Level: bachelor	
Course title: Foundations of computer science 1 (I211)	
Status: obligatory	
ECTS: 8	
Requirements: none	

Learning objectives

Acquiring the basic mathematical knowledge and skills essential for understanding the formal models of advanced computer science concepts.

Learning outcomes

Student should be able to understand and analyze formal models of simple computer science phenomena based on the naive set theory.

Syllabus

Theoretical instruction

Naive set theory, notation, operations on sets, basic properties of operations on sets. Relations. Binary relations. Special binary relations and their first properties. Operations on relations. Functions. Function composition. Surjective, injective, bijective functions. Invertibility and the inverse of a bijection. Kernel and image of a function. Cardinality of sets. Finite and countable sets. Propositional logic. Tautologies, modus ponens. Boolean functions and circuits. Normal forms (conjunctive, disjunctive) and completeness. Predicate logic, quantifiers. Models of predicate logic and validity. Syntax of the predicate logic. partially ordered sets, special elements. Representations of partially ordered sets. Infima, suprema and lattices. Complemented lattices and Boolean algebras (informal).

Practical instruction

Sets. Induction. Integers. The structure of mathematical proofs and standard proof techniques. Special binary relations. Functions. Modelling computer science phenomena in naive set theory using relations and functions. Describing the properties of formal models using predicate logic. Boolean functions and circuits. Lattices.

Weekly teaching load				Other: 0
Lectures: 3	Exercises: 3	Other forms of teaching: 0	Student research: 0	