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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) | Mathematical models in physics |
| Course title | Stochastic processes |
| Level of study | ☐Bachelor x Master’s ☐ Doctoral |
| Type of course | ☐ Obligatory x Elective |
| Semester  | ☐Autumn xSpring |
| Year of study  | I |
| Number of ECTS allocated | 7.5 |
| Name of lecturer/lecturers | Prof. dr Marija Milošević |
| Teaching mode |  xLectures ☐Group tutorials ☐ Individual tutorials ☐Laboratory work ☐ Project work ☐ Seminar ☐Distance learning ☐ Blended learning ☐ Other |
| **PURPOSE AND OVERVIEW (max. 5 sentences)** |
| *The purpose of this course is to provide the students with the opportunity to get knowledge of the fundamentals of stochastic processes. Students should be able to apply the knowledge in the framework of economy, population dynamics and optimization.*  |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| *Basic concepts and definitions: trajectories and the family of finite-dimensional distributions, Kolmogorov theorem, stochastic equivalence, separability, measurability, continuity.**Some classes of stochastic processes: Gaussian processes, processes with independent increments, processes with finite second moments, stationary processes, spectral representation of correlation function, Markov processes.* *Conditional expectation with respect to sigma algebra and random variable.**Conditional probability.* *Discrete and continuous martingales: stochastic basis, stopping time, stopped process.* *Brownian motion: definition, properties of trajectories, martingale property, stochastic exponent, Gaussian white noise.* *Stochastic differential equations: stochastic Ito integral, Ito formula, geometric Brownian motion, Brownian bridge.*  |
| **LANGUAGE OF INSTRUCTION** |
| xSerbian (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** |  | **Oral examination** | **50** |
| **Teaching colloquia** | **40** | **OVERALL SUM** | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** |