



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

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	7. ali / or
Five-year master's degree program Subject Teacher	/	5.	9.

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:

Prerequisites:

Izpit iz Algebraičnih struktur

Exam from Algebraic structures

Vsebina:

Content (Syllabus outline):

- Grupe in podgrupe. Simetrične grupe.
- Konjugiranost elementov in podgrup.
- Homomorfizmi in izomorfizmi grup.
- Podgrupe edinke in faktorske grupe.
- Delovanje grupe na množico.
- Sylowske podgrupe, izreki Sylowa.
- Kolobar, ideal, obseg.
- Karakteristika kolobarja. Končna polja.

- Groups and subgroups. Symmetric groups.
- Conjugated elements and subgroups.
- Group homomorphisms and isomorphisms.
- Normal subgroups and factor groups.
- Action of a group on a set.
- Sylow subgroups, Sylow theorems
- Ring, ideal, division ring.
- 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

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
- Excercises
- Individual work

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

Assessment:

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

- 1.** BENKOVIČ, Dominik, GRAŠIČ, Mateja. Jordan $\{g,h\}\{\diamond,h\}$ -derivations of unital algebras. *Operators and matrices*. 2022, vol. 16, no. 2, str. 415-428. ISSN 1846-3886. <http://oam.ele-math.com/16-32/Jordan-g,h-derivations-of-unital-algebras>, DOI: [10.7153/oam-2022-16-32](https://doi.org/10.7153/oam-2022-16-32). [COBISS.SI-ID [114972163](https://www.cobiss.si/id/114972163)],
- 2.** XIA, Yong-Hui, GRAŠIČ, Mateja, HUANG, Wentao, ROMANOVSKI, Valery. Limit cycles in a model of olfactory sensory neurons. *International journal of bifurcation and chaos in applied sciences and engineering*. 2019, vol. 29, no. 3, str. 1950038-1-1950038-9. ISSN 0218-1274. DOI: [10.1142/S021812741950038X](https://doi.org/10.1142/S021812741950038X). [COBISS.SI-ID [22250006](https://www.cobiss.si/id/22250006)],
- 3.** BENKOVIČ, Dominik, GRAŠIČ, Mateja. Generalized skew derivations on triangular algebras determined by action on zero products. *Communications in algebra*. 2018, vol. 46, iss. 5, str. 1859-1867. ISSN 0092-7872. <https://doi.org/10.1080/00927872.2017.1360334>, DOI: [10.1080/00927872.2017.1360334](https://doi.org/10.1080/00927872.2017.1360334). [COBISS.SI-ID [18505817](https://www.cobiss.si/id/18505817)].