Specification for the book of courses

Study program	Electrical Engineering and Computer Science		
Module	Electronics		
Type and level of studies	Undergraduate Academic Studies		
The name of the course	Digital Signal Processing		
Lecturer (for lectures)	Nikolić V. Saša		
Lecturer/associate (for exercises)	Stančić Z. Goran		
Lecturer/associate (for OFE)	Stančić Z. Goran		
Number of ECTS	6	**Course status (obligatory/elective)**	Obligatory
Prerequisites			
Course objectives	Acquiring basic knowledge of analysis, synthesis and processing of digital signals. Introduction to the methods of practical implementation of the transfer function. Introduction to basic Matlab commands for analyzing and processing of digital signals. Acquiring basic knowledge for easer study of courses of Audio signal processing and Digital image processing.		
Course outcomes	Theoretical and practical knowledge about discret systems and their realization techniques. Mastering the techniques for designing of recursive and nonrecursive digital filters.		
Course outline			
Theoretical teaching	z transform. Inverse z transform. Discrete Fourier transform. Short-time Fourier transform. Discrete systems. Convolution. Linear difference equation with constant coefficients. Discrete system block diagram representation. Discrete system transfer function. Frequency response. Analog to discrete space transformation. Derivative transform. Impulse invariant transform. Bilinear transform. Nonrecursive digital filters. Linear phase networks. Design methods of nonrecursive digital filters. Window functions. Frequency sampling nonrecursive digital filter design. Hilbert transformer.		
Practical teaching (exercises, OFE, study and research	Derivative transform. Impulse invariant transform. Calculation of z transform based on Laplace transform. Bilinear transform. Modified z transform. LT-FT-ZT relations. Digital filters realization structures. Direct realization. Cascade realization. Parallel realization. Transposed realization. Lader realization. Lattice realization. Allpass realization. Binar arithmetic. Filter transfer function coefficient quantization effects. Limit cycles. Product quantization and limit cycles effects. Limit cycles as adder overflow effect. Digital to analog conversion.		
Textbooks/references			
1	Jon G. Proakis, Dimitris Manolakis, Digital Signal Processing, Pearson, 2007.		
2	S. Mitra, Digital signal processing A computer based approach, McGraw-Hill, 2006.		
3	Steven T. Karris, Signals and systems with Matlab applications, Orchard publications, 2003.		
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Number of classes of active education per week during semester/trimester/year				
Lectures	**Exercises**	**OFE**	**Study and research work**	**Other classes**
2	2	1	0	0
Teaching methods	Lectures, auditory exercices, projects, consultations.			

Grade (maximum number of points 100)			
Pre-exam duties	**Points**	**Final exam**	**Points**
Activity during lectures		**Written exam**	30
Exercises		**Oral exam**	30
Colloquia	40		
Projects			