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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) | | | |  | | |
| Course title | | | | Stochastic Processes | | |
| Level of study | | | | ☐Bachelor ☐ Master’s x Doctoral | | |
| Type of course | | | | ☐ Obligatory x Elective | | |
| Semester | | | | x Autumn ☐Spring | | |
| Year of study | | | | I | | |
| Number of ECTS allocated | | | | 12 | | |
| 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 foundations of the theory of stochastic processes in continuous time and stochastic calculus which may serve as a guide to the introduction of other special courses. Students should be able to learn major courses of stochastic processes and their applications.* | | | | | | |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** | | | | | | |
| * The space of finite-dimensional distributions.   • Separability, measurability and continuity.  • Gaussian processes.  • Processes with independent increments.  • Second-order processes. Orthogonal expansions and Hilbert space of processes.  • Processes with orthogonal increments.  • Stationary processes. Spectral representation. Linear transformations. Ergodicity.  • Markov processes. Equivalent definitions. The strong Markov property. Homogeneous Markov processes. Diffusion equations (Kolmogorov's and Feller's equations). Diffusion processes. Birth and death processes.  • Brownian motion. The Construction of Brownian motion and properties of trajectories. Martingale properties and stopping time properties.  • Stochastic measures and integrals. | | | | | | |
| **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** |  | | **Written examination** | | | **35** |
| **Practical teaching** |  | | **Oral examination** | | | **35** |
| **Teaching colloquia** | **30** | | **OVERALL SUM** | | | **100** |
| **\*Final examination mark is formed in accordance with the Institutional documents** | | | | | | |