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):**
Nekomutativni obsegi. Frobeniusov izrek. Wedderburnov izrek o končnih obsegih. Radikal. Polenostavne algebre. Wedderburnov	Noncommutative division rings. Frobenius' theorem. Wedderburn's theorem on finite divison rings. Radical. Semisimple algebras. Wedderburn's

izrek. Maschkejev izrek. Enostavni in polenostavni moduli. Izrek o gostoti. Jacobsonov radikal. Tenzorski produkti algeber. Skolem-Noetherin izrek. Izrek o drugem centralizatorju. Brauerjeva grupa.	theorem. Maschke's theorem. Simple and semisimple modules. Density theorem. Jacobson radical. 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:	**Objectives and competences:**
Spoznati osnovne pojme in orodja nekomutativne algebre.	To master basic concepts and tools of noncommutative algebra.

Predvideni študijski rezultati:	**Intended learning outcomes:**
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	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.

predmet: Formulacija in reševanje problemov z abstraktnimi metodami.	Transferable skills: Formulation and solution of problems using abstract methods.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, vaje, domače naloge, konzultacije.	Lectures, exercises, homeworks, consultations.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt): domače naloge ustni izpit Ocene: 1-5 (negativno), 6-10 (pozitivno) (po Statutu UL)	 50% 50%	Type (examination, oral, coursework, project): homework assignment oral exam Grading: 1-5 (fail), 6-10 (pass) (according to the Statute of UL)

Reference nosilca / Lecturer's references:

Matej Brešar:

– 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]

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]