Faculty of Science and Mathematics / Mathematics / Algebra 1

Prerequisites	Prerequisities do not exist
Aims	Introduction to the basic algebraic structures.
Lecturer / Teaching assistant	Sanja Jančić-Rašović
Metdod	Lectures, exercises,consultations.
Week 1, lectures	The notion of operation. Properties of operations.The notion of algebraic structure (algebra).
Week 1, exercises	The notion of operation. Properties of operations.The notion of algebraic structure (algebra).
Week 2, lectures	Subalgebra. Congruence relation. Factor algebra
Week 2, exercises	Subalgebra. Congruence relation. Factor algebra
Week 3, lectures	Groupoid. Homomorphism of groupoids.Fundamental theorem of groupoid homomorphisms
Week 3, exercises	Groupoid. Homomorphism of groupoids.Fundamental theorem of groupoid homomorphisms
Week 4, lectures	Semigroup. Some classes of semigroups
Week 4, exercises	Semigroup. Some classes of semigroups
Week 5, lectures	Algebra of natural numbers.Peano axioms.Algebra of sets, relation algebra and the algebra of functions.
Week 5, exercises	Algebra of natural numbers.Peano axioms.Algebra of sets, relation algebra and the algebra of functions.
Week 6, lectures	Lattices. Boolean algebras.
Week 6, exercises	Lattices. Boolean algebras.
Week 7, lectures	Interim exam.
Week 7, exercises	Interim exam.
Week 8, lectures	Groups. The basic properties and examples
Week 8, exercises	Groups. The basic properties and examples
Week 9, lectures	Subgroups. The basic properties of subgroups. Lagrange's theorem (group theory).
Week 9, exercises	Subgroups. The basic properties of subgroups. Lagrange's theorem (group theory).
Week 10, lectures	Normal subgroups. Factor group
Week 10, exercises	Normal subgroups. Factor group
Week 11, lectures	Group homomorphism.Fundamental theorem of group homomorphisms.
Week 11, exercises	Group homomorphism.Fundamental theorem of group homomorphisms.
Week 12, lectures	Isomorphism theorems for groups. Inner automorphisms.
Week 12, exercises	Isomorphism theorems for groups. Inner automorphisms.
Week 13, lectures	Cyclic groups. Commutator (derived) subgroup
Week 13, exercises	Cyclic groups. Commutator (derived) subgroup
Week 14, lectures	Correctional exam for interim exam.
Week 14, exercises	Correctional exam for interim exam.
Week 15, lectures	Free groups.
Week 15, exercises	Free groups.
Student obligations	Students have to attend lectures and exercises, take interim exam and final exam.
Consultations	After the lectures
Workload	A week 2 hours of lectures 2 hours of exercise 2 hours and 40 minutes of student work, including consultations During the semester Teachig and the final exam: 16x(5h 20min)=85h i 20 min Necessery preparation (before semester administration, enrollment and verification): 2x5h 20min=10h 40min. Total hours for the course::4x30 =120 hours Additional work : 0 to 24 hours Structure:: 85h 40min(lecture)+10h40min(preparation)+24h (additional work)
Literature	

Examination metdods	- Interim exam 50 points - Final exam 50 points Grade A B C D E 91-100 81-90 71-80 61-70 51-60
Special remarks	
Comment	
Learning outcomes	After successful completion of this course the student will be able to: 1. Define the basic algebraic structures: groupoid, semigroup, monoid,group, ring and the field. 2. Describe algebra of sets,the algebra of functions and the algebra of natural numbers. 3. Explain and transmit the notion of lattice and complemented lattice. 4. Explain and transmit the basic notions of group theory such as the notions of subgroup, normal subgroup, factor group, cyclic groups, derived subgroup, group homomorphism and inner automorphism. 5. Prove and apply in practice Lagrange”s theorem and the fundamental theorem of group homomorphisms.