

UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2016/17)						
<b>Predmet:</b>	Analiza 1					
<b>Course title:</b>	Analysis 1					
<b>Študijski program in stopnja</b> <b>Study programme and level</b>	<b>Študijska smer</b> <b>Study field</b>			<b>Letnik</b> <b>Academic year</b>	<b>Semester</b> <b>Semester</b>	
Interdisciplinarni univerzitetni študijski program Računalništvo in matematika	ni smeri			1	prvi	
Interdisciplinary first cycle academic study programme Computer Science and Mathematics	none			1	first	
<b>Vrsta predmeta / Course type</b>				obvezni / compulsory		
<b>Univerzitetna koda predmeta / University course code:</b>				27201		
<b>Predavanja</b> <b>Lectures</b>	<b>Seminar</b> <b>Seminar</b>	<b>Vaje</b> <b>Tutorial</b>	<b>Klinične vaje</b> <b>work</b>	<b>Druge oblike študija</b>	<b>Samost. delo</b> <b>Individ. work</b>	<b>ECTS</b>
45		45			120	7
<b>Nosilec predmeta / Lecturer:</b>				prof. dr. Janez Mrčun, prof. dr. Sašo Strle		
<b>Jeziki / Languages:</b>	<b>Predavanja / Lectures:</b>		slovenski / Slovene			
	<b>Vaje / Tutorial:</b>		slovenski / Slovene			
<b>Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:</b>				<b>Prerequisites:</b>		
Vpis v letnik študija.				Enrolment in the programme.		
<b>Vsebina:</b>				<b>Content (Syllabus outline):</b>		

<p>Uvod: naravna števila in matematična indukcija, realna števila, zaporedja, stekališča in limite, kompaktne podmnožice Evklidskih prostorov.</p> <p>Funkcije: pojem funkcije ene in več spremenljivk, nivojske krivulje in nivojske ploskve, zveznost in limita funkcije, lastnosti zveznih funkcij, elementarne funkcije.</p> <p>Odvod funkcij ene spremenljivke: definicija in geometrijski pomen odvoda, pravila za računanje, odvodi elementarnih funkcij, lastnosti odvedljivih funkcij, uporaba odvoda (risanje grafov, računanje limit, ekstremi), Taylorjeva formula.</p> <p>Odvod funkcij več spremenljivk: parcialni odvodi, gradient in smerni odvod, totalni diferencial in tangentni prostor, Taylorjeva formula, lokalni ekstremi in vezani ekstremi, izrek o implicitni funkciji.</p>	<p>Introduction: natural numbers and mathematical induction, real numbers, sequences and limits, compact subsets of Euclidean spaces.</p> <p>Functions: the notion of a function of one and many variables, level curves and level surfaces, continuity and limit of a function, properties of continuous functions, elementary functions.</p> <p>Derivative of a function of one variable: definition of the derivative and its geometric meaning, differentiation rules, derivatives of elementary functions, applications of the derivative (drawing graphs of functions, computations of limits, extrema), Taylor formula.</p> <p>Derivative of a function of many variables: partial derivatives, gradient and directional derivative, total differential and tangent space, Taylor formula, local extrema and conditional extrema, the implicit function theorem.</p>
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#### **Temeljni literatura in viri / Readings:**

<p>Ivan Vidav: Višja matematika I, Ljubljana: DMFA-založništvo, 1994.</p> <p>Gabrijel Tomšič, Bojan Orel, Neža Mramor Kosta: Matematika I, Ljubljana: Založba FE in FRI, 2001.</p> <p>Neža Mramor Kosta, Borut Jurčič Zlobec: Zbirka nalog iz matematike I, Ljubljana: Založba FE in FRI, 2001.</p> <p>Pavlina Mizori-Oblak: Matematika za študente tehnike in naravoslovja, Del 1. Ljubljana: Fakulteta za strojništvo, 1991.</p> <p>James Stuart: Calculus, Brooks/Cole Publishing Company, 1999.</p> <p>M. H. Protter, C. B. Morrey, Intermediate Calculus. Springer-Verlag, New York-Heidelberg, 1985.</p> <p>W. Rudin, Principles of mathematical analysis. McGraw-Hill, Auckland, 1976.</p>
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#### **Cilji in kompetence:**

#### **Objectives and competences:**

Študent spozna osnovne pojme matematične analize, kot so limita zaporedja in zveznost ter odvod funkcije ene oziroma več realnih spremenljivk. Analiza 1 sodi med temeljne predmete pri študiju matematike in računalništva.

Student learns the basic concepts of mathematical analysis such as limit of a sequence and continuity and derivative of real functions of one and as well as many real variables. Analysis 1 is one of the fundamental courses of the study of mathematics and computer science.

**Predvideni študijski rezultati:**

Znanje in razumevanje: Poznavanje in razumevanje osnovnih pojmov, definicij in izrekov.

Uporaba: Analiza 1 sodi med temeljne predmete študijskega programa. Razumevanje snovi predmeta je nepogrešljivo pri mnogih drugih matematičnih in računalniških predmetih na programu.

Refleksija: Razumevanje teorije na podlagi uporabe.

Prenosljive spretnosti - niso vezane le na en predmet: Spretnosti uporabe domače in tuje literature in drugih virov, identifikacija in reševanje problemov, kritična analiza.

**Intended learning outcomes:**

Knowledge and understanding: Knowledge and understanding of basic notions, definitions and theorems.

Application: Analysis 1 is one of the fundamental courses of the program. Understanding of the material of this course is indispensable for many other mathematics and computer science courses of the program.

Reflection: Understanding the theory from the applications.

Transferable skills: Skills in using the literature and other sources, the ability to identify and solve the problem, critical analysis.

**Metode poučevanja in učenja:**

Predavanja in vaje, domače naloge.

**Learning and teaching methods:**

Lectures and tutorial sessions, homework.

**Načini ocenjevanja:**

Delež (v %) /

Weight (in %)

**Assessment:**

2 kolokvija namesto izpita iz vaj, izpit iz vaj,  
ustni izpit / izpit iz teorije.

50  
50

2 midterm exams instead of written exam, written exam,  
oral exam / theoretical test.

6-10 (pozitivno), in 1-5 (negativno) (po Statutu UL).		6-10 (pass), 1-5 (fail) (according to the Statute of UL)
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**Reference nosilca / Lecturer's references:**

Janez Mrčun:

MOERDIJK, Ieke, MRČUN, Janez. On the developability of Lie subalgebroids. *Advances in mathematics*, ISSN 0001-8708, 2007, vol. 210, no. 1, str.1-21. [COBISS.SI-ID 14209881]

MRČUN, Janez. On isomorphisms of algebras of smooth functions. *Proceedings of the American Mathematical Society*, ISSN 0002-9939, 2005, vol. 133, no. 10, str. 3109-3113. [COBISS.SI-ID 13782361]

MOERDIJK, Ieke, MRČUN, Janez. On integrability of infinitesimal actions. *American journal of mathematics*, ISSN 0002-9327, 2002, vol. 124, no. 3, str. 567-593. [COBISS.SI-ID 11700057]

Sašo Strle:

RUBERMAN, Daniel, STRLE, Sašo. Concordance properties of parallel links. *Indiana University mathematics journal*, ISSN 0022-2518, 2013, vol. 62, no. 3, str. 799-814. [COBISS.SI-ID 16946265]

OWENS, Brendan, STRLE, Sašo. Dehn surgeries and negative-definite four-manifolds. *Selecta mathematica. New series*, ISSN 1022-1824, 2012, vol. 18, iss. 4, str. 839-854. [COBISS.SI-ID 16808025]

CHA, Jae Choon, KIM, Taehee, RUBERMAN, Daniel, STRLE, Sašo. Smooth concordance of links topologically concordant to the Hopf link. *Bulletin of the London Mathematical Society*, ISSN 0024-6093, 2012, vol. 44, iss. 3, str. 443-450. [COBISS.SI-ID 16807769]