



| UČNI NAČRT PREDMETA / COURSE SYLLABUS | | | | | | | |
|---|--|--------------------------------------|------------------------------|--|----------------------------------|--------------------------------------|-----------------------------|
| Predmet: | | Teorija grup | | | | | |
| Course title: | | Group Theory | | | | | |
| | | | | | | | |
| Študijski program in stopnja Study programme and level | | Študijska smer Study field | | | Letnik Academic year | | Semester Semester |
| Izobraževalna matematika – enopredmetna, 2. Stopnja | | Modul I2 | | | 1. ali 2. | | 1. ali 3. |
| Educational mathematics - single-major, 2 nd cycle | | Module I2 | | | 1. or 2. | | 1. or 3. |
| Vrsta predmeta / Course type | | | | Izbirni / elective | | | |
| 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 |
| 45 | | | 30 | | | 105 | 6 |
| Nosilec predmeta / Lecturer: | | Mateja GRAŠIČ | | | | | |
| Jeziki / Languages: | | Predavanja / Lectures: | SLOVENSKO/SLOVENE | | | | |
| | | Vaje / Tutorial: | SLOVENSKO/SLOVENE | | | | |
| Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti: | | | | Prerequisites: | | | |
| Jih ni. | | | | None. | | | |
| Vsebina: | | | | Content (Syllabus outline): | | | |
| Simetrične grupe. Konjugirani elementi in podgrupe. Delovanje grupe na množico. Linearne grupe: osnovne lastnosti in primeri. | | | | Symetric groups. Conjugated elements and subgroups. The action of a group on a set. Linear groups: main properties and examples. | | | |
| Izreki Sylowa. Podajanje grupe z generatorji in relacijami. Direktni produkt grup. Ablove grupe. | | | | Sylow's theorems. Definition of a group by generators and relations. Direct product of groups. Abelian groups. | | | |
| Enostavne grupe. Komutant grupe, rešljivost končnih p-grup in grupe zgornje trikotnih matrik. | | | | Simple groups. Derived group, solvability of finite p-groups and the group of upper triangular matrices. | | | |
| Upodobitve grup: osnovni pojmi in primeri. | | | | Representations of groups: concepts and examples. | | | |

Temeljni literatura in viri / Readings:

W. Y. Gilbert, W. K. Nicholson, Modern Algebra with Applications, Wiley, Chichester 2004
 S. Lang, Undergraduate Algebra, Springer, 2005
 J. F. Humphreys, A Course in Group Theory, Oxford University Press, 1997
 I. Vidav, Algebra, DMFA, Ljubljana 1980

Cilji in kompetence:

Študentje poglobijo znanje osnove teorije grup in njihovih upodobitev.

Objectives and competences:

Students deepen the knowledge of the basic concepts of the theory of groups and their representations.

Predvideni študijski rezultati:

Znanje in razumevanje:

- Razumevanje osnovnih pojmov, povezanih z grupami in njihovimi upodobitvami.
- Poznavanje osnovnih značilnosti in tipičnih primerov grup.

Prenesljive/ključne spretnosti in drugi atributi:

- Pridobljena znanja prispevajo k razumevanju ostalih predmetov s področja algebre, geometrije in topologije.

Intended learning outcomes:

Knowledge and Understanding:

- To understand the main concepts of groups and their representations.
- To recognize the typical properties and main examples of groups.

Transferable/Key Skills and other attributes:

- The obtained knowledge contributes to better understanding of other subjects in fields of algebra, geometry and topology.

Metode poučevanja in učenja:

- Predavanja
- Seminarske vaje

Learning and teaching methods:

- Lectures
- Tutorial

Načini ocenjevanja:**Assessment:**

| Način (pisni izpit, ustno izpraševanje, naloge, projekt): | Delež (v %) / Weight (in %) | 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 exam – 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. |
| Opravljene pisni del izpita je pogoj za pristop | | Passing grade of the written exam is |

k teoretičnem delu izpita.

required for taking the oral exam.

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. [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. [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. [COBISS.SI-ID 18505817].~~
- ~~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](https://doi.org/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](https://doi.org/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]~~