



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Osnove analize
Course title:	Basic Analysis

Študijski program in stopnja	Študijska smer	Letnik	Semester
Study programme and level	Study field	Academic year	Semester
Enovit magistrski študijski program druge stopnje Predmetni učitelj	/	1.	2.
Five-year master's degree program Subject Teacher	/		

Vrsta predmeta / Course type	Obvezni / Compulsory
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Univerzitetna koda predmeta / University course code:	
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Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
60		30			60	5

Nosilec predmeta / Lecturer:	Niko TRATNIK
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Jeziki / Languages:	Predavanja / Lectures:	slovenski / Slovenian
	Vaje / Tutorial:	slovenski / Slovenian

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Vsaka izmed naštetih obveznosti v načinih ocenjevanja mora biti opravljena s pozitivno oceno.

Prerequisites:

Each of the mentioned commitments must be assessed with a passing grade.

Passing grade of the written exam is required for taking the theoretical exam.

Pozitivna ocena pri pisnem izpitu je pogoj za pristop k teoretičnemu izpitu.

Vsebina:

Realna števila; racionalna in iracionalna števila. Intervali. Supremum, maksimum. Absolutna vrednost. Kompleksna števila: osnovne lastnosti; polarni zapis.

Funkcije: limite; zveznost; monotone funkcije; zvezne funkcije na zaprtih intervalih, enakomerna zveznost; elementarne funkcije. Zaporedja: konvergenca, operacije z zaporedji; monotona zaporedja, število e ; podzaporedja, stekališča; Cauchyjeva zaporedja.

Vrste: konvergenca; vrste s pozitivnimi členi; absolutna in pogojna konvergenca; vsota in produkt vrst.

Content (Syllabus outline):

Real numbers; rational and irrational numbers. Intervals. Supremum, maximum. Absolute value. Complex numbers: basic properties; trigonometric form.

Functions: limits, continuity, monotone functions; functions continuous on a closed interval, uniform continuity; elementary functions.

Sequences: convergence, operations on sequences; monotone sequences, the number e ; subsequences, accumulation points; Cauchy sequences.

Series: convergence, series of positive terms; absolute and conditional convergence; addition and multiplication of series.

Temeljni literatura in viri / Readings:

I. Vidav, *Višja matematika I*. Ljubljana: DMFA, 1994.

R. C. Wrede, M. R. Spiegel, *Schaum's outlines advanced calculus*. New York: McGraw Hill, 2010.

M. Dobovišek, M. Hladnik, M. Omladič, *Rešene naloge iz analize I*. Ljubljana: DMFA, 1992.

Dodatna literatura / Additional Readings:

F. Ayres, E. Mendelson, *Schaum's outline of calculus*. New York: McGraw-Hill, 1999.

B. Drinovec-Drnovšek, S. Strle, *Naloge iz analize 1: z odgovori, nasveti in rešitvami*. Ljubljana: DMFA - založništvo, 2021.

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Cilji in kompetence:

- Razumevanje osnovnih pojmov analize.
- Sposobnost reševanja nalog iz analize in z uporabo analize.

Objectives and competences:

- Understanding the basic concepts of analysis.
- Ability to solve problems from analysis and by use of analysis.

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje: • Realnih in kompleksnih števil. • Zaporedij in vrst. • Limit in zveznosti funkcij. Pridobljena znanja so podlaga za večino predmetov v nadaljevanju študija.	Knowledge and understanding: • Real and complex numbers. • Sequences and series. • Limits and continuity of functions. The obtained knowledge is a basis for most of the later subjects.
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Metode poučevanja in učenja: • Predavanja • Vaje • Individualno delo	Learning and teaching methods: • Lectures • Tutorial • Individual work
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Delež (v %) / Weight (in %)		
Načini ocenjevanja:		Assessment:
Pisni izpit	50%	Written exam
Teoretični izpit	50%	Theoretical exam

Opombe:

Pisni izpit se lahko nadomesti s kolokviji v enakem deležu 50%.

Comments:

Written exam can be replaced by written midterm exams in the weight of 50%.

Reference nosilca / Lecturer's references:

1. BREZOVNIK, Simon, CHE, Zhongyuan, TRATNIK, Niko, ŽIGERT PLETERŠEK, Petra. Outerplane bipartite graphs with isomorphic resonance graphs. *Discrete applied mathematics*. Jan. 2024, vol. 343, str. 340-349. ISSN 0166-218X. DOI: [10.1016/j.dam.2023.11.006](https://doi.org/10.1016/j.dam.2023.11.006). [COBISS.SI-ID 172545795]
2. TRATNIK, Niko. Zhang-Zhang polynomials of phenylenes and benzenoid graphs. *Match : communications in mathematical and in computer chemistry*. 2024, vol. 92, no. 1, str. 25-53. ISSN 0340-6253. DOI: [10.46793/match.92-1.025T](https://doi.org/10.46793/match.92-1.025T). [COBISS.SI-ID 185502723]
3. BREZOVNIK, Simon, DEHMER, Matthias, TRATNIK, Niko, ŽIGERT PLETERŠEK, Petra. Szeged and Mostar root-indices of graphs. *Applied mathematics and computation*. Apr. 2023, vol. 442, article no. 127736, 11 str. ISSN 0096-3003. DOI: [10.1016/j.amc.2022.127736](https://doi.org/10.1016/j.amc.2022.127736). [COBISS.SI-ID 139442179]
4. TRATNIK, Niko, YE, Dong. Resonance graphs on perfect matchings of graphs on surfaces. *Graphs and combinatorics*. 2023, vol. 39, iss. 4, article no. 68, 15 str. ISSN 0911-0119. DOI: [10.1007/s00373-023-02666-4](https://doi.org/10.1007/s00373-023-02666-4). [COBISS.SI-ID 155893507]
5. KNOR, Martin, TRATNIK, Niko. A method for computing the edge-Hosoya polynomial with application to phenylenes. *Match : communications in mathematical and in computer chemistry*. 2023, vol. 89, no. 3, str. 605-629. ISSN 0340-6253. DOI: [10.46793/match.89-3.605K](https://doi.org/10.46793/match.89-3.605K). [COBISS.SI-ID 142041603]

