

Specification of the course for the Book of courses

Study program		Applied statistics		
Title of the course		Data mining		
Teachers (for lectures)		Branimir Todorović		
Teacher/fellow teacher (for exercises)		Dejan Mančev		
ESPB	6	Status of the course (obligatory (O) /elective (E))		E
Conditions				
Aim of the course	The goal of course is introduction and understanding of the principles, techniques and methodologies of data analysis and neural networks.			
Course outcomes	Students will understand and be able to use a wide range of techniques of data analysis. They will acquire the ability to select and use techniques and tools depending on the type and complexity of the problem.			
Content of the course				
Theoretical classes	Fisher and Bayes estimation of linear regression models, introduction to information theory, linear classifiers, perceptron, support vector machine, the principle of entropy maximization artificial neural networks, error back propagation algorithm, recurrent neural networks, error propagation back in time, recurrent learning in real-time estimation of Bayesian neural networks and Kalman filter, the weighted probability density function and the expectation maximization algorithm, continuous latent variables and analysis of main components, hidden Markov model.			
Practical classes	Practical classes include practising content from lectures, using appropriate software environment.			
References				
1	Hastie T., Tibshirani R., and Friedman J.: The Elements of Statistical Learning: Data Mining, Inference and Prediction, Springer-Verlag, 2001.			
2	Christopher M. Bishop, Pattern recognition and machine learning, Springer 2006			
3	Han, Jiawei: Data mining, Amsterdam [etc.]: Morgan Kaufmann Publishers, 2006			
4	Haykin, Simon: Neural Networks, Upper Saddle River: Prentice-Hall, 1999			
5	I. Witten and E. Frank. Data Mining: Practical Machine Learning Tools and Techniques (2nd Edition), Morgan Kaufmann, 2005			
The number of contact hours per week during the semester / trimester / year				
Lectures	Exercises	DON	Research work	Other classes
2	2	----	-----	-----
Teaching methods	Lectures, exercises, writing the statistical reports, consultative teaching			
Evaluation of knowledge (maximum score 100)				
Pre exam duties		points	Final exam	points
Activity during lectures		5	Oral exam	40
Activity during exercises		5		
colloquia		20		
seminars		30		