



UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet	Analiza I
Course name	Analysis I

Študijski program in stopnja Study program and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Fizika in Astrofizika I. stopnja	/	1	1
Physics and Astrophysics I. level	/	1	1

Vrsta predmeta / Course type	obvezni / mandatory
Univerzitetna koda predmeta / University course code	1FAF01

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Lab. work	Teren. vaje Field work	Samost. delo Indiv. work	ECTS
45	/	45	/	/	180	9

Nosilec predmeta / Lecturer	Izr. prof. dr. Elio Cabib	
Jeziki / Languages	Predavanja / Lectures	slovenščina / English
	Vaje / Tutorial	slovenščina / English

Pogoji za opravljanje študijskih obveznosti	Prerequisites
/	/

Vsebina	Syllabus outline
1. Uvod v matematično analizo	1. Introduction to analysis (functions; limits; infinitely small and large quantities; continuity of functions)
2. Odvajanje funkcij	2. Differentiation of functions (calculating derivatives directly; tabular differentiation; derivatives of implicit functions; derivatives of higher orders; differentials of first and higher orders; mean value theorems; Taylor formula; L'Hospital-Bernoulli rule for evaluating indeterminate forms.)
3. Ekstremi funkcij in geometrijske aplikacije odvodov	3. Extrema of a function and geometric applications of a derivative (extrema of one argument functions, direction of concavity; points of inflection; asymptotes; graphing functions by characteristic points; differential of an arc curvature)
4. Nedoločeni integrali	4. Indefinite integrals (direct integration; integration by substitution;
5. Določeni integrali	
6. Vrste	
7. Funkcije več spremenljivk	
8. Večkratni in krivoljni integrali	



integration by parts; standard integrals containing a quadratic trinomial; integration of rational functions; integration of irrational functions; integrating trigonometric functions; integration of hyperbolic functions; integration using trigonometric and hyperbolic substitutions; integration of various transcendental functions; reduction formulas.)

5. Definite integrals

(definite integral as a limit of a sum; evaluating definite integrals by means of indefinite integrals; improper integrals; change of variable in a definite integral; integration by parts; areas of plane figures; the arc length of a curve; volumes of solids; applying definite integrals to the solution of physical problems.)

6. Series

(number series; functional series; Taylor's series; Fourier's series.)

7. Functions of several variables

(concepts; continuity; partial derivatives; total differential of a function; differentiation of composite functions; derivative in a given direction and the gradient of a function; higher-order derivatives and differentials; integration of total differentials; differentiation of implicit functions; change of variables; tangent plane and the normal to a surface; Taylor's formula for a function of several variables; extreme of a function of several variables; largest and smallest values of functions; singular points of plane curves; envelope; arc length of a space curve; vector function of a scalar argument; natural trihedron of a space curve; curvature and torsion of a space curve.)

8. Multiple and line integrals

(double integral in rectangular coordinates; change of variables in a double integral; computing areas and volumes; double and triple integrals; line and surface integrals; Ostrogradsky-Gauss Formula; Stokes.)

Temeljni literatura in viri / Basic readings

R. Courant, *Differential and Integral Calculus I*. Blackie & Son Ltd (1961).

B. Demidovich et al, *Problems in Mathematical Analysis*, Mir Publishers (1972).



Cilji in kompetence	Objectives and competences
Osnovni cilj predmeta je poučiti študente o načinih klasične matematične analize: izračun limit ob različnih predpostavkah, izračun odvodov funkcij (z enim in več argumenti), izračun integralov. Osnovni cilj je dati študentom znanje, potrebno za analizo funkcij.	The primary goal of this course is to give students the knowledge of methods of classic mathematical analysis: calculation of limits at various conditions, calculation of derivatives of functions with one and many argument, calculation of integrals. Basic goal is following: to give the knowledge for analysis of functions.

Predvideni študijski rezultati	Intended learning outcomes
Študentje se bodo naučili poiskati ekstreme funkcij, prepoznavati asimptotično vedenje funkcij, ničle funkcij, itd. Pridobili bodo znanje, potrebno za celotno analizo funkcij.	Students will get the information about finding of extreme points of functions, about asymptotic behaviour of functions, about roots of functions etc. Finally, they will have knowledge for total analysis of functions.

Metode poučevanja in učenja	Learning and teaching methods
- predavanja - računske vaje	- lectures - tutorial

Načini ocenjevanja	Utež / Weight (%)	Assessment
- kolokviji, pisni izpit - ustni izpit	50 50	- written tests, written exam - oral exam

Reference nosilca / references of the course principal
Izr. prof. dr. Elio Cabib je pridružen profesor za področje matematike. Dr. Elio Cabib is an Associate professor of Mathematics.