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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | Faculty of Sciences and Mathematics |
| **GENERAL INFORMATION** |
| Study program  | **Computer Science** |
| Study Module (if applicable) |  |
| Course title | Symbolic computation |
| Level of study | [x] Bachelor [ ]  Master’s [ ]  Doctoral |
| Type of course | [ ]  Obligatory [x]  Elective |
| Semester  |  [x]  Autumn [ ] Spring |
| Year of study  | 3 |
| Number of ECTS allocated | 8 |
| Name of lecturer/lecturers | Predrag S. Stanimirović |
| Teaching mode |  [x] Lectures [ ] Group tutorials [ ]  Individual tutorials [ ] Laboratory work [ ]  Project work [x]  Seminar [ ] Distance learning [ ]  Blended learning [ ]  Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| *Introduction to the basic ideas, concepts and results of symbolic computation. Possibility of package MATHEMATICA in symbolic computation and data manipulation. Apply symbolic processing in main algorithms.* |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| **Basic concepts:** Computer Algebra systems. Integers. Rational number arithmetic. Polynomials: Elementary operations on polynomials. Single variable polynomials. Multivariate polynomials. Polynomial division and expansions. Polynomial decomposition. Polynomial simplification. Automatic simplification and expression structure. **MATHEMATICA as programming language:** Expressions and values of expressions. Prefix, postfix and infix notation. Lists. Patterns. Transformation Rules and Definitions. Functions and Programs. Functional operations. **Simplification.** Transformation rules and definitions. Functional operations. Functions as the first order data types. Repetitive applications of functions. Applications of functions on lists and other expressions. Pure functions. Higher order functions. **Solving equations and inequalities.** Complex polynomial systems. The MATHEMATICA functions Reduce, Resolve, and FindInstance; Advanced string patterns: Regular expressions and string expressions. **Dynamic interactivity. Linear algebra.**  |
| **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** | **10** | **Written examination** | **20** |
| **Practical teaching** |  | **Oral examination** | **50** |
| **Teaching colloquia** | **20** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |