UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	Neasociativna algebra
Course title:	Nonassociative algebra

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Magistrski študijski program Matematika	ni smeri	1 ali 2	prvi ali drugi
Master's study programme Mathematics	none	1 or 2	first or second

Vrsta predmeta / Course type	izbirni

Univerzitetna koda predmeta / University course code:	M2222

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
45		30			105	6

Nosilec predmeta / Lecturer:	prof. Tomaž Košir

Jeziki / Languages:	Predavanja / Lectures:	slovenski/Slovene, angleški/English
	Vaje / Tutorial:	slovenski/Slovene, angleški/English

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

Vsebina:	Content (Syllabus outline):
Pomembnejši tipi neasociativnih algeber (alternativne algebre, jordanske algebre). Definicija Liejeve algebre. Ideali in	Important types of nonnassociative algebras (alternating algebras, Jordan algebras). The definition of Lie algebra. Ideals and homomorphisms. Solvable and nilpotent Lie

homomorfizmi. Rešljive in nilpotentne Liejeve algebre. Liejev in Cartanov izrek. Killingova forma. Povsem razcepne upodobitve. Upodobitve algebre sl(2, F). Razcep na korenske podprostore. Korenski sistemi. Enostavni koreni in Weylova grupa. Klasifikacija (končnorazsežnih) enostavnih Liejevih algeber. Univerzalna ovojna algebra. Poicaré-Birkhoff-Wittov izrek. Upodobitve enostavnih Liejevih algeber.	algebras. Lie's and Cartan's Theorems. The Killing form. Completely irreducible representations. Representations of sl(2,F). Root subspace decomposition. Root systems. Simple roots and the Weyl group. Classification of (finite-dimensional) simple Lie algebras. Universal envelloping algebra. Theorem Poicaré-Birkhoff-Witt. Representation theory of simlpe Lie algebras.

Temeljni literatura in viri / Readings:

K. A. Zhevlakov, A. M. Slinko, I. P. Shestakov, A. I. Shirshov, Rings that are nearly associative, Academic Press, 1982.

J. E. Humphreys: Introduction to Lie Algebras and Representation Theory, Springer, New York-Berlin, 1997.

J. P. Serre: Complex Semisimple Lie Algebras, Springer, Berlin, 2001.

W. A. de Graaf: Lie Algebras : Theory and Algorithms, North Holland, Amsterdam, 2000.

Cilji in kompetence:	**Objectives and competences:**
Študent spozna osnovne pojme in izreke neasociativne algebre.	Student meets the fundamental notions and theorems of the nonassociative algebra.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Poznavanje osnovnih pojmov in izrekov neasociativne algebre in njihovo prepoznavanje v drugih vejah matematike. Uporaba: V drugih vejah matematike. Refleksija: Razumevanje teorije na podlagi	Knowledge and understanding: Understanding of basic concepts and theorems of noncommutative algebra, and their role in some other areas. Application: In other mathematical areas. Reflection: Understanding the theory on the

	Delež (v %) /	

primerov in uporabe.

Prenosljive spretnosti – niso vezane le na en predmet: Formulacija in reševanje problemov z abstraktnimi metodami.

basis of examples and applications.

Transferable skills: Formulation and solution of problems using abstract methods.

Metode poučevanja in učenja:

predavanja, vaje, domače naloge, konzultacije

Learning and teaching methods:

Lectures, exercises, homeworks, consultations

Načini ocenjevanja:

Delež (v %) /
Weight (in %)

Assessment:

Način (pisni izpit, ustno izpraševanje, naloge, projekt): izpit iz vaj (2 kolokvija ali pisni izpit) ustni izpit Ocene: 1-5 (negativno), 6-10 (pozitivno) (po Statutu UL)	50% 50%	Type (examination, oral, coursework, project): 2 midterm exams instead of written exam, written exam oral exam Grading: 1-5 (fail), 6-10 (pass) (according to the Statute of UL)

Reference nosilca / Lecturer's references:

Tomaž Košir:

– GRUNENFELDER, Luzius, GURALNICK, Robert M., KOŠIR, Tomaž, RADJAVI, Heydar. Permutability of characters on algebras. Pacific journal of mathematics, ISSN 0030-8730, 1997, let. 178, št. 1, str. 63-70 [COBISS.SI-ID 7437145]

– GRUNENFELDER, Luzius, KOŠIR, Tomaž, OMLADIČ, Matjaž, RADJAVI, Heydar. Maximal Jordan algebras of matrices with bounded number of eigenvalues. Israel journal of mathematics, ISSN 0021-2172, 2002, vol. 128, str. 53-75 [COBISS.SI-ID 11625305]

– BERNIK, Janez, DRNOVŠEK, Roman, KOKOL-BUKOVŠEK, Damjana, KOŠIR, Tomaž, OMLADIČ, Matjaž, RADJAVI, Heydar. On semitransitive jordan algebras of matrices. Journal of algebra and its