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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | **Faculty of Sciences and Mathematics** |
| **GENERAL INFORMATION** |
| Study program  | **Mathematics, Computer Science** |
| Study Module (if applicable) |  |
| Course title | **Theory of Semigroups and Semirings** |
| Level of study | [ ] Bachelor [ ]  Master’s [x]  Doctoral |
| Type of course | [ ]  Obligatory [x]  Elective |
| Semester  |  [ ]  Autumn [ ] Spring |
| Year of study  |  |
| Number of ECTS allocated | 12.00 |
| Name of lecturer/lecturers | **Miroslav Ćirić** |
| Teaching mode |  [x] Lectures [ ] Group tutorials [ ]  Individual tutorials [ ] Laboratory work [ ]  Project work [ ]  Seminar [ ] Distance learning [ ]  Blended learning [ ]  Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| The purpose of course is to master the basic ideas, concepts and results of theory of semigroups and theory of semirings, as well as their applications, especially in theoretical computer science. Upon completion of the course, students should gain a thorough knowledge of the basic ideas, concepts and results of theories of semigroups and semirings, and to be able to independently apply this knowledge in other mathematical and scientific disciplines. |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| Semigroups, subsemigroups, generating sets, idempotents and group elements, semigroups of binary relations, transformation semigroups, ideals and Rees congruence, ideal and retractive extensions, free semigroups and monoids, Green’s relations, regular and completely regular elements of a semigroup, generalizations of regularity, completely simple and completely 0-simple semigroups, inverse semigroups, orthodox semigroups, semilattice decompositions of semigroups, band decomposition of semigroups, decompositions of semigroups with zero, subdirect decompositions of semigroups, composition of semigroup, identities and semigroup varieties, semirings, ordered semirings, complete semirings, star operation, continuous semirings, formal power series over a semiring, rational power series, matrices over a semiring, dioids, semimodules, anti-rings, additively idempotent semirings, inclines.  |
| **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** | **–** |
| **Practical teaching** | **20** | **Oral examination** | **70** |
| **Teaching colloquia** | **–** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |