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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 | Probability theory |
| Level of study | ☐Bachelor x Master’s ☐ Doctoral |
| Type of course | x Obligatory ☐ Elective |
| Semester  |  x Autumn ☐Spring |
| 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 student with the opportunity to get knowledge of the axiomatic of the probability theory. Students should be able to apply the knowledge within stochastic modelling, financial and actuarial mathematics and other areas of applied mathematics.*  |
| **SYLLABUS (brief outline and summary of topics, max. 10 sentences)** |
| *Kolmogorov axioms: probability space, random variables, independence, transformations of random variables.* *Mathematical expectation as Lebesgue integral: definition and properties, moment inequalities, mathematical expectation of the random vector, covariance matrix.**Characteristic functions: definitions and properties.**Sequences of random variables: convergence, central limit theorems, zero-one law, laws of large numbers, law of iterated logarithm.**Multivariate normal distribution: parameters of distribution, marginal distributions, distribution of the linear combination.**Markov chains: Markov property, homogenous Markov chains, Chapman-Kolmogorov equations, ergodicity, homogenous Markov chains with continuous time, homogenous Poisson process.**Brownian motion: definition and basic properties.* |
| **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** |