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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | **Faculty of Sciences and Mathematics** |
| **GENERAL INFORMATION** |
| Study program  | **Mathematics** |
| Study Module (if applicable) |  |
| Course title | **Linear Algebra over 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 knowledge on systems of linear equations and matrices over various types of semirings, on solving matrix equations and inequalities over semirings, and their applications. Upon completion of the course, the student should gain a thorough knowledge of linear algebra over 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)** |
| Semirings, complete semirings, semimodules, residuated semirings and semimodules, matrices over semirings, matrix calculus over anti-rings, ordered semirings, inclines, dioids, max-plus, min-plus and max-min algebras, fuzzy matrix calculus, transitive closure, linear dependence and independence in semimodules, eigen and sub-eigen vectors, solving systems of linear equations and inequalities, matrix inequalities and equations over dioids, max-plus, min-plus and max-min algebra, applications in optimization, data analysis and other fields.  |
| **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** |