Study programmes: BACHELOR STUDIES - Mathematics

Course name: Probability and statistics A

Lecturers: Pavle N. Mladenović

Status: Compulsory for modules ML,MM, MR, MP and MA

ECTS: 5

Attendance prerequisites: No prerequisites.

Course aims: Getting familiar with all more important concepts of probability, based on measure theory.

Course outcome: The student got knowledge of the basic concepts of probability and typical probabilistic models, which are applicable in many other disciplines.

Course content:

Discrete probability space. Variations, permutations, combinations. Conditional probability. Formula of total probability. Independence of events. Discrete random variables. Mathematical expectation and variance of discrete random variables. Discrete random vectors. Independence of random variables. Binomial distribution and Bernoulli's theorem. Chebyshev's law of large numbers. The de Moivre–Laplace theorem and normal distribution. Poisson's distribution. Symmetric random walk on the line. Symmetrization principle. The position of the particle after n steps in the symmetric random walk on the line. Average waiting time for return at symmetric random walk. Arcsine law. Non symmetric random walk. Sigma-algebra. Axioms of probability theory. Absolutely continuous distributions (normal, uniform, exponential). Cantor's singular distribution function. Decomposition of distribution function. Multi-dimensional distribution function. Probability distribution in infinite dimensional space. Random variable (general definition). Mathematical expectation. Variance. Independence of random variables. Covariance and coefficient of correlation. Conditional distribution.

Literature:

1. Pavle Mladenović: Elementaran uvod u verovatnoću i statistiku, drugo izdanje, Društvo matematičara Srbije, Beograd, 1998.
2. Pavle Mladenović: Verovatnoća i statistika, četvrto izdanje, Matematički fakultet, Beograd, 2008.
3. J. Vukmirović, P. Mladenović: Teorija verovatnoća, zadaci i problemi, Beograd, 2013.

Number of hours: 4	**Lectures**: 2	**Tutorials**: 2	**Laboratory**: -	**Research**: -

Teaching and learning methods: Frontal / Tutorial

Assessment (maximal 100 points)

Course assignments	points	Final exam	points
Lectures	-	Written exam	-
Exercises / Tutorials	10	Oral exam	40
Colloquia	40	Written-oral exam	-
Essay / Project	10		