

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 Finančna matematika		ni smeri		1 ali 2	prvi ali drugi	
Master's study programme Financial 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, jordske algebre). Definicija Liejeve algebre. Ideali in				Important types of nonassociative algebras (alternating algebras, Jordan algebras). The definition of Lie algebra. Ideals and homomorphisms. Solvable and nilpotent Lie		

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

Študent spozna osnovne pojme in izreke neasociativne algebre.

Objectives and competences:

Student meets the fundamental notions and theorems of the nonassociative algebra.

Predvideni študijski rezultati:

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

Intended learning outcomes:

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

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

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

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

applications, ISSN 0219-4988, 2011, vol. 10, iss. 2, str. 319-333 [COBISS.SI-ID 15908697]