

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		Digital Processing of Audio Signal		
Lecturer (for lectures)		Stančić Z. Goran		
Lecturer/associate (for exercises)				
Lecturer/associate (for OFE)				
Number of ECTS	10	Course status (obligatory/elective)	Elective	
Prerequisites				
Introducing students with basic and advanced methods of digital audio signal processing.				
Course objectives				
Training students for independent digital audio signal processing by using existing advanced software . Design of digital filters for introducing various audio effects				
Course outcomes				
Training students for independent digital audio signal processing by using existing advanced software . Design of digital filters for introducing various audio effects				
Course outline				
Theoretical teaching				
Basic audio signal formats. Sampling and reconstruction of signal. A/D and D/A conversion. Adequate determination of sampling frequency and transformation. Effective calculation of the fast Fourier transformation. Down-sampling and up-sampling. Digital filter banks. Spectral analysis. Parametric and nonparametric filter design methods. Examples of application of digital signal processing in analysis and synthesis of speech and music signals, and discrete analytical signals.				
Practical teaching (exercises, OFE, study and research)				
Time domain approximation methods. Equiripple error approximation. Least-squares approximation. Interpolation techniques. The other approximation methods. Direct approximation in z-domain. Hilbert transformator. Digital differentiators. Modeling of musical instruments. Echo generators, reverberators. Shelving filters. Various time delay filters.				
Textbooks/references				
1 M.Milić, Audio systems (in Serbian), Akademska misao, Beograd, 2011.				
2 Lj. Milić и Z. Dobrosavljević, Introduction to digital signal processing (in Serbian), Akademska misao, 2009.				
3 L. Milic, Multirate filtering for digital signal processing: MATLAB applications, Information Science Reference-Imprint of: IGI Publishing, 2008.				
4 Jon G. Proakis, Dimitris Manolakis, Digital Signal Processing, Pearson, 2007.				
5				
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, auditory exesrcises,consultation				
Grade (maximum number of points 100)				
Pre-exam duties		Points	Final exam	Points
Activity during lectures			Written exam	30
Exercises			Oral exam	40
Colloquia				
Projects		30		