



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Osnove analize
Course title:	Basic Analysis

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik 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

Univerzitetna koda predmeta / University course code:

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:

Jeziki / Languages:
Predavanja / Lectures:
Vaje / Tutorial:

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

Vsebina:
Content (Syllabus outline):

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.

Osnovno o odvodih in njihovi uporabi.

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.

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.

Derivatives and their use.

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.

Temeljna literatura in viri / Readings:

- M. Dobovišek, M. Hladnik, M. Omladič, Rešene naloge iz analize I, DMFA - založništvo, Ljubljana, 2008
- F. Ayres, J., E. Mendelson: Schaum's Outline of Calculus, New York, McGraw-Hill, 1962 (Fourth Edition, 1999)
- I. Vidav, Višja matematika I, DZS, Ljubljana, 1974.
- R.C. Wrede, M.R. Spiegel, Schaum's outlines advanced calculus, McGraw Hill, 2010

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:

Znanje in razumevanje:

- Realnih in kompleksnih števil.
- Zaporedij in vrst.
- Limit, zveznosti in odvodov funkcij

Pridobljena znanja so podlaga za večino predmetov v nadaljevanju študija.

Intended learning outcomes:

Knowledge and understanding:

- Real and complex numbers
- Sequences and series
- Limits, continuity and derivatives of functions

The obtained knowledge is a basis for most of the later subjects.

Metode poučevanja in učenja:

<ul style="list-style-type: none"> • Predavanja • Vaje • Individualno delo

Learning and teaching methods:

<ul style="list-style-type: none"> • Lectures • Tutorial • Individual work

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

Pisni test – praktični del	50%	Written test – practical part
Izpit (ustni) – teoretični del	50%	Exam (oral) – theoretical part
Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.		Each of the mentioned commitments must be assessed with a passing grade.
Positivna ocena pri pisnem testu je pogoj za pristop k izpitu.		Passing grade of the written test is required for taking the exam.
Pisni test – praktični del se lahko nadomesti z dvema delnima testoma (ki sta sprotni obveznosti).		Written test – practical part can be replaced by two mid-term tests.

Reference nosilca / Lecturer's references:

1. BANIČ, Iztok, ČREPŃJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš, SOVIČ, Tina. The closed subset theorem for inverse limits with upper semicontinuous bonding functions. *Bulletin of the Malaysian Mathematical Society*, ISSN 0126-6705, 2019, vol. 42, iss. 3, str. 835-846, doi: [10.1007/s40840-017-0517-5](https://doi.org/10.1007/s40840-017-0517-5). [COBISS.SI-ID [23281928](https://www.cobiss.si/id/23281928)].
2. BANIČ, Iztok, ČREPŃJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš. The (weak) full projection property for inverse limits with upper semicontinuous bonding functions. *Mediterranean journal of mathematics*, ISSN 1660-5446, Aug. 2018, vol. 15, iss. 4, str. 1-21, doi: [10.1007/s00009-018-1209-6](https://doi.org/10.1007/s00009-018-1209-6). [COBISS.SI-ID [23960328](https://www.cobiss.si/id/23960328)].
3. BANIČ, Iztok, ČREPŃJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš, SOVIČ, Tina. An Anderson-Choquet-type theorem and a characterization of weakly chainable continua. *Mediterranean journal of mathematics*, ISSN 1660-5446, 2017, vol. 14, iss. 2, str. 1-14, doi: [10.1007/s00009-017-0868-z](https://doi.org/10.1007/s00009-017-0868-z). [COBISS.SI-ID [22997512](https://www.cobiss.si/id/22997512)].
4. BANIČ, Iztok, ČREPŃJAK, Matevž, ERCEG, Goran, MERHAR, Matej, MILUTINOVIĆ, Uroš. Inducing functions between inverse limits with upper semicontinuous bonding functions. *Houston journal of mathematics*, ISSN 0362-1588, 2015, vol. 41, no. 3, str. 1021-1037. [COBISS.SI-ID [21550856](https://www.cobiss.si/id/21550856)].
5. BANIČ, Iztok, ČREPŃJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš. Inverse limits, inverse limit hulls and crossovers. *Topology and its Applications*, ISSN 0166-8641. [Print ed.], 2015, vol. 196, str. 155-172, doi: [10.1016/j.topol.2015.09.040](https://doi.org/10.1016/j.topol.2015.09.040). [COBISS.SI-ID [21615112](https://www.cobiss.si/id/21615112)].