Course: Universal Algebra

Course instructors: Petar Marković

Course type: elective

Credit points ECTS: 10

Prerequisites: none, but desirable previous knowledge of basic Universal Algebra

Course objectives:

Introduction to the modern theories of Universal Algebra, particularly the Commutator Theory.

Learning outcomes:

Upon completing the course, the student should absorb the basic ideas, concepts and results of Commutator Theory. The main goal is to arrive at the operative level of knowledge of the theory, whereupon one can apply it in scientific research within a wide range of mathematical areas.

Course description (outline):

Examples of commutators in groups and rings. Congruence modular varieties and Day terms. Shifting Lemma and its applications. Several definitions of a commutator: centralizer, $[\alpha,\beta]$, $[\alpha,\beta]_s$, $M(\alpha,\beta)$. Basic properties of the commutator. Abelian, strongly Abelian, nilpotent and solvable congruences. Commutator in congruence modular varieties: equivalence of various definitions. Residuated lattice of congruences. Generating $[\alpha,\beta]$ in A⁴. Abelian and affine algebras in congruence modular varieties. Difference term. Permutability. Gumm terms and congruence modularity. Nilpotent algebras, decomposition and congruence regularity. Rings associated with varieties. Structure of algebras in congruence modular varieties.

References:

- 1. 1. R.Freese, R.N.McKenzie, *Commutator Theory for Congruence Modular Varieties*, Cambridge University Press, 1987.
- 2. 2. R.N.McKenzie, G.F.McNulty, W.F.Taylor, *Algebras, Lattices, Varieties, I*, Wadsworth and Brooks/Cole, Monterey, 1987.
- 3. 3. S.Burris, H.P.Sankappanavar, A Course in Universal Algebra, Springer-Verlag, 1981.
- 4. D. Hobby, R. McKenzie, *The Structure of Finite Algebras*, Amer. Math. Soc. 1988.

| Active teaching hours: 5 | Theoretical classes: 5 | Practice classes: |
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| 36.3.3.0.3.1 | | |

Methods of teaching:

The lectures use classical teaching methods, aided by contemporary information and communication technology and interaction with students. Students' progress during the course is monitored by homework assignments and by means of writing and defending seminar papers. The goal of the final oral exam is to test the comprehensive understanding of the material of the course.

Grading structure (100 points)

Homework and seminars: 30 points. Final oral exam: 70 points.

Начин провере знања могу бити различити : (писмени испити, усмени испт, презентација пројекта, семинари итд.....

*максимална дужна 1 страница А4 формата