|  |
| --- |
|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | **Faculty of Sciences and Mathematics** |
| **GENERAL INFORMATION** |
| Study program  | Computer Science |
| Study Module (if applicable) | Information management, Software development |
| Course title | Theory of Algorithms, Automata and Languages |
| Level of study | [ ] Bachelor [x]  Master’s [ ]  Doctoral |
| Type of course | [x]  Obligatory [ ]  Elective |
| Semester  |  [ ]  Autumn [x] Spring |
| Year of study  | first |
| Number of ECTS allocated | 8.00 |
| Name of lecturer/lecturers | Jelena Ignjatović |
| Teaching mode |  [x] Lectures [ ] Group tutorials [ ]  Individual tutorials [ ] Laboratory work [ ]  Project work [ ]  Seminar [ ] Distance learning [ ]  Blended learning [ ]  Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| Introduction to basic forms and models of calculating, especially in calculating with abstract mathematical models, as well as the formal languages and grammars. At the end of the course a student would master basic calculation models with help of abstract mathematical models, would gain insight which problems can be solved algorithmically, which not, and to gain knowledge about the practical applications of formal languages and automata in computer sciences. |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| **Introduction to automata theory**;**Free monoid of words** -Words, order on the monoid of words, languages, generative grammars, rules of implicationChomsky’s hierarchy; **Deterministic finite automata** (**DFA**) – achievable part of an automaton;**Minimization of automata** - congruence relations on automata, homomorphism between automata, derivatives (factors) of a language, algorithms for minimization of automata;**Non-deterministic finite automata** (**NFA**) - numerous of algorithms for determinization of automata; **Regular languages -** properties of regular languages, regular grammars, Kleene ​​Theorem, minimum machine language;**Context-free languages –** context-free grammars, push-down automata as their representation, application: parsers, mark-up languages, XML;**Context-dependent languages –** context-dependent grammars, Turing machines as representation of these languages; **Automata with outputs.** |
| **LANGUAGE OF INSTRUCTION** |
| [x] Serbian (complete course) [ ]  English (complete course) [ ]  Other \_\_\_\_\_\_\_\_\_\_\_\_\_ (complete course)[ ] Serbian with English mentoring [ ] Serbian with other mentoring \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **ASSESSMENT METHODS AND CRITERIA** |
| **Pre exam duties** | **Points** | **Final exam** | **Points** |
| **Activity during lectures** | **5** | **Written examination** | **--** |
| **Practical teaching** | **10** | **Oral examination** | **45** |
| **Teaching colloquia** | **40 (2x20)** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |