

## Specification for the book of courses

<b>Study program</b>		Electrical Engineering and Computer Science		
<b>Module</b>		Computing and Informatics		
<b>Type and level of studies</b>		Undergraduate Academic Studies		
<b>The name of the course</b>		Computer Vision		
<b>Lecturer (for lectures)</b>		Milosavljević Lj. Aleksandar		
<b>Lecturer/associate (for exercises)</b>		Antolović D. Igor		
<b>Lecturer/associate (for OFE)</b>		Antolović D. Igor		
<b>Number of ECTS</b>	5	<b>Course status (obligatory/elective)</b>	Elective	
<b>Prerequisites</b>				
<b>Course objectives</b>	Introduce students to the field of computer vision. Getting acquainted with basic concepts, algorithms, techniques used in this field.			
<b>Course outcomes</b>	Getting to know basic principles, techniques, and algorithms of computer vision.			
<b>Course outline</b>				
<b>Theoretical teaching</b>	Introduction to computer vision and historical context. Representation of images. Color spaces. Filtering images. Frequency domain. Morphological operations. Edge detection. Detection of lines and circles. Detection of characteristic (feature) points. Detection of corners. The pairing of characteristic points and finding transformation (SIFT descriptor, RANSAC algorithm). Recognition - generative approach (Eigenfaces method for face recognition). Recognition - discriminatory approach (Viola-Jones method for face recognition, HOG method). Bag of visual words method. Convolutional neural networks and deep learning. Camera model. Camera calibration. Epipolar geometry. Video processing (optical flow, background extraction, human pose estimation). Object tracking (Kalman filter, particle filter, central shift method).			
<b>Practical teaching (exercises, OFE, study and research)</b>	Practical work on the implementation of computer vision algorithms using the Python programming language, Numpy, OpenCV and Dlib libraries.			
<b>Textbooks/references</b>				
1	Richard Szelinski, Computer Vision: Algorithms and Applications, Springer, 2010.			
2	Robert Laganiere, OpenCV 3 Computer Vision Application Programming Cookbook, Pack, 2017.			
3	Francois Chollet, Deep Learning with Python, Manning, 2018.			
4				
5				
<b>Number of classes of active education per week during semester/trimester/year</b>				
<b>Lectures</b>	<b>Exercises</b>	<b>OFE</b>	<b>Study and research work</b>	<b>Other classes</b>
2	2	1	0	0
<b>Teaching methods</b>	Lectures, auditory exercises, laboratory exercises.			
<b>Grade (maximum number of points 100)</b>				
<b>Pre-exam duties</b>	<b>Points</b>	<b>Final exam</b>		<b>Points</b>
<b>Activity during lectures</b>	10	<b>Written exam</b>		
<b>Exercises</b>	40	<b>Oral exam</b>		50
<b>Colloquia</b>				
<b>Projects</b>				