

UČNI NAČRT PREDMETA / COURSE SYLLABUS							
Predmet:		Analiza 2a					
Course title:		Analysis 2a					
Študijski program in stopnja Study programme and level		Študijska smer Study field			Letnik Academic year		Semester Semester
Univerzitetni študijski program Matematika		ni smeri			2		prvi
First cycle academic study programme Mathematics		none			2		first
Vrsta predmeta / Course type					obvezni		
Univerzitetna koda predmeta / University course code:					M0253		
Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS	
60		45			135	8	
Nosilec predmeta / Lecturer:		prof. Barbara Drinovec Drnovšek, prof. Franc Forstnerič, prof. Miran Černe					
Jeziki / Languages:		Predavanja / Lectures:		slovenski/Slovene			
		Vaje / Tutorial:		slovenski/Slovene			
Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:				Prerequisites:			
Opravljen predmet Analiza 1.				Completed course Analysis 1.			
Vsebina:				Content (Syllabus outline):			

<p>Funkcije več spremenljivk. Zveznost. Parcialni odvodi in diferenciacijabilnost. Jacobijeva matrika in determinanta. Diferencial sestavljene funkcije. Izrek o implicitni in inverzni preslikavi. Višji parcialni odvodi. Taylorjeva formula. Prosti in vezani ekstrema.</p> <p>Integrali s parametrom, zveznost in odvedljivost. Fubinijev izrek. Klasične Fourierove vrste. Fourierova transformacija. Osnovne lastnosti. Inverzna formula. Plancherelov izrek.</p> <p>Večkratni Riemannov integral. Lastnosti. Množice z ničelnim volumnom in mero. Izrek o obstoju integrala. Prevedba na večkratni integral. Posplošeni integrali. Uporaba integralov v geometriji in fiziki.</p>	<p>Functions of several variables. Continuity. Partial derivatives and differentiability. Jacobian matrix and determinant. Differential of a composed mapping. Implicit function theorem and inverse function theorem. Higher order partial derivatives. Taylor's formula. Free and constrained extrema.</p> <p>Parametric integrals, continuity and differentiability. Fubini's theorem. Classical Fourier series. Fourier transform. Elementary properties. Inverse formula. Plancherel theorem.</p> <p>Multiple Riemann integral. Properties. Sets with zero volume and measure. Theorem on the existence of integrals. Transformation into a multiple integral. Improper integrals. The use of integrals in geometry and physics.</p>
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Temeljni literatura in viri / Readings:

Vidav: Višja Matematika I, DMFA-založništvo, Ljubljana, 1994.

Vidav: Višja Matematika II, DZS, Ljubljana, 1981.

T. M. Apostol: Calculus II : Multi-Variable Calculus and Linear Algebra with Applications, 2nd edition, John Wiley & Sons, New York, 1975.

J. E. Marsden, A. J. Tromba: Vector Calculus, 5th edition, Freeman, New York, 2004.

Suhadolc: Integralske transformacije/Integralske enačbe, DMFA-založništvo, Ljubljana, 1994.

A. Suhadolc: Metrični prostor, Hilbertov prostor, Fourierova analiza, Laplaceova transformacija, DMFA-založništvo, 1998

Cilji in kompetence:

Študent se seznanja z diferencialnim in integralnim računom funkcij več realnih spremenljivk.

Objectives and competences:

Student becomes familiar with the differential and the integral calculus of functions of several real variables.

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje: Razumevanje diferencialnega in integralnega računa funkcij več spremenljivk ter sorodnih tem. Uporaba razvitih metod v geometriji in naravoslovju. Uporaba: Analiza 2a sodi med temeljne predmete pri študiju matematike vseh usmeritev in je pogoj za vpis predmetov Analiza 3, Teorija mere, Funkcionalna analiza, Verjetnost in statistika, Analiza na mnogoterostih.

Refleksija: Razumevanje teorije na podlagi primerov in uporabe.

Prenosljive spretnosti – niso vezane le na en predmet: Postavitev problema, izbira primerne metode, reševanje problema, analiza doseženega rezultata na primerih. Formulacija problemov v matematičnem jeziku. Spretnost uporabe domače in tuje literature.

Knowledge and understanding: Understanding of the differential and the integral calculus of functions of several variables and related topics. Application of these methods in geometry and natural science.

Application: Analysis 2a is one of the fundamental courses in mathematical studies. It is a prerequisite for the courses Analysis 3, Measure theory, Functional analysis, Probability and statistics, Analysis on manifolds.

Reflection: Understanding of the theory based on examples and applications.

Transferable skills: The ability to design the problem, select an appropriate method, solve the problem, and analyse the results on test cases. The ability to formulate a problem in mathematical language. Skills in using the domestic and foreign literature.

Metode poučevanja in učenja:

Predavanja, vaje, domače naloge, konzultacije

Learning and teaching methods:

Lectures, exercises, homework, consultations

Načini ocenjevanja:

Način (pisni izpit, ustno izpraševanje, naloge, projekt):
2 kolokvija namesto izpita iz vaj, izpit iz vaj,
izpit iz teorije
ocene: 1-5 (negativno), 6-10 (pozitivno)

Delež (v %) /
Weight (in %)

50%
50%

Assessment:

Type (examination, oral, coursework, project):
2 midterm exams instead of written exam, written exam
oral exam
grading: 1-5 (fail), 6-10 (pass) (according

(po Statutu UL)		to the Statute of UL)
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Reference nosilca / Lecturer's references:

Miran Černe:

- ČERNE, Miran. Maximal plurisubharmonic functions and the polynomial hull of a completely circled fibration. Arkiv för matematik, ISSN 0004-2080, 2002, vol. 40, no. 1, str. 27-45 [COBISS.SI-ID 11623513]
- ČERNE, Miran, FORSTNERIČ, Franc. Embedding some bordered Riemann surfaces in the affine plane. Mathematical research letters, ISSN 1073-2780, 2002, vol. 9, no. 5-6, str. 683-696 [COBISS.SI-ID 12391257]
- ČERNE, Miran. Nonlinear Riemann-Hilbert problem for bordered Riemann surfaces. American journal of mathematics, ISSN 0002-9327, 2004, vol. 126, no. 1, str. 65-87 [COBISS.SI-ID 12895577]

Barbara Drinovec Drnovšek:

- DRINOVEC-DRNOVŠEK, Barbara. Discs in Stein manifolds containing given discrete sets. Mathematische Zeitschrift, ISSN 0025-5874, 2002, vol. 239, no. 4, str. 683-702 [COBISS.SI-ID 11567449]
- DRINOVEC-DRNOVŠEK, Barbara. Proper holomorphic discs avoiding closed convex sets. Mathematische Zeitschrift, ISSN 0025-5874, 2002, vol. 241, no. 3, str. 593-596 [COBISS.SI-ID 12076377]
- DRINOVEC-DRNOVŠEK, Barbara. Proper discs in Stein manifolds avoiding complete pluripolar sets. Mathematical research letters, ISSN 1073-2780, 2004, vol. 11, no. 5-6, str. 575-581 [COBISS.SI-ID 13311065]

Franc Forstnerič:

- FORSTNERIČ, Franc, ROSAY, Jean-Pierre. Approximation of biholomorphic mappings by automorphisms of \mathbb{C}^n . Inventiones Mathematicae, ISSN 0020-9910, 1993, let. 112, št. 2, str. 323-349 [COBISS.SI-ID 9452121]
- ČERNE, Miran, FORSTNERIČ, Franc. Embedding some bordered Riemann surfaces in the affine plane. Mathematical research letters, ISSN 1073-2780, 2002, vol. 9, no. 5-6, str. 683-696 [COBISS.SI-ID 12391257]
- FORSTNERIČ, Franc. Noncritical holomorphic functions on Stein manifolds. Acta mathematica, ISSN 0001-5962, 2003, vol. 191, no. 2, str. 143-189 [COBISS.SI-ID 13138009]
- FORSTNERIČ, Franc. Runge approximation on convex sets implies the Oka property. Annals of

mathematics, ISSN 0003-486X, 2006, vol. 163, no. 2, str. 689-707 [COBISS.SI-ID 13908825]