<table>
<tr><td>COURSE NAME</td><td colspan="7">Mathematical analysis III</td></tr>
<tr><td>Code</td><td>PMM109</td><td>Year of study</td><td colspan="5">3rd year of undergraduate study</td></tr>
<tr><td>Course teacher</td><td>Nikola Koceić Bilan</td><td>Credits (ECTS)</td><td colspan="5">7,0</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Type of instruction (number of hours)</td><td>L</td><td>S</td><td>E</td><td colspan="2"></td></tr>
<tr><td>45</td><td></td><td>30</td><td colspan="2"></td></tr>
<tr><td>Status of the course</td><td>Compulsory</td><td>Percentage of application of e-learning</td><td colspan="5">30</td></tr>
<tr><td colspan="8">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="7">Students will:
-acquire a basic knowledge on topological, metric and vector structure of n-dimensional Euclidean space
-be introduced with notions of interior, closure, connectedness, path connecteness, compactness
-deepen knowledge about convergence of sequences, (uniform) continuity and limits of mappings of Euclidean (sub)spaces
-learn to examine continuously differentiability of functions $f:R^m\to R^n$ and to determine higher-order differentials of a function via matrix notation of linear operator
-learn basic theorems of differential calculus of functions $f:R^m\to R^n$
-learn to differ curve from the set admitting 1-parametrization and to differ surface from the set admitting 2-parametrization
-gain insight in notions of the length of the curve, curve tangent, the area of the surface, surface normals and tangent planes
-learn to compute curvilinear integral and surface integral of the 1st and of the 2nd kind.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="7">Course enrolment : Successfully completed courses Diferential and integral calculus II and Linear algebra
Entry competences : Students should be comfortable with using the following concepts: Differential and integral calculus of multivariable functions, Linear algebra</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="7">Upon successful completion of this course students will be able to:
-describe topological, metric and vector structure of n-dimensional Euclidean space
-explain notions of interior, closure, connectedness, path connecteness, compactness
-examine a convergence of sequence in Euclidean space and to examine (uniform) continuity and limit of mappings of (sub)spaces of Euclidean spaces
-examine continuously differentiability of functions $f:R^m\to R^n$
-determine higher-order differentials of a function $f:R^m\to R^n$ via matrix notation of linear operator
-apply theorems of differential calculus for functions $f:R^m\to R^n$
-differ curve from the set admitting 1-parametrization
- differ surface from the set admitting 2-parametrization
-define the curve rectifiability, surface area, curve tangent and tangent plane
-compute curvilinear integral and surface integral of the 1st and of the 2nd kind.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="7">- Various kind of norms and the induced metrics on R^n. (1)
-Topological structure of n-dimensional Euclidean space. Topological space and subspace. Limit point of a set. Interior and closure. Connectedness. Compactness. (6)
-Continuity of maps. Mapping of metric spaces. (2)
-Vector space of mappings $C(R^m,R^n)$. (1)
-Homeomorphism. Path connectedness. (1)
-Invariants under mappings. Mappings of connected and compact spaces. Theorem</td></tr>
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	of intermediate value. (2) -Uniform continuity. Lipschitz property. (2) -Limit functions $f:R^m\text{->}R^n$. (1) -Convergence of sequence in topological space. Characterization of mappings and closed sets in metric spaces via sequence convergence. (2) - Differentiability of functions $f:R^m\text{->}R^n$. Differential, derivative and partial derivative. (3) - Continuously differentiability. Functions of class C^n. (3) -Theorems of differential calculus of functions $f:R^m\text{->}R^n$.(4) -Diffeomorphism. Inverse function theorem. (2) -1-parametrization of sets in R^n. Curve. Arch. Curve orientation. (2) -Rectifiability. Curve length. (3) -Smooth curves. Curve tangent. (2) -2-parametrization of sets in R^3. Surface. Smooth surface. Surface orientation. (2) -Surface normal and tangent plane. Surface area. (2) - Curvilinear integral of the 1st and of the 2nd kind. (2) - Surface integral of the 1st and of the 2nd kind. (2)
Format of instruction	Lectures and exercises.
Student responsibilities	Attending classes. Students are expected to be present at least 70% of classes.
Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Attending classes: 2,25 ECTS. Partial exams/Written exam: 2,25 ECTS Final exam: 2,5 ECTS.
Grading and evaluating student work in class and at the final exam	Two partial written exams / one final written exam and final oral exam. There are 2 partial written exams during a semester. Passing both partial exams enables students to take an oral exam. Successfully passing the oral exam leads to successful completion of the course. Final grade is derived as the arithmetic mean of scores in partial exams (or a written exam) and the oral exam. In the case of failure in partial exams or the oral exam students must undergo a written exam before taking oral exam (again). Written exam consists of practical and theoretical exercises.
Required literature (available in the library and via other media)	N.Koceić Bilan, Osnove matematičke analize, nastavni materijal-skripta Š. Ungar, Matematička analiza u R^n, Tehnička knjiga, Zagreb, 2003.
Optional literature (at the time of submission of study	N. Uglešić, *Matematička analiza II, Matematička anliza III,* W. Rudin, *Principles of Mathematical Analysis*, Mc-Graw Hill, New York, 1964.

programme proposal)	
Quality assurance methods that ensure the acquisition of exit competences	Summarizing test results and conducting an anonymous student survey at the end of the course. The survey is conducted according to the rules of the University of Split.
Other (as the proposer wishes to add)	