UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2017/18)			
Predmet:	Linearna algebra		
Course title:	Linear algebra		

Študijski program in stopnja **Study programme and level**	**Študijska smer** **Study field**	**Letnik** **Academic year**	**Semester** **Semester**
Interdisciplinarni univerzitetni študijski program Računalništvo in matematika	ni smeri	1	prvi in drugi
Interdisciplinary first cycle academic study programme Computer Science and Mathematics	none	1	first and second

Vrsta predmeta / Course type	obvezni / compulsory

Univerzitetna koda predmeta / University course code: 27203

Predavanja **Lectures**	**Seminar** **Seminar**	**Vaje** **Tutorial**	**Klinične vaje** **work**	**Druge oblike študija**	**Samost. delo** **Individ. work**	**ECTS**
60		60			180	10

Nosilec predmeta / Lecturer: prof. dr. Jakob Cimprič, prof. dr. Karin Cvetko-Vah

Jeziki / **Languages:**	**Predavanja /** **Lectures:**	slovenski / Slovene
	Vaje / Tutorial:	slovenski / Slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Vpis v letnik študija.	Enrolment in the programme.

Vsebina:	**Content (Syllabus outline):**

Prvi semester (obveznosti za 5 ECTS):	First semester (5 ECTS)
Vektorji v Rn. Osnove analitične geometrije.	Vectors in Rn. Fundamentals of analytic geometry.
Matrike in determinante. Sistemi linearnih enačb.	Matrices and determinants. Systems of linear equations.
Osnovne algebraične structure.	Basic algebraic structures.
Vektorski prostori, linearna neodvisnost, baze.	Vector spaces, linear independence, bases.
Linearne preslikave in njihove matrike.	Linear transformations and their matrices.
Drugi semester (obveznosti za 5 ECTS):	Second semester (5 ECTS)
Lastne vrednosti in lastni vektorji matrik.	Eigenvalues and eigenvectors of matrices.
Diagonalizacija in Jordanova kanonična forma.	Diagonalization and Jordan canonical form.
Vektorski prostori s skalarnim produktom, ortonormirane baze. Adjungirana preslikava.	Inner product spaces, orthonormal bases, adjoint of a linear transformation.
Simetrične, normalne in ortogonalne matrike.	Symmetric, normal and orthogonal matrices.
Kvadratne forme. Krivulje in ploskve 2. reda.	Quadratic forms. Curves and surfaces of degree two.

Temeljni literatura in viri / Readings:

Učbeniki in zbirke vaj (Textbooks and problem sets)

J. Grasselli, A. Vadnal: Linearna algebra, linearno programiranje, DMFA založništvo, Ljubljana, 1986.

S. I. Grossman, Elementary linear algebra with applications, McGraw-Hill 1994.

E. Kramar, Rešene naloge iz linearne algebre, DMFA, Ljubljana 1994.

M. Dobovišek, D. Kobal, B. Magajna, Naloge iz algebre I, DMFA, Ljubljana, 2000.

S. Lipschutz: Linear Algebra (Schaum's O.S.), McGraw-Hill, New York 1968.

Elektronski viri (Electronic sourses)

Tomaž Košir, Algebra 1, http://www.fmf.uni-lj.si/~kosir/poucevanje/0910/alg1-fm.html

Bojan Orel, Linearna algebra, http://matematika.fri.uni-lj.si/LA/la1.pdf

Cilji in kompetence:

Študentje spoznajo osnovne pojme iz linearne algebre, potrebne pri nadaljnjem študiju: osnove dvo- in tro-razsežne evklidske geometrije, matrično algebro, reševanje sistemov linearnih enačb, računanje s polinomi in osnovne elemente abstraktne algebre. Naučijo se matematičnega načina razmišljanja in pridobijo praktično in delovno znanje s področja linearne algebre.

Objectives and competences:

Students get familiar with the basic concepts of linear algebra, necessary for further study: basics of two and three-dimensional euclidean geometry, matrix algebra, solving systems of linear equations, calculating with polynomials and basic elements of abstract algebra. They learn a mathematical way of thinking and achieve practical and working knowledge from the field of linear algebra.

Predvideni študijski rezultati:

Poznavanje in razumevanje osnovnih pojmov in postopkov linearne algebra. Sposobnost uporabe pridobljenega znanja v matematiki in drugod.

Intended learning outcomes:

Familiarity with basic notions and algorithms of Linear algebra. Ability to apply the knowledge in mathematics and elsewhere.

Metode poučevanja in učenja:

Predavanja, vaje, domače naloge, konzultacije.

Learning and teaching methods:

Lectures, tutorials, homework assignments, consultations.

Načini ocenjevanja:

Način:	Delež (v %) / Weight (in %)	Assessment: Type:
pisni izpit, naloge	50%	Written exam, coursework
ustno izpraševanje	50%	Oral exam

Reference nosilca / Lecturer's references:

Jaka Cimprič:

CIMPRIČ, Jaka. Strict positivstellensätze for matrix polynomials with scalar constraints. Linear Algebra and its Applications, ISSN 0024-3795. [Print ed.], 2011, vol. 434, iss. 8, str. 1879-1883.

[COBISS.SI-ID 15863385]

CIMPRIČ, Jaka. Archimedean operator-theoretic Positivstellensätze. Journal of functional analysis, ISSN 0022-1236, 2011, vol. 260, iss. 10, str. 3132-3145. [COBISS.SI-ID 15997529]

CIMPRIČ, Jaka. Real algebraic geometry for matrices over commutative rings. Journal of algebra, ISSN 0021-8693, 2012, vol. 359, str. 89-103. [COBISS.SI-ID 16315993]

Karin Cvetko Vah:

CVETKO-VAH, Karin, LEECH, Jonathan. Rings whose idempotents form a multiplicative set. Communications in algebra, ISSN 0092-7872, 2012, vol. 40, no. 9, str. 3288-3307. [COBISS.SI-ID 16432729]

CVETKO-VAH, Karin. On strongly symmetric skew lattices. Algebra universalis, ISSN 0002-5240, 2011, vol. 66, no. 1-2, str. 99-113. [COBISS.SI-ID 16219993]

CVETKO-VAH, Karin. Internal decompositions of skew lattices. Communications in algebra, ISSN 0092-7872, 2007, vol. 35, no. 1, str. 243-247. [COBISS.SI-ID 14223193]