Level: bachelor

Course title: Formal languages and automata (I142)

Status: mandatory for the *Computer Science* module

ECTS: 8

Requirements: none

Learning objectives:
Introducing the students to fundamental and abstract concepts of theoretical computer science.

Learning outcomes:
Minimal: Students should be able to recognize the basic identities of the algebra of languages, find the language of a given finite automaton, construct the minimal automaton for a given regular language, find the language of a given grammar, construct a grammar which generates a given language, and differentiate between various types of languages.
Desired: Understanding of the basic ideas and principles of automata theory and theory of formal languages, as well as understanding the essence of decidability questions in theoretical computer science.

Syllabus:
Theoretical instruction
Algebra of languages. Semiautomata. Finite automata and regular languages. Minimization of automata. Automata with output. Generative grammars. Regular, context-free and context sensitive grammars. Recursive and recursively enumerable languages. Decidability problems.
Practical instruction
Manipulating the identities of the algebra of languages. Construction of semiautomata and monoid of a semiautomaton. Analysis and synthesis of finite automata. Pumping Lemma applications. Minimization of finite automata. Determining the language of a grammar and determining the grammar of a language.

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