



Univerza v Mariboru

Fakulteta za naravoslovje  
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS						
<b>Predmet:</b>	<b>Izbrana poglavja iz algebre</b>					
<b>Course title:</b>	Selected topics in algebra					
<b>Študijski program in stopnja</b> Study programme and level	<b>Študijska smer</b> Study field			<b>Letnik</b> Academic year	<b>Semester</b> Semester	
Izobraževalna matematika, dvopredmetni študij, 2. stopnja	<b>Modul D1</b>			<b>1. ali 2.</b>	<b>1. ali 3.</b>	
Educational mathematics, double major 2 <sup>nd</sup> degree	Module D1			<b>1. or 2.</b>	<b>1. or 3.</b>	
<b>Vrsta predmeta / Course type</b>						
<b>Univerzitetna koda predmeta / University course code:</b>						
<b>Predavanja</b> Lectures	<b>Seminar</b> Seminar	<b>Sem. vaje</b> Tutorial	<b>Lab. vaje</b> Laboratory work	<b>Teren. vaje</b> Field work	<b>Samost. delo</b> Individ. work	<b>ECTS</b>
<b>30</b>		<b>30</b>			<b>60</b>	<b>4</b>
<b>Nosilec predmeta / Lecturer:</b> Dušan PAGON						
<b>Jeziki /</b> <b>Languages:</b>	<b>Predavanja/Lectures:</b>	SLOVENSKO/SLOVENE				
	<b>Vaje / Tutorial:</b>	SLOVENSKO/SLOVENE				
<b>Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:</b>				<b>Prerequisites:</b>		
Ne.				None.		
<b>Vsebina:</b>				<b>Content (Syllabus outline):</b>		
<ul style="list-style-type: none"> <li>• Grupe in podgrupe. Simetrične grupe.</li> <li>• Konjugiranost elementov in podgrup.</li> <li>• Homomorfizmi in izomorfizmi grup.</li> <li>• Podgrupe edinke in faktorske grupe.</li> <li>• Delovanje grupe na množico.</li> <li>• Sylowske podgrupe, izreki Sylowa.</li> <li>• Kolobar, ideal, obseg.</li> <li>• Karakteristika kolobarja. Končna polja.</li> </ul>				<ul style="list-style-type: none"> <li>• Groups and subgroups. Symmetric groups.</li> <li>• Conjugated elements and subgroups.</li> <li>• Group homomorphisms and isomorphisms.</li> <li>• Normal subgroups and factor groups.</li> <li>• Action of a group on a set.</li> <li>• Sylow subgroups, Sylow theorems</li> <li>• Ring, ideal, division ring.</li> <li>• The characteristics of a ring. Finite fields.</li> </ul>		

**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 izpit – praktični del

Ustni izpit – teoretični del

Pisni izpit – praktični del se lahko nadomesti z dvema delnima testoma (sprotne obveznosti).

Delež (v %) /  
Weight (in %)

50%

50%

Type (examination, oral,  
coursework, project):

Written exam – practical part

Oral exam – theoretical part

Written test – practical part can be replaced by two partial tests (mid-term testing).

**Reference nosilca / Lecturer's references:**

1. PAGON, Dušan, REPOVŠ, Dušan, ZAICEV, Mikhail. On the codimension growth of simple color Lie superalgebras. *J. Lie theory*, 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. *International journal of pure and applied mathematics*, 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.



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*Order (Dordr.)*, 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. *Acta math. Hung.*, 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](https://doi.org/10.1007/s10474-009-8144-8). [COBISS.SI-ID 15212121]

5. PAGON, Dušan. The dynamics of selfsimilar sets generated by multibranching trees. *International journal of computational and numerical analysis and applications*, 2004, vol. 6, no. 1, str. 65-76. [COBISS.SI-ID 14037081]