Study programme(s): Mathematics

Level: doctoral studies

Course title: Universal algebra 2 (AL-19)

Lecturer: Petar V. Marković

Status: elective

ECTS: 10

Requirements: Universal algebra 1 (AL-18)

Learning objectives:
Acquainting the students with advanced concepts, results and proof techniques of Universal algebra.

Learning outcomes:
The student will acquire understanding of advanced concepts and methods which allow conducting research in the area of universal algebra, particularly of the classification of finite algebras.

Syllabus:
Polynomial clones and induced structure of a subset of the algebra. Theorem by Palfy and Pudlak. Fundamental theorem of finite algebras. Basic properties of minimal sets. Structure of minimal algebras. Five types. Type 2. Nonabelian types. E-minimal algebras. Types of covering in a congruence lattice. Subtraces and snags. Nonabelian covers and pseudo-complements. Semidistributive laws (meet-, join-). Lattice theoretic characterization of nonabelian covers. Solvability and congruence meet-semidistributivity. Willard terms and the Willard finite basis theorem. Congruence modularity and distributivity. Free spectra. Generative complexity.

Literature
1. D.Hobby, R.N.McKenzie, The Structure of Finite Algebras, American Mathematical Society, Providence, 1988.
2. R.N.McKenzie, G.F.McNulty, W.F.Taylor, Algebras, Lattices, Varieties, I, Wadsworth and Brooks/Cole, Monterey, 1987.
3. S.Burris, H.P.Sankappanavar, A Course in Universal Algebra, Springer-Verlag, 1981.

Weekly teaching load				Other: 0
Lectures: 2	Exercises 0	Other forms of teaching: 0	Student research: 6	

Teaching methodology
Lectures are presented using classical teaching methods. The students are given homework problems which are discussed in class throughout the semester. On one colloquium the students demonstrate their ability to independently solve problems related to the course material. The final exam is oral and the student is supposed to demonstrate a general understanding of the presented theoretical material.

Grading method (maximal number of points 100)

Pre-exam obligations	**points**	**Final exam**	**Points**
Colloquium	30	Oral exam	70