1.	Course Title	Probability and statistics
2.	Code	F18L2W006
3.	Study program	Software engineering and information systems
4.	Study Program Organizer	Faculty of Computer Science and Engineering
5.	Degree (first, second, third cycle)	first cycle
6.	Academic year / semester 2 / winter / optional	7. ECTS credits 6
8.	Teacher	full professor Zhaneta Popeska, full professor Verica Bakeva, associate professor Marija Mihova, assistant professor Natasha Ilievska, assistant professor Biljana Tojtovska, assistant professor Aleksandra Popovska Mitrovikj
9.	Course enrollment prerequisites	Калкулус или Калкулус 2 или Бизнис статистика
10.	Course program goals (competencies): Students will be introduced to basic concepts of probability and statistical analyses with their application in computer sciences. The knowledge of this subject is solid support for advanced courses where elements of probability and statistics are applied.	
11.	Course program content: Elements of combinatorics. Probability of random events. Probability properties. Discrete probability space. Classical definition of probability. Conditional probability. Bayes' rule. Independence of random events. Bernoulli's scheme. Discrete and continuous distributions. Random vectors: marginal and conditional distributions. Functions of random variables. Numerical characteristics of random variables: mean, variance of random variable, correlation coefficient between two random variables. Law of large numbers.Central limit theorem. Elements of statistics: population and sample, parameters and statistics. Elementary data analyses and descriptive statistics. Mathematical model of random sample. Distributions of sample statistics: Normal distribution, t-distribution, Chi-square distribution and F-distribution. Point estimation: method of moments, maximum likelihood method and confidence intervals. Parametric tests. Nonparametric tests. Linear regression, the least squares estimators.	
12.	Learning methods: Lectures using presentations, interactive lectures, exercises (using equipment and software packages), teamwork, case studies, invited guest lecturers, independent preparation and defense of a project assignment and seminar work.	
13.	Total available time	6 ECTS x 30 hours = 180 hours

14.	Distribution of the available time		45 + 45 + 0 + 45 + 45 = 180 hours	
15.	Teaching activity forms	15.1.	Lectures – theoretical teaching	45 hours
		15.2.	Exercises (laboratory, auditory), seminar papers, teamwork	45 hours
16.	Other activity forms	16.1.	Project Tasks	0 hours
		16.2.	Independent Learning Tasks	45 hours
		16.3.	Home learning	45 hours

17.	Assessment methodology		
	17.1.	Tests	0 points
	17.2.	Seminar paper/project (presentation: written and oral)	0 points
	17.3.	Activity and learning	0 points
	17.4.	Final exam	100 points

18.	Assessment criteria (points/grade)	up to 50 points	5 (five) (F)
		51 to 60 points	6 (six) (E)
		61 to 70 points	7 (seven) (D)
		71 to 80 points	8 (eight) (C)
		81 to 90 points	9 (nine) (B)
		91 to 100 points	10 (ten) (A)

19.	Course completion and final exam requirements	Realized activities 15.1 and 15.2
20.	Teaching Language	Macedonian and English
21.	Teaching quality evaluation method	Internal evaluation mechanisms and questionnaires

22.	Course Material	
	22.1.	Mandatory course material

	No.	Author	Title	Publisher	Year
	1	Верица Бакева	Веројатност	УКИМ	2015
	2	D. C. Montgomery, G.C. Runger	Applied Statistics and Probability for Engineers	John Wiley & Sons, Inc.	2003
	3	Geza Schay	Introduction to probability with statistical applications	Birkh¨auser	2007
	4	Michael Baron	Probability and statistics for computer scientists	Chapman & Hall/CRC	2007

22.2. Additional course material

No.	Author	Title	Publisher	Year