



Univerza v Mariboru



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Fakulteta za naravoslovje in
matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Osnove analize
Course title:	Calculus

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Fizika		1.	2.
Physics		1.	2.

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		45			105	7

Nosilec predmeta / Lecturer:

Uroš Milutinović

Jeziki /
Languages:

Predavanja /
Lectures:
Vaje / Tutorial:

SLOVENSKO/SLOVENE

SLOVENSKO/SLOVENE

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

Priporočeno je predznanje maturitetnega kurza matematike.

Vsebina:

1. Funkcije ene realne spremenljivke. Pregled elementarnih funkcij. Zveznost in limita funkcij.
2. Definicija in geometrijski pomen odvoda, odvodi elementarnih funkcij, pravila za odvajanje. Analiza poteka funkcije; monotonost, konveksnost in konkavnost; ekstremini in prevoji. Lagrangeov izrek, L'Hospitalovo pravilo. Višji odvodi.
3. Zaporedja, vrste, potenčne vrste, Taylorjeve

Prerequisites:

Matura-level knowledge of mathematics is recommended.

Content (Syllabus outline):

1. Functions of one real variable. Elementary functions. Continuity and limits of functions.
2. Definition and geometric meaning of a derivative, derivatives of elementary functions, rules for calculating derivatives. Determining the graph of a function; monotonicity, convexity, maxima and minima, inflexion points. Mean value theorems. L'Hospital's rule. Higher order derivatives.
3. Sequences, series, power series, Taylor's

vrste. 4. Definicija nedoločenega integrala, metode integriranja, integrali elementarnih funkcij. Definicija določenega integrala. Newton-Leibnizova formula. Uporaba določenega integrala. 5. Pojem diferencialne enačbe.	series. 4. Indefinite integrals, methods of integration, integrals of elementary functions. Definition of the definite integral. The fundamental theorem of the calculus. Applications. 5. The concept of a differential equation.
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Temeljni literatura in viri / Readings:

1.	Vidav: Višja matematika I. Ljubljana, DZS, 1974
2.	F. Ayres, J., E. Mendelson: Schaum's Outline of Calculus, New York, McGraw-Hill, 1962 (Fourth Edition, 1999)
3.	E. Mendelson: 3000 Solved Problems in Calculus. New York, McGraw-Hill, 1988

Cilji in kompetence:

Študentje obvladajo osnovne pojme in metode analize, na nivoju diferencialnega in integralnega računa funkcij ene realne spremenljivke.

Objectives and competences:

Students learn the basic concepts and methods of the calculus of functions of one real variable.

Predvideni študijski rezultati:

Znanje in razumevanje.
Znajo osnove analize.

Prenesljive/ključne spretnosti in drugi atributi:
Matematično orodje, ki je nujno potrebno za delo pri vseh fizikalnih predmetih.

Intended learning outcomes:

Knowledge and understanding.
They know calculus.

Transferable/Key Skills and other attributes:
Knowledge of mathematical tools that is essential for all the subjects on physics

Metode poučevanja in učenja:

Predavanja
Teoretične vaje

Learning and teaching methods:

Lectures
Theoretical exercises

Načini ocenjevanja:

Način (pisni izpit, ustno izpraševanje, naloge, projekt)
Pisni test – praktični del
Izpit (ustni) – teoretični del

Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.

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

Delež (v %) /
Weight (in %)
50%
50%

Assessment:

Type (examination, oral, coursework, project):
Written test – practical part
Exam (oral) – theoretical part

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

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

Reference nosilca / Lecturer's references:

1. BANIČ, Iztok, ČREPNIJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš. Towards the complete classification of generalized tent maps inverse limits. Topol. appl.. [Print ed.], 2013, vol.

160, iss. 1, str. 63-73. <http://dx.doi.org/10.1016/j.topol.2012.09.017>. [COBISS.SI-ID 16485977]

2. BANIČ, Iztok, ČREPNJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš, SOVIČ, Tina. Ważewski's universal dendrite as an inverse limit with one set-valued bonding function. Preprint series, 2012, vol. 50, št. 1169, str. 1-33. <http://www.imfm.si/preprinti/PDF/01169.pdf>. [COBISS.SI-ID 16194137]

3. BANIČ, Iztok, ČREPNJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš. Paths through inverse limits. Topol. appl.. [Print ed.], 2011, vol. 158, iss. 9, str. 1099-1112. <http://dx.doi.org/10.1016/j.topol.2011.03.001>. [COBISS.SI-ID 18474504]

4. BANIČ, Iztok, ČREPNJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš. Limits of inverse limits. Topol. appl.. [Print ed.], 2010, vol. 157, iss. 2, str. 439-450. <http://dx.doi.org/10.1016/j.topol.2009.10.002>. [COBISS.SI-ID 15310169]

5. KLAUVŽAR, Sandi, MILUTINOVIĆ, Uroš, PETR, Ciril. Stern polynomials. Adv. appl. math., 2007, vol. 39, iss. 1, str. 86-95. <http://dx.doi.org/10.1016/j.aam.2006.01.003>. [COBISS.SI-ID 14276441]