

UČNI NAČRT PREDMETA / COURSE SYLLABUS						
Predmet:		Nekomutativna algebra				
Course title:		Noncommutative 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:				M2211		
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. Jakob Cimprič, prof. Matej Brešar				
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):		
Nekomutativni obsegi. Frobeniusov izrek. Wedderburnov izrek o končnih obsejih.				Noncommutative division rings. Frobenius' theorem. Wedderburn's theorem on finite division rings.		
Radikal. Polenostavne algebre. Wedderburnov				Radikal. Semisimple algebras. Wedderburn's		

izrek. Maschkejev izrek.	theorem. Maschke's theorem.
Enostavni in polenostavni moduli. Izrek o gostoti. Jacobsonov radikal.	Simple and semisimple modules. Density theorem. Jacobson radical.
Tenzorski produkti algeber. Skolem-Noetherin izrek. Izrek o drugem centralizatorju. Brauerjeva grupa.	Tensor product of algebras. Skolem-Noether theorem. Double centralizer theorem. Brauer group.

Temeljni literatura in viri / Readings:

R. K. Dennis, B. Farb, Noncommutative algebra, Springer, 1993.
T. Y. Lam, A first course in noncommutative rings, Springer, 2001.
R. S. Pierce, Associative algebras, Springer, 1982.
L. Rowen, Graduate algebra: Noncommutative view, AMS, 2008.
M. Brešar, Introduction to Noncommutative Algebra, Springer, 2014

Cilji in kompetence:

Spoznati osnovne pojme in orodja nekomutativne algebre.

Objectives and competences:

To master basic concepts and tools of noncommutative algebra.

Predvideni študijski rezultati:

Znanje in razumevanje: Razumevanje osnovnih pojmov in izrekov nekomutativne algebre ter njihove vloge na nekaterih drugih področjih.
Uporaba: V drugih vejah matematike.
Refleksija: Razumevanje teorije na podlagi primerov in uporabe.
Prenosljive spretnosti – niso vezane le na en

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 basis of examples and applications.

<p>predmet:</p> <p>Formulacija in reševanje problemov z abstraktnimi metodami.</p>	<p>Transferable skills:</p> <p>Formulation and solution of problems using abstract methods.</p>
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<p>Metode poučevanja in učenja:</p> <p>Predavanja, vaje, domače naloge, konzultacije.</p>	<p>Learning and teaching methods:</p> <p>Lectures, exercises, homeworks, consultations.</p>
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	Delež (v %) / Weight (in %)	
Načini ocenjevanja:		Assessment:
<p>Način (pisni izpit, ustno izpraševanje, naloge, projekt): domače naloge</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): homework assignment</p> <p>oral exam</p> <p>Grading: 1-5 (fail), 6-10 (pass) (according to the Statute of UL)</p>

Reference nosilca / Lecturer's references:

<p>Matej Brešar:</p> <ul style="list-style-type: none"> - BREŠAR, Matej, CHEBOTAR, M. A., MARTINDALE, Wallace S. Functional identities, (Frontiers in mathematics). Basel, Boston, Berlin: Birkhäuser, cop. 2007. XII, 272 str. ISBN 978-3-7643-7795-3. ISBN 978-3-7643-7796-0 [COBISS.SI-ID 14332505] - BREŠAR, Matej. An elementary approach to Wedderburn's structure theory. Expositiones mathematicae, ISSN 0723-0869, 2010, vol. 28, no 1, str. 79-83 [COBISS.SI-ID 15382617] - BREŠAR, Matej. An alternative approach to the structure theory of PI-rings. Expositiones mathematicae, ISSN 0723-0869, 2011, vol. 29, no 1, str. 159-164 [COBISS.SI-ID 15859545] <p>Jakob Cimprič:</p> <ul style="list-style-type: none"> - CIMPRIČ, Jaka. Free skew fields have many [ast]-orderings. Journal of algebra, ISSN 0021-8693,
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2004, vol. 280, no. 1, str. 20-28 [COBISS.SI-ID 13210201]

– CIMPRIČ, Jaka. Formally real involutions on central simple algebras. *Communications in algebra*, ISSN 0092-7872, 2008, vol. 36, no. 1, str. 165-178 [COBISS.SI-ID 14613337]

– CIMPRIČ, Jaka, HELTON, J. William, MCCULLOUGH, Scott, NELSON, Christopher. A noncommutative real nullstellensatz corresponds to a noncommutative real ideal: algorithms. *Proceedings of the London Mathematical Society*, ISSN 0024-6115, 2013, vol. 106, iss. 5, str. 1060-1086 [COBISS.SI-ID 16636249]