UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	**Izbrana poglavja iz algebre**
Course title:	**Selected Topics in Algebra**

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Enovit magistrski študijski program druge stopnje Predmetni učitelj	/	**4. ali / or** **5.**	**7. ali / or** **9.**
Five-year master's degree program Subject Teacher	/		

Vrsta predmeta / Course type | Obvezni / Compulsory

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30	**-**	**30**	**-**	**-**	**60**	**4**

Nosilec predmeta / Lecturer: | Mateja Grašič

Jeziki /	**Predavanja / Lectures:**	**slovenski / Slovene**
Languages:	**Vaje / Tutorial:**	**slovenski / Slovene**

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti: | **Prerequisits:**

Izpit iz Algebraičnih struktur	Exam from Algebraic structures

Vsebina: | **Content (Syllabus outline):**

• Grupe in podgrupe. Simetrične grupe.	• Groups and subgroups. Symmetric groups.
• Konjugiranost elementov in podgrup.	• Conjugated elements and subgroups.
• Homomorfizmi in izomorfizmi grup.	• Group homomorphisms and isomorphisms.
• Podgrupe edinke in faktorske grupe.	• Normal subgroups and factor groups.
• Delovanje grupe na množico.	• Action of a group on a set.
• Sylowske podgrupe, izreki Sylowa.	• Sylow subgroups, Sylow theorems
• Kolobar, ideal, obseg.	• Ring, ideal, division ring.
• Karakteristika kolobarja. Končna polja.	• The characteristics of a ring. Finite fields.

Temeljni literatura in viri / Readings:

S. Lang, Undergraduate Algebra, Springer, 2005 (elektronski vir)

J. A. Bahturin, Basic structures of modern algebra, Kluwer, Dordrecht 1993

A. I. Kostrikin, Introduction to Algebra, Springer-Verlag, New York 1982

I. Vidav, Algebra, DMFA, Ljubljana 1980

M. Dobovišek, D. Kobal, B. Magajna, Naloge iz algebre I, DMFA založništvo, Ljubljana, 2005.
M. Kolar, B. Zgrablič, Več kot nobena, a manj kot tisoč in ena rešena naloga iz linearne algebre, Pedagoška fakulteta Ljubljana, Ljubljana, 1996.

Cilji in kompetence:

Spoznati osnove teorije grup in polj, skupaj s spremljajočimi pojmi kot so podstruktura, homomorfizem, kvocientna struktura.

Objectives and competences:

To get familiar with the fundamentals of the theory of groups and fields, including such related topics as substructure, homomorphism and factor structure.

Predvideni študijski rezultati:

Znanje in razumevanje:

• Razumevanje temeljnih pojmov algebrske strukture, njene podstrukture in izomorfnih struktur.
• Poznavanje osnovnih značilnosti in tipičnih primerov grup, kolobarjev in polj.

Intended learning outcomes:

Knowledge and understanding:

• Understanding the basic notions about an algebraic structure, its substructure and isomorphic structures.
• To recognize the typical properties and main examples of groups, rings and fields.

Metode poučevanja in učenja:

• Predavanja
• Seminarske vaje
• Individualno delo

Learning and teaching methods:

• Lectures
• Excersises
• Individual work

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:

Način (pisni izpit, ustno izpraševanje, naloge, projekt):		Type (examination, oral, coursework, project):
Pisni izpit – praktični del Ustni izpit – teoretični del	**50%** **50%**	Written exam – practical part Oral exam – theoretical part
Pisni izpit – praktični del se lahko nadomesti z dvema delnima testoma (sprotni obveznosti).		Written test – practical part can be replaced by two partial tests (mid-term testing).
Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.		Each of the mentioned commitments must be assessed with a passing grade.
Opravljen pisni del izpita je pogoj za pristop k teoretičnem delu izpita.		Passing grade of the written exam is required for taking the oral exam.

Reference nosilca / Lecturer's references:

1. BENKOVIČ, Dominik, GRAŠIČ, Mateja. Generalized skew derivations on triangular algebras determined by action on zero products. *Communications in algebra*, ISSN 0092-7872, 2018, vol. 46, iss. 5, str. 1859-1867. https://doi.org/10.1080/00927872.2017.1360334, doi: 10.1080/00927872.2017.1360334. [COBISS.SI-ID 18505817]

2. GRAŠIČ, Mateja. Zero product determined Jordan algebras, II. *Algebra colloquium*, ISSN 1005-3867, 2015, vol. 22, iss. 1, str. 109-118, doi: 10.1142/S1005386715000103. [COBISS.SI-ID 21136136]

3. BENKOVIČ, Dominik, GRAŠIČ, Mateja. Generalized derivations on unital algebras determined by action on zero products. *Linear Algebra and its Applications*, ISSN 0024-3795. [Print ed.], 2014, vol. 445, str. 347-368. http://dx.doi.org/10.1016/j.laa.2013.12.010. [COBISS.SI-ID 20314120]

4. BIERWIRTH, Hannes, BREŠAR, Matej, GRAŠIČ, Mateja. On maps determined by zero products. *Communications in algebra*, ISSN 0092-7872, 2012, vol. 40, no. 6, str. 2081-2090. http://dx.doi.org/10.1080/00927872.2011.570833. [COBISS.SI-ID 16315481]

5. GRAŠIČ, Mateja. Zero product determined Jordan algebras, I. *Linear and Multilinear Algebra*, ISSN 0308-1087, 2011, vol. 59, no. 6, str. 671-685. http://dx.doi.org/10.1080/03081087.2010.485199. [COBISS.SI-ID 15927641]