1.	Course title	Probability and Statistics		
2.	Course code	CSEW303		
3.	Study program	FCSE		
4.	Unit offering the course	**FCSE**		
5.	Undergraduate/postgraduate/PhD	**Undergraduate**		
6.	Year/semester 2/winter/ compulsory	7. ECTS: **6**		
8.	Teacher(s)	prof. Zaneta Popeska prof. Verica Bakeva assoc. prof. Marija Mihova prof. Katerina Zdravkova		
9.	Course prerequisites	Calculus 1, Discrete Mathematics 2		
10.	Goals (competences): 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 content: Introduction to probability theory. Probability of random events. Probability properties. Conditional probability. Bayes' theorem. Independence of random events. Discrete and continuous distributions. Multidimensional distributions, marginal and conditional distributions. Mean and variance of random variables, conditional mean. Families of discrete probability distributions: Bernoulli distribution, Binomial distribution, Poisson distribution, hypergeometric distribution, negative binomial distribution. Families of continues probability distributions: uniform distribution, exponential distribution, gamma distribution. Normal distribution. Normal approximation of binomial distribution. Generating functions. Functions of random variables. Law of large numbers. Central limit theorem. Elements of statistics, population, sample, parameters and statistics. Elementary data analyses and descriptive statistics. Mathematical model of random sample. Distributions of sample statistics: *t*-distribution, Chi-square distribution and *F*-distribution. Methods of point estimation: method of moments and method of maximum likelihood. Confidence interval. Tests of hypotheses. Hypothesis tests for population parameters. Testing for goodness of fit. Linear regression, method of the least squares estimators. Software package R.			
12.	Teaching methods: Lectures supported by slide presentations, interactive lectures, trainings (using lab equipment and software packages), team work, case studies, invited guests and lectures, individual practical assignments presentations, seminar paper, e-learning (forums, consultations).			
13.	Total available time	6 ECTS x 30 h = 180 h		
14.	Distribution of the available time	45 + 30+15 + 90 = 180 h		
15.	Teaching activities	15.1.	Lectures	45 hours
		15.2.	Training (labs, problem solving), seminar and team work	30+15=45 hours
16.	Other activities	16.1.	Project work	10 hours

		16.2.	Self study	40 hours
		16.3.	Home work	40 hours

17.	Grading		
	17.1.	Tests	90 points
	17.2.	Laboratory exercises (written or oral presentation)	10 points
	17.3.	Active participation	

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

19.	Final exam prerequisites	Successful completion of activities 15.1 and 15.2
20.	Course language	Macedonian and English
21.	Quality assurance methods	Internal evaluation mechanisms supported by student polls

22. Literature

22.1. Compulsory

No.	Authors	Title	Publisher	Year
1.	Douglas C. Montgomery, George C. Runger	Applied Statistics and Probability for Engineers —3rd ed.	John Wiley & Sons, Inc.	2003
2.	Geza Schay	Introduction to probability with statistical applications	Birkh¨auser	2007
3.	Sheldon Ross (Prentice Hall, 7th edition, 2005	A First Course in Probability	(Prentice Hall, 7th edition)	2005

22.2. Mandatory

No.	Authors	Title	Publisher	Year
1.	Mendenhall, W., Sincich, T.	Statistics for engineering and science	Dellen Publishing Company	1992
2.	Verica Bakeva	Probability	reviewed textbook (in Macedonian)	2012
3.				