

Specification for the book of courses

Study program		Electrical Engineering and Computer Science		
Module		Communications and Information Technologies - Communications and Information Processing		
Type and level of studies		Undergraduate Academic Studies		
The name of the course		Digital Image Processing		
Lecturer (for lectures)		Perić H. Zoran, Jovanović Ž. Aleksandra, Nikolić R. Jelena		
Lecturer/associate (for exercises)		Jovanović Ž. Aleksandra, Nikolić R. Jelena		
Lecturer/associate (for OFE)		Nikolić R. Jelena		
Number of ECTS	6	Course status (obligatory/elective)	Elective	
Prerequisites				
Course objectives				
Provide fundamental knowledge in theory and application of digital image processing and analysis. Train students to design digital image processing algorithms and to apply them in the Matlab software package.				
Course outcomes				
Theoretical knowledge and practical skills in the domain of digital image processing and analysis. This knowledge will be useful for students in the development of new methods for image processing and for further application in designing filters, for improving quality, for restoration and transformation of images.				
Course outline				
Theoretical teaching				
Digital image formation and digitization. Fundamental image properties (mean value, standard variance, histogram). Subjective and objective measures of image quality. Image transforms (DCT, DFT, WT). Improvement of image quality. Single-pixel operations. Spatial operations. Image restoration. Image compression. Lossless image compression. Lossy predictive coding. Transform coding. Edge detection. Image segmentation.				
Practical teaching (exercises, OFE, study and research)				
On practical exercises, theoretical knowledge is upgraded through solving problems, which also enables students to understand the importance of the considered digital image processing algorithms. On laboratory exercises, students gain practical experience in working with software tools for digital image processing.				
Textbooks/references				
1	R. C. Gonzalez, R. E. Woods, Digital Image Processing, Pearson; 4th edition, 2018.			
2	R. C. Gonzalez, R. E. Woods, S. L. Eddins, Digital Image Processing Using MATLAB, Gatesmark Publishing; 2nd edition, 2011.			
3	Igor Djurovic, Digital Image Processing (in Serbian), Faculty of Electrical Engineering, Podgorica, 2006.			
4	C. Solomon, T. Breckon, Fundamentals of Digital Image Processing: A Practical Approach with Examples in MATLAB, John Wiley & Sons, 2011.			
5	M. Sonka, V. Hlavac, R. Boyle, Image Processing, Analysis, and Machine Vision, CL Engineering, 4th Edition, 2015.			
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, PowerPoint presentations, practical exercises, practical lessons on computers, homework assignments, consultations.				
Grade (maximum number of points 100)				
Pre-exam duties		Points	Final exam	Points
Activity during lectures		5	Written exam	20
Exercises		25	Oral exam	20
Colloquia				
Projects		30		