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 izrek. Maschkejev izrek. Enostavni in polenostavni moduli. Izrek o gostoti. Jacobsonov radikal. Tenzorski produkti algeber. Skolem-Noetherin izrek. Izrek o drugem centralizatorju. Brauerjeva grupa.	Noncommutative division rings. Frobenius' theorem. Wedderburn's theorem on finite divison rings. Radical. Semisimple algebras. Wedderburn's 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:	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:

Razumevanje teorije na podlagi primerov in uporabe. Prenosljive spretnosti – niso vezane le na en predmet: Formulacija in reševanje problemov z abstraktnimi metodami.	Understanding the theory on the basis of examples and applications. 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]