Course Unit Descriptor

Study Programme: Computer Science	
Course Unit Title: Discrete Probability and Statistics	
Course Unit Code: CS351	
Name of Lecturer(s): Miloš Stojaković	
Type and Level of Studies: Bachelor Academic Degree	
Course Status (compulsory/elective): Compulsory	
Semester (winter/summer): Summer	
Language of instruction: Serbian (primary), English (secondary)	
Mode of course unit delivery (face-to-face/distance learning): Face-to-face	
Number of ECTS Allocated: 6	
Prerequisites: Discrete Structures 1, Discrete Structures 2	

Course Aims:

Students should learn and understand the basic notions and concepts of probability theory, several standard approaches in statistical analysis, as well as their connections with computer science.

Learning Outcomes:

Minimum: At the end of the course, it is expected that a student is able to perform basic discrete probabilistic analysis based on counting, and master standard statistical methods.

Desirable: At the end of the course, it is expected that a successful student is able to apply his/her knowledge of probability theory in a more complicated setting, possibly requiring a deeper analysis.

Syllabus:

Counting in combinatorics and discrete probability spaces. Formal definition of a probability space. Probability measure, independence, random variables. Discrete and continuous distributions, conditional probability. Expectation, properties. Variance, properties. Limit theorems. Simulations.

Randomness and computation. Probability in information theory.

Statistical analysis. Parameter estimation, maximum likelihood and moment methods, tests, confidence intervals.

Required Reading:

S. Ross, A First Course in Probability, Pearson, 2014.

J. Rice, Mathematical statistics and data analysis, Duxbury, 2006.

M. Mitzenmacher, E. Upfal. Probability and computing: Randomized algorithms and probabilistic analysis, Cambridge University Press, 2005.

Weekly Contact Hours: 4	**Lectures:** 2	**Practical work:** 2

Teaching Methods:

Blackboard lectures, blackboard exercises.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Active class participation		written exam	
Practical work		oral exam	50
Preliminary exam(s)	50	…….	

Seminar(s)			
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			