Level: bachelor

Course title: Algebra for computer scientists (I222)

Status: obligatory on the module *Information technologies*

ECTS: 8

Requirements: none

Learning objectives:
Introducing students to the basic concepts of algebra and its place in mathematics. Introducing practical techniques for numbers, polynomials, systems of linear equations, determinants and matrices.

Learning outcomes:
Minimal. Understanding the basic algebraic structures and related notions, as well as the ability to solve simple problems. Understanding constructions and properties of sets of numbers. Problem-solving using mathematical induction, solving systems of congruencies and Diophantine equations, finding roots of polynomials. Mastering methods of solving systems of linear equations, calculating determinants and finding the inverse matrix.
Desirable. A successful student will be able to solve advanced problems about algebraic structures, numbers and polynomials, to recognize basic algebraic laws, structures and their properties in various areas of mathematics.

Syllabus
Theoretical instruction: Algebraic structures. Groupoids and their properties, subgroupoids, factor-groupoids, homomorphisms, direct products. Semigroups, semigroups of words. Groups. Rings. Fields. Lattices and Boolean algebras. Natural numbers, integers. The Euclid's algorithm. The fundamental theorem of arithmetic. Linear Diophantine equations. Rational, real and complex numbers. Systems of linear equations and Gaussian elimination. Matrices and determinants. Cramer's rule. The inverse matrix. Polynomials, the ring of polynomials, divisibility and roots of polynomials. The fundamental theorem of algebra.

Practical instruction: follows theoretical instructions.

Weekly teaching load				Other: -
Lectures: 3	Exercises: 3	Other forms of teaching:-	Student research: -	