Study programmes: Bachelor studies - Mathematics

Course name: RM10 - Lexical analysis with applications

Lecturers: Filip Marić and other teachers from the Department of Computer science

Status: Compulsory

ECTS: 5

Attendance prerequisites: RM01, RM02

Course aims: Gaining general and specific knowledge about theoretical aspects, programming techniques and methods of lexical analysis of programming languages and their autonomous applications.

Course outcome: After the course, the student has learned the concepts related to theoretic and application aspects of the theory of regular languages and finite automata and their various applications. He learned how to use the tools used for lexical analysis (e.g. Lex/Flex) and the application of regular languages in various script languages (e.g. Python).

Course content:

- Elements of formal language theory (alphabet, word, language, operations with languages).
- Regular languages and regular expressions. Implementation in different tools and languages (e.g., Python, grep, sed, awk).
- Finite automata. Kleene theorem. Glushkov's construction. Thompson's construction. Removing epsilon moves.
- Deterministic finite automata. Subset construction.
- Minimal automaton (quotients, Myhill-Nerode theorem, Moore's construction).
- Properties of regular languages (product of automata, set operations over automata, pumping lemma).
- Lexical analysis. Greedy algorithm. System Lex/Flex.
- Elements of lexical analysis of natural languages.
- Other applications of lexical analysis.

Literature:

1. Д. Витас: Преводиоци и интерпретатори, Математички факултет, Београд, 2006.
2. A. Aho; R. Sethi; J. Ullman: Compilers - Principles Techniques and Tools, Addison-Wesley, 2006.
3. J. R. Levine et al: lex and yacc, O'Reilly Associates, 1992.
(наставник може изабрати другу одговарајућу актуелну литературу)

Number of hours: 4	**Lectures: 2**	**Tutorials: 2**	**Laboratory: -**	**Research: -**

Teaching and learning methods: Frontal, group, individual, practical.

Assessment (maximal 100 points)

Course assignments	**points**	**Final exam**	**points**
Lectures	20	Written exam	-
Exercises / Tutorials	20	Oral exam	-
Colloquia	-	Written-oral exam	60
Essay / Project	-		