

Specification of the course for the Book of courses

Study program		Applied statistics	
Title of the course		Cluster analysis	
Teachers (for lectures)		Jelena Ignjatović	
Teacher/fellow teacher (for exercises)		Ivana Jančić	
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 cluster analysis.		
Course outcomes	Students will understand and be able to use a wide range of techniques of cluster 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	Clusters and clusterings. Clustering algorithms: connectivity based clustering (hierarchical clustering), centroid-based clustering (k-means algorithm), distribution-based clustering, density-based clustering, subspace-based clustering, group-based clustering, graph-based clustering. Evaluation of clustering results. Fuzzy clustering: fuzzy c-means clustering, clustering methods based on fuzzy equivalence relations, fuzzy pattern recognition, fuzzy image processing. Applications of clustering.		
Practical classes	Practical classes include practising content from lectures, using appropriate software environment.		
References			
1	B. S. Everitt, S. Landau, M. Leese, D. Stahl, Cluster Analysis, 5 th edition, John Wiley & Sons, Ltd, 2011.		
2	J. Abonyi, B. Feil, Cluster Analysis for Data Mining and System Identification, Birkhauser Verlag, AG, 2007.		
3	H. Charles Romesburg, Cluster Analysis for Researchers, Lulu Press, North Carolina, 2004.		
4	W. Pedrycz, Knowledge-Based Clustering – From Data to Information Granules, John Wiley & Sons, Ltd, 2005.		
5	F. Hoepfner, F. Klawonn, R. Kruse, T. Runkler, Fuzzy Cluster Analysis – Methods for Classification, Data Analysis and Image Recognition, John Wiley & Sons, Ltd, 2000.		
6	G. J. Klir, B. Yuan, Fuzzy Sets and Fuzzy Logic, Theory and Application, Prentice-Hall, Englewood Cliffs, NJ, 1995.		
The number of contact hours per week during the semester / trimester / year			
Lectures	Exercises	DON	Research work
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		