<table>
<tr><td colspan="5">Study programme(s): Computer Science</td></tr>
<tr><td colspan="5">Level: bachelor</td></tr>
<tr><td colspan="5">Course title: Theoretical Computer Science</td></tr>
<tr><td colspan="5">Lecturer: Miloš Stojaković</td></tr>
<tr><td colspan="5">Status: obligatory</td></tr>
<tr><td colspan="5">ECTS: 6</td></tr>
<tr><td colspan="5">Requirements: Discrete Structures 1</td></tr>
<tr><td colspan="5">Learning objectives
Students should learn and understand the basic concepts and methods of computer science, all the way from its historical context, laying a solid foundation for an algorithmic approach to problem solving.</td></tr>
<tr><td colspan="5">Learning outcomes
Minimum: At the end of the course, it is expected that a student understands basic notions of complexity theory, using it to distinguish between different classes of problems.
Desirable: At the end of the course, it is expected that a successful student masters the concept of hardness, being able to classify and tackle some standard algorithmic problems based on their complexity.</td></tr>
<tr><td colspan="5">Syllabus
Alphabets, words, languages, measuring the information content of words, representation of algorithmic tasks, decidability. Finite automata, regular and context-free grammars.
Turing machines and computability. Complexity theory, space and time complexity. NP-hardness, polynomial reductions, NP-completeness.
Design of polynomial algorithms, examples. Algorithms for hard problems, examples.</td></tr>
<tr><td colspan="5">Literature
• M. Sipser, Introduction to the Theory of Computation. Thomson Learning, 2012.
• J. Hromkovič, Theoretical Computer Science: Introduction to Automata, Computability, Complexity, Algorithmics, Randomization, Communication, and Cryptography, Springer, 2011.
• J.E. Hopcroft, R. Motwani, J.D. Ullman, Introduction to Automata Theory, Languages, and Computations, Prentice Hall, 2006.</td></tr>
<tr><td colspan="4">Weekly teaching load</td><td rowspan="2">Other:
0</td></tr>
<tr><td>Lectures:
3</td><td>Exercises:
2</td><td>Practical Exercises:
0</td><td>Student research:
0</td></tr>
<tr><td colspan="5">Teaching methodology
Blackboard lectures, blackboard exercises.</td></tr>
<tr><td colspan="5">Grading method (maximal number of points 100)</td></tr>
<tr><td>Pre-exam obligations</td><td>points</td><td>Final exam</td><td colspan="2">points</td></tr>
<tr><td>Colloquia</td><td>50</td><td>Oral exam</td><td colspan="2">50</td></tr>
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