



Univerza v Mariboru



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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
Izobraževalna matematika, dvopredmetni študij, 2. stopnja	Modul D1	1. ali 2.	1. ali 3.
Educational mathematics, double major 2 nd degree	Module D1	1. or 2.	1. or 3.

Vrsta predmeta / Course type

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:

Dušan PAGON

Jeziki /

Languages:

Predavanja /

Lectures:

SLOVENSKO/SLOVENE

Vaje / Tutorial:

SLOVENSKO/SLOVENE

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Jih ni.

Prerequisites:

There are none.

Vsebina:

- 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.

Content (Syllabus outline):

- Groups and subgroups. Symmetric groups.
- Conjugated elements and subgroups.
- Homomorphisms and isomorphisms of groups.
- 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.

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Temeljni literatura in viri / Readings:

W. Y. Gilbert, W. K. Nicholson, Modern Algebra with Applications, Wiley, Chichester 2004
S. Lang, Undergraduate Algebra, Springer, 2005
A. I. Kostrikin, Introduction to Algebra, Springer-Verlag, New York 1982
I. Vidav, Algebra, DMFA, Ljubljana 1980
N. Božović, Ž. Mihajlović. Uvod u teoriju grupa. Naučna knjiga, Beograd 1983

Cilji in kompetence:

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

Objectives and competences:

The students 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.

Prenesljive/ključne spretnosti in drugi atributi:

- Algebrske strukture z eno in dvema notranjima binarnima operacijama so osnova za razumevanje sodobne matematike.

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.

Transferable/Key Skills and other attributes:

- Algebraic structures with one and two inner binary operations are of principal importance for understanding the modern mathematics.

Metode poučevanja in učenja:

- Predavanja
- Seminarske vaje
- Individualno delo

Learning and teaching methods:

- Lectures
- Tutorial
- Individual work

Načini ocenjevanja:**Assessment:**

Način (pisni izpit, ustno izpraševanje, naloge, projekt)
Pisni test – praktični del
Izpit – teoretični del

Delež (v %) /
Weight (in %)
50%
50%

Type (examination, oral, coursework, project):
Written test – practical part
Exam – theoretical part

Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.

Each of the mentioned commitments must be assessed with a passing grade.

Pozitivna ocena pri pisnem testu je pogoj za pristop k izpitu.

Passing grade of the written test is required for taking the exam.

Reference nosilca / Lecturer's references:		
1. PAGON, Dušan, REPOVŠ, Dušan, ZAICEV, Mikhail. On the codimension growth of simple color Lie superalgebras. <i>J. Lie theory</i>, 2012, vol. 22, no. 2, str. 465-479. http://www.heldermann.de/JLT/JLT22/JLT222/jlt22017.htm. [COBISS.SI-ID 16070233] 2. PAGON, Dušan. Simplified square equation in the quaternion algebra. <i>International journal of pure and applied mathematics</i>, 2010, vol. 61, no. 2, str. 231-240. [COBISS.SI-ID 17718024] 3. GUTIK, Oleg, PAGON, Dušan, REPOVŠ, Dušan. On chains in H-closed topological pospaces. <i>Order (Dordr.)</i>, 2010, vol. 27, no. 1, str. 69-81. http://dx.doi.org/10.1007/s11083-010-9140-x. [COBISS.SI-ID 15502169] 4. GUTIK, Oleg, PAGON, Dušan, REPOVŠ, Dušan. The continuity of the inversion and the structure of maximal subgroups in countably compact topological semigroups. <i>Acta math. Hung.</i>, 2009, vol. 124, no. 3, str. 201-214. http://dx.doi.org/10.1007/s10474-009-8144-8, doi: 10.1007/s10474-009-8144-8. [COBISS.SI-ID 15212121] 5. PAGON, Dušan. The dynamics of selfsimilar sets generated by multibranching trees. <i>International journal of computational and numerical analysis and applications</i>, 2004, vol. 6, no. 1, str. 65-76. [COBISS.SI-ID 14037081]		