

Specification for the book of courses

Study program		Electronics and Microsystems		
Module		Electronics and Microsystems		
Type and level of studies		Master studies		
The name of the course		Adaptive Signal Processing		
Lecturer (for lectures)		Stančić Z. Goran		
Lecturer/associate (for exercises)		Cvetković S. Stevica		
Lecturer/associate (for OFE)		Cvetković S. Stevica		
Number of ECTS	5	Course status (obligatory/elective)	Elective	
Prerequisites				
Acquiring basic knowledge of adaptive processing of digital signals. Introduction to the methods of practical implementation of the adaptive filter transfer function. Introduction to Matlab commands for analyzing and processing of digital signals. Theoretical and practical knowledge of the methods for the design of adaptive filters. Mastering the techniques of nonrecursive adaptive filters design.				
Course objectives				
Collecting of theoretical and practical knowledge of the methods for the design of adaptive filters. Mastering the techniques of nonrecursive adaptive filters design.				
Course outcomes				
Course outline				
Least-squares approximation. Correlation. Discrete Fourier transform. Random signals. Spectral estimation. Power density spectrum. Signal energy. Properties of the power spectrum. Power spectral estimation. Wiener filter. Kalman filter. Least-squares system design. Linear predictor realization. System identification. Channel equalization. Interference canceling. Adaptive notch filters. MSE function. Covariance. Convergence time constants. Ideal condition convergence. Steepest-descent algorithm. LMS algorithm. Modified LMS algorithms. RLS algorithm. Measures of adaptive system performance. Learning curve.				
Theoretical teaching				
Least-squares approximation calculations in Matlab for analog signals. Least-squares approximation calculations in Matlab for digital signals. Orthogonality. The discrete Fourier series. Correlation. Covariance. Realization of linear predictor, system identification, channel equalization and interference canceling in Matlab.				
Practical teaching (exercises, OFE, study and research)				
Textbooks/references				
1	Samuel D. Stearns, Digital signal processing with examples in Matlab, CRC Press Washington, 2003.			
2	Ed. Vijay K. Madisetti and Douglas B. Williams, Introduction to Adaptive Filters, Digital Signal Processing Handbook, 1999			
3				
4				
5				
Number of classes of active education per week during semester/trimester/year				
Lectures	Exercises	OFE	Study and research work	Other classes
2	2	1		
Teaching methods				
Lectures, auditory exercises, 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		