UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet	Linearna algebra
Course name	Linear algebra

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	1FAF02

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Lab. work	Teren. vaje Field work	Samost. delo Indiv. work	ECTS
30	/	30	/	/	120	6

Nosilec predmeta / Lecturer	Izr. prof. dr. Irina Elena Cristea	
Jeziki / Languages	**Predavanja / Lectures**	slovenščina / English
	Vaje / Tutorial	slovenščina / English

Pogoji za opravljanje študijskih obveznosti	Prerequisites
/	/

Vsebina	Syllabus outline
1. Matrike 2. Sistemi linearnih enačb 3. Vektorski prostori 4. Evklidski vektorski prostori 5. Linearne transformacije 6. Lastne vrednosti in lastni vektorji 7. Pomen afine linearne geometrije	1. Matrices (addition and multiplication of matrices; reduction of matrices; rank of a matrix; triangular matrices; determinants and their properties; the Laplace expansion; inverse matrices; the general linear group GL(n)) 2. Systems of linear equations (Gauss elimination method; equivalent linear systems; the Rouche'-Capelli theorem; homogeneous systems.) 3. Vector spaces (definition and basic properties; subspaces; linear combinations; linear independence; the direct sum of subspaces; basis and dimension; Grassmann theorem.) 4. Euclidean vector spaces (definition of scalar product and basic properties; bilinear forms; the isotropic cone; orthonormal basis; Gram-Schmidt method;

	orthogonal projections; orthogonal matrices and isometries.) 5. Linear maps (transformations) (definition and basic properties; kernel and image; isomorphisms; matrix of a linear transformation; composition of linear maps; change of basis in a vector space.) 6. Eigenvalues and eigenvectors (definition and characteristic polynomial; similar matrices; diagonalization of an endomorphism; the Jordan normal form; diagonalization of symmetric matrices.) 7. Notions of Affine Linear Geometry (Lines and planes in the affine space; Euclidean affine spaces; cross and mixed product; orthogonality and distance between linear affine varieties.)

Temeljni literatura in viri / Basic readings
P. R. Halmos, "Finite-Dimensional vector spaces" (Springer, 1993). G. Landi and A. Zampini, "Linear algebra and analytic geometry for physical sciences" (Springer, 2018)

Cilji in kompetence	**Objectives and competences**
Študent se bo seznanil s končno dimenzionalnimi vektorskimi prostori, linearnimi preslikavami med njimi in z analitično geometrijo.	Introduction to the finite dimensional vector spaces, linear operators, spectral theory of linear operators, analitical geometry.

Predvideni študijski rezultati	**Intended learning outcomes**
Študenti bodo sposobni: - opravljati operacije z matrikami - izračunati determinante - rešiti sisteme linearnih enačb - določiti bazo in izračunati dimenzijo vektorskega prostora - določiti koordinate vektorja glede na osnovi bazi vektorskega prostora - izračunati jedro in sliko - najti lastne vrednosti in lastne vektorje matrike - diagonalizirati simetrično matriko - reševati probleme z vektorji, premicami in ravninami v prostoru	Students will be able to: - do operations with matrices - calculate determinants - solve linear systems - determine a basis and the dimension of a vector space - determine the coordinates of a vector with respect to a basis of a vector space - calculate the kernel and image of a linear transformation - find the eigenvalues and eigenvectors of a matrix - diagonalize a symmetric matrix - solve problems with vectors, lines and planes in the space

Metode poučevanja in učenja	**Learning and teaching methods**

- predavanja - računske vaje	- lectures - tutorial

Načini ocenjevanja	Utež / Weight (%)	Assessment
- kolokviji, pisni izpit - ustni izpit	75 25	- written tests, written exam - oral exam

Reference nosilca / references of the course principal
Dr. Irina Elena Cristea je izredna profesorica za področje matematike na Univerzi v Novi Gorici. Dr. Irina Elena Cristea is an Assistant professor of mathematics at the University of Nova Gorica.