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|  **UNIVERSITY OF NIŠ** |
| **Course Unit Descriptor** | **Faculty**  | Faculty of Science and Mathematics |
| **GENERAL INFORMATION** |
| Study program  | **Mathematics** |
| Study Module (if applicable) | Probability, statistics and financial mathematics |
| Course title | Stochastic dynamic models |
| Level of study | ☐Bachelor **X** Master’s ☐ Doctoral |
| Type of course | ☐ Obligatory **X** Elective |
| Semester  |  ☐ Autumn **X**  Spring |
| Year of study  | 2 |
| Number of ECTS allocated | 6 |
| Name of lecturer/lecturers | dr Marija Krstić |
| 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 subject of this course is introduction of random influences into dynamic systems described by ordinary differential equations and stability problems related to stochastic models. This should enable students to apply their knowledge in solving simple population and epidemiological problems. |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| Simple Markov population processes: Simple Poisson process, Pure death process, Pure birth process, Simple birth-death process, Simple immigration- birth-death process, Simple immigration-emigration process. General Markov population processes.Classification of the solutions (states): Equilibrium solutions, Time-dependent solutions and Diffusion aproximations of the solutions.  The random walk. The Fokker-Planck diffusion equation. Two-species interaction processes: Competition processes, Predator-prey processes, epidemic processes. |
| **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** | **0** | **Written examination** | **35** |
| **Practical teaching** | **0** | **Oral examination** | **35** |
| **Teaching colloquia** | **30** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |