

UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2017/18)						
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				izbirni temeljni / core elective		
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. dr. Matej Brešar, prof. dr. Jakob Cimprič		
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:		
Vpis v letnik študija.				Enrolment in the programme.		
Vsebina:				Content (Syllabus outline):		

<p>Nekomutativni obsegi. Frobeniusov izrek. Wedderburnov izrek o končnih obsekih.</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' 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>
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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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Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Način (pisni izpit, ustno izpraševanje, naloge, projekt):		Type (examination, oral, coursework, project):
domače naloge		homework assignment
ustni izpit	50%	oral exam
Ocene: 1-5 (negativno), 6-10 (pozitivno) (po Statutu UL)	50%	Grading: 1-5 (fail), 6-10 (pass) (according to the Statute of UL)

<p>Reference nosilca / Lecturer's references:</p> <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>

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]

Jaka 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]