a complex variable
- qualifying the students for applying the knowledge from this teaching course on other courses

16. Learning outcomes:

At the end of semester, successful students should be able to:
- solving the system of differential equations
-calculating the arc length in 3D space, torsion and curvature, finding the principal normal vector , tangent vector and binormal vector to the curve
-calculating the area of surface, solving the surface integrals of the I and II kind
-using various kind of operators (gradient and curl of a vector field, Hamilton (nabla) operator, Laplace operator)
-finding the circulation and flux of vector field
- knowing the elementary facts about the functions of complex variable, finding the limit and derivatives of the functions of complex variable, as well as investigate differentiability and analiticity of these functions

17. Course content:

The systems of differential equations: basic notions, passing to the one differential equation of the higher order, the first integrals of the system; linear systems with constant coefficients and Euler's method for their solving.
The elements of the differential geometry: vector-valued function, rectification of the curve, natural triedar of the curve, torsion and curvature, Frenet formulae.
Orientation and area measure of surface. The surface integrals of I and II kind.
Theory of vector fields: gradient, nabla operator, divergence, curl, Laplace operator, potential field, solenoid field, circulation and flux of a vector filed.
The elements of the complex analysis: complex sequences, criteria for the convergence of sequences, functions of the complex variable- the limit value and continuity of these functions, derivatives of the functions of the complex variable, Cauchy-Riemann conditions, harmonic functions, elementary functions of the complex variable.

18. Learning methods:

The most significant methods of learning are:
- Lectures and the technique of active studying with active participation and discussion of students.
- Exercise classes where students solve exercises problems independently or with the help of a teaching assistant.
The following activities of succesful learning are planned: observation and deliberation, creating abstract concepts and generalization.
Planned styles of learning: logical-mathematical, visual, auditory and verbal.

19. 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. All students are supposed to take Test 1 and Test 2 at the same time, which enables equality of the level of testing knowledge and conditions of testing, too. Students take the final exam by answering four questions. For continued activity on classes and well-done homeworks students may gain up to 4 points.
The final exam carries a maximum of 46 points. Testing of all parts of the exam knowledge are accepted as a cumulative exam.
The condition for successfully passing the exam is to obtain a minimum of 23 out of 46 points in the final exam obligations, while the student must obtain a minimum of 54 points for a passing grade (6).
A student, who does not make the minimum points, takes the makeup exam, at whom he/she can correct each of before mentioned parts of the exam. The makeup exam is considered passed if the student wins at least 54 cumulative points.

20. Assessment components:

Pre-exam obligations: First test 25 points; Second test 25 points. Activity and homeworks 4 points.
Final exam: 46 points.
The student must obtain a minimum of 23 points at the final exam, and a minimum of 54 points to obtain a passing grade (6).
The following is the grading scale, showing the points, numerical grade, descriptive grade and letter grade:
0-53 5 (five) fail F
54-63 6 (six) satisfactory E
64-73 7 (seven) good D
74-83 8 (eight) very good C
84-93 9 (nine) excellent B
94-100 10 (ten) outstanding A

21. Required reading list:

Tomić, M. (1988.) Matematika. Sarajevo: Univerzitet u Sarajevu; "Svjetlost "
Mihailović, D. , Tošić D.Đ.(1986.) Elementi matematičke analize II. Beograd: Naučna knjiga.
Halilović S.(2015) Predavanja iz predmeta Matematika III-Skripta, Tuzla.
Miličić, P. M., Uščumlić, M. P. (1981.) Zbirka zadataka iz više matematike II. Beograd: Naučna knjiga.

22. Web sources:

23. Applicable starting from the academic year:

2015/16.

24. Adopted in the Faculty/Academy session:

01.06.2015