Specification for the book of courses

Study program	Electrical Engineering and Computer Science		
Module	Common		
Type and level of studies	Doctoral studies		
The name of the course	Mathematical Foundations of Statistical Learning and Applications		
Lecturer (for lectures)	Perić H. Zoran, Milošević M. Dušan		
Lecturer/associate (for exercises)			
Lecturer/associate (for OFE)			
Number of ECTS	10	**Course status (obligatory/elective)**	Elective
Prerequisites			
Course objectives	Introduction to the mathematical basics of statistics and statistical learning. Enabling students to apply the acquired knowledge on the concrete tasks.		
Course outcomes	Acquired fundamentals of statistical learning and ability to practically use the acquired knowledge in the signal and data processing.		
Course outline			
Theoretical teaching	Point estimates, confidence intervals. Nonparametric methods for distribution hypothesis testing. Maximal 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. AR processes, MA processes and ARMA processes. Training alghorithms based on statiatical learning. Algorithms		
Practical teaching (exercises, OFE, study and research	Lectures. Consultations. Work on project.		
Textbooks/references			
1	G. James, D. Witten, T. Hastie, R. Tibshirani, An Introduction to Statistical Learning with Applications in R, Springer, 2017.		
2	T. Hastie, R. Tibshirani, J. Friedman, The Elements of Statistical Learning: Data Mining, Inference, and Prediction, 2nd Edition, Springer, 2009.		
3	Milan Merkle, Probability and Statistics (in Serbian), IV edition, Academical thought, 2016.		
4	D. Milosevic, L. Rancic, M. Petkovic, Mathematics IV (in Serbian), Faculty of Elcetronics Engineering, 2015.		
5	V. N. Vapnik, Statistical Learning Theory, Wiley-Interscience, 1998.		

Number of classes of active education per week during semester/trimester/year

Lectures	**Exercises**	**OFE**	**Study and research work**	**Other classes**
3	0	0	0	0

Teaching methods	Lectures. Consultations. Work on project.

Grade (maximum number of points 100)

Pre-exam duties	**Points**	**Final exam**	**Points**
Activity during lectures		**Written exam**	
Exercises		**Oral exam**	50
Colloquia			
Projects	50		