

## Specification for the book of courses

<b>Study program</b>		Electrical Engineering and Computer Science		
<b>Module</b>		Communications and Information Technologies - Communications and Information Processing		
<b>Type and level of studies</b>		Undergraduate Academic Studies		
<b>The name of the course</b>		Mathematical Foundations of Statistical Learning		
<b>Lecturer (for lectures)</b>		Perić H. Zoran, Milošević M. Dušan		
<b>Lecturer/associate (for exercises)</b>		Eferica M. Predrag		
<b>Lecturer/associate (for OFE)</b>		Eferica M. Predrag		
<b>Number of ECTS</b>	5	<b>Course status (obligatory/elective)</b>	Elective	
<b>Prerequisites</b>				
<b>Course objectives</b>	Introduction to the mathematical basics of statistics and statistical learning. Train students to apply the acquired knowledge to the concrete problems.			
<b>Course outcomes</b>	Acquired fundamentals of statistical learning and ability to practically implement the acquired knowledge in telecommunications and data processing.			
<b>Course outline</b>				
<b>Theoretical teaching</b>	Estimation of parameters of known probability density function (mean, variance, ...). Estimation of probability. Estimation of coefficients of correlation, autocorrelation and prediction. Testing hypothesis in statistics. Point estimates, confidence intervals. Nonparametric methods for distribution hypothesis testing. Maximum likelihood method. Linear regression, dependence between two random variables, regression line, dependence between random and control variable. Nonlinear regression, piecewise linear regression, logistic regression. Time series analysis, linear and nonlinear prediction.			
<b>Practical teaching (exercises, OFE, study and research)</b>	Study and solve selected problems from the areas that are covered by the content of the subject.			
<b>Textbooks/references</b>				
1	D. Milosevic, L. Rancic, M. Petkovic, Mathematics 4 (In Serbian), Faculty of Electronic Engineering, Nis, 2015.			
2	M. Merkle, Probability and statistics, four edition, Akademik mind, 2016.			
3	T. Hastie, R. Tibshirani, J. Friedman, The Elements of Statistical Learning: Data Mining, Inference, and Prediction, 2nd Edition, Springer, 2009.			
4	G. James, D. Witten, T. Hastie, R. Tibshirani, An Introduction to Statistical Learning with Applications in R, Springer, 2014.			
5				
<b>Number of classes of active education per week during semester/trimester/year</b>				
<b>Lectures</b>	<b>Exercises</b>	<b>OFE</b>	<b>Study and research work</b>	<b>Other classes</b>
2	2	1	0	0
<b>Teaching methods</b>	Lectures, PowerPoint presentations, practical exercises, homework assignments, consultations			
<b>Grade (maximum number of points 100)</b>				
<b>Pre-exam duties</b>	<b>Points</b>	<b>Final exam</b>		<b>Points</b>
<b>Activity during lectures</b>	5	<b>Written exam</b>		20
<b>Exercises</b>		<b>Oral exam</b>		20
<b>Colloquia</b>	35			
<b>Projects</b>	20			