

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 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				temeljni		
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):		

<p>Nekomutativni obsegi. Frobeniusov izrek. Wedderburnov izrek o končnih obsejih.</p> <p>Radikal. Polenostavne algebre. Wedderburnov izrek. Maschkejev izrek.</p> <p>Enostavni in polenostavni moduli. Izrek o gostoti. Jacobsonov radikal.</p> <p>Tenzorski produkti algeber. Skolem-Noetherin izrek. Izrek o drugem centralizatorju. Brauerjeva grupa.</p>	<p>Noncommutative division rings. Frobenius's theorem. Wedderburn's theorem on finite division rings.</p> <p>Radical. Semisimple algebras. Wedderburn's theorem. Maschke's theorem.</p> <p>Simple and semisimple modules. Density theorem. Jacobson radical.</p> <p>Tensor product of algebras. Skolem-Noether theorem. Double centralizer theorem. Brauer group.</p>
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Temeljni literatura in viri / Readings:

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

<p>Spoznati osnovne pojme in orodja nekomutativne algebre.</p>
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Objectives and competences:

<p>To master basic concepts and tools of noncommutative algebra.</p>
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Predvideni študijski rezultati:

<p>Znanje in razumevanje:</p> <p>Razumevanje osnovnih pojmov in izrekov nekomutativne algebre ter njihove vloge na nekaterih drugih področjih.</p> <p>Uporaba:</p> <p>V drugih vejah matematike.</p>
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Intended learning outcomes:

<p>Knowledge and understanding:</p> <p>Understanding of basic concepts and theorems of noncommutative algebra, and their role in some other areas.</p> <p>Application:</p> <p>In other mathematical areas.</p>
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<p>Refleksija:</p> <p>Razumevanje teorije na podlagi primerov in uporabe.</p> <p>Prenosljive spretnosti – niso vezane le na en predmet:</p> <p>Formulacija in reševanje problemov z abstraktnimi metodami.</p>	<p>Reflection:</p> <p>Understanding the theory on the basis of examples and applications.</p> <p>Transferable skills:</p> <p>Formulation and solution of problems using abstract methods.</p>

Metode poučevanja in učenja:

<p>Predavanja, vaje, domače naloge, konzultacije.</p>

Learning and teaching methods:

<p>Lectures, exercises, homeworks, consultations.</p>

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

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>
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Reference nosilca / Lecturer's references:

<p>Matej Brešar:</p> <p>– 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]</p> <p>– 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]</p>
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- 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]

Jakob Cimprič:

- CIMPRIČ, Jaka. Free skew fields have many [ast]-orderings. *Journal of algebra*, ISSN 0021-8693, 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]