Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Izbrana poglavja iz algebre**
Course title:	**Topics in Algebra**

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Matematika, 3. stopnja		**1. ali 2.**	**1. ali 3. ali 4.**
Mathematics, 3rd cycle		**1st or 2nd**	**1st or 3rd or 4th**

Vrsta predmeta / Course type	izbirni/elective
Univerzitetna koda predmeta / University course code:	

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30					**150**	**6**

Nosilec predmeta / Lecturer:	Matej Brešar

Jeziki / Languages:	**Predavanja / Lectures:**	Slovenski jezik Slovene
	Vaje / Tutorial:	

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Poznavanje temeljnih algebrskih struktur: grup, modulov, kolobarjev in polj.	Knowledge of fundamental algebraic structures: groups, modules, rings and fields.

Vsebina:

Izbrana so posebna poglavja iz teorije grup, teorije kolobarjev in modulov, neasociativne algebre ali katerega drugega modernega algebraičnega področja. Izbira poglavij je odvisna od interesa in raziskovalne usmerjenosti študentov ter trendov v sodobni algebri. Spodaj navedena literatura praviloma služi le kot osnova in je nadgrajena z bolj specializiranimi teksti

Content (Syllabus outline):

Special topics in group theory, ring and module theory, nonassociative algebra or some other area of contemporary algebra are chosen. The choice depends on students' interests and their research orientation, as well as on trends in modern algebra. The literature below in principle serves only as a basis, and is combined with more specialized

Temeljni literatura in viri / Readings:

- W. A. Adkins, S. H. Weintraub, Algebra. An approach via module theory. Springer-Verlag, 1999.
- M. Brešar, Introduction to Noncommutative Algebra, Springer, 2014.
- T. W. Hungerford, Algebra, Springer-Verlag, 1980.
- S. Lang, Algebra, Springer-Verlag, 1999.

Dodatna literatura / Additional Readings:

- Y. Bahturin, Basic structures of modern algebra, Kluwer AP, 1991.
- P. M. Cohn, Basic algebra. Groups, rings and fields, Springer-Verlag, 2003.
- P. A. Grillet, Abstract algebra, Springer-Verlag, 2007.
- I. M. Isaacs, Algebra. A graduate course, Brooks/Cole Publishing Company, 1994.
- A. W. Knapp, Basic algebra, Springer-Verlag, 2006.

Cilji in kompetence:

- Študentu predstaviti moderno algebraično področje, kar lahko služi kot uvod v raziskovalno delo;
- Doseči poglobljeno razumevanje teoretskih in metodoloških konceptov s področja algebre
- Razviti sposobnost za samostojno reševanje najzahtevnejših problemov iz algebre.
- Zmožnost razvijanja kritične refleksije na področju algebre

Objectives and competences:

- To present a modern algebraic area, which can serve as an introduction to student's research work;
- To achieve a deeper understanding of theoretical and methodological concepts of algebra
- To develop the ability for solving the most challenging problems in algebra.
- Ability to develop critical reflection in algebra

Predvideni študijski rezultati:

Znanje in razumevanje:

- poglobljeno znanje posebnega algebrskega področja;
- poglobljeno razumevanje nekaterih posebnih algebrskih pojmov.

Prenesljive/ključne spretnosti in drugi atributi:

- podlaga za raziskovalno delo na posebnem področju algebre.

Intended learning outcomes:

Knowledge and understanding:

- a deeper knowledge of a special algebraic topic;
- a deeper understanding of some special algebraic concepts.

Transferable/Key Skills and other attributes:

- a basis for research in a special algebraic area

Metode poučevanja in učenja:	Learning and teaching methods:
• predavanja; • priprava seminarja; • konzultacije; • samostojni študij.	• lectures; • seminar work; • consultations; • self-study.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Seminarska naloga Teoretični izpit	50 % 50 %	Seminar paper Theoretical exam

Reference nosilca / Lecturer's references:

1. BREŠAR, Matej, ŠEMRL, Peter. The Waring problem for matrix algebras. *Israel journal of mathematics*. Mar. 2023, vol. 253, iss. 1, str. 381-405. ISSN 0021-2172. https://link.springer.com/article/10.1007/s11856-022-2366-7, DOI: 10.1007/s11856-022-2366-7. [COBISS.SI-ID 149854467], [JCR]
kategorija: 1A2

2. BREŠAR, Matej, GODOY, M. L. C. Weighted Jordan homomorphisms. Linear and multilinear algebra. 2023, vol. 71, no. 8, str. 1265-1279. ISSN 0308-1087. https://www.tandfonline.com/doi/full/10.1080/03081087.2022.2059434, DOI: 10.1080/03081087.2022.2059434. [COBISS.SI-ID 152079875], [JCR]
kategorija: 1A2

3. BREŠAR, Matej. Automorphisms and derivations of finite-dimensional algebras. *Journal of algebra*. June 2022, vol. 599, str. 104-121. ISSN 0021-8693. https://www.sciencedirect.com/science/article/pii/S0021869322000746, DOI: 10.1016/j.jalgebra.2022.02.010. [COBISS.SI-ID 100274435], [JCR]
kategorija: 1A3

4. BREŠAR, Matej, ŠEMRL, Peter. The Waring problem for matrix algebras. *Israel journal of mathematics*. Mar. 2023, vol. 253, iss. 1, str. 381-405. ISSN 0021-2172. https://link.springer.com/article/10.1007/s11856-022-2366-7, DOI: 10.1007/s11856-022-2366-7. [COBISS.SI-ID 149854467], [JCR]
kategorija: 1A2

5. BREŠAR, Matej, SHULMAN, Victor S. On, around, and beyond Frobenius' theorem on division algebras. *Linear and Multilinear Algebra*. 2022, vol. 70, iss. 7, str. 1369-1381. ISSN 0308-1087. https://www.tandfonline.com/doi/full/10.1080/03081087.2020.1761281, DOI: 10.1080/03081087.2020.1761281. [COBISS.SI-ID 106388227], [JCR]
kategorija: 1A2