1.	Course Title	Digital image processing
2.	Code	F18L2S095
3.	Study program	Software engineering and information systems
4.	Study Program Organizer	Faculty of Computer Science and Engineering
5.	Degree (first, second, third cycle)	first cycle
6.	Academic year / semester 2 / summer / mandatory	7. ECTS credits 6
8.	Teacher	associate professor Ivica Dimitrovski, associate professor Andrea Kulakov
9.	Course enrollment prerequisites	Дсикретна математика или Дискретни структури 2
10.	Course program goals (competencies): Upon the completion of the course the student is expected to rule and use the basic tools and methods for image processing.	
11.	Course program content: Introduction; The basics of digital image processing; Representation and digitalization of images; Tools and programs for digital image processing; Digital images and pixels; Color components; Application domains; 2-D sampling and reconstruction; quantization; digitalization; Introduction to OpenCV and Python; Basic operations with images; Point based operations; Image histograms; Contrast and gamma; Histogram equalization; Adaptive histogram equalization; Color space; Theory of colour. Colour correction and special effects; Linear filters and convolution; Blurring and Sharpening Images; Edge detection; Image segmentation; Morphological operations: dilatation/erosion; opening/closing; Contour extraction; Region filling; Skeletonization; Transformations, effects, filters and deformation; Visual descriptors; Key-point extraction; Panorama stitching	
12.	Learning methods: Lectures using presentations, interactive lectures, exercises (using equipment and software packages), teamwork, case studies, invited guest lecturers, independent preparation and defense of a project assignment and seminar work.	
13.	Total available time	6 ECTS x 30 hours = 180 hours

14.	Distribution of the available time		30 + 45 + 15 + 15 + 75 = 180 hours	
15.	Teaching activity forms	15.1.	Lectures – theoretical teaching	30 hours
		15.2.	Exercises (laboratory, auditory), seminar papers, teamwork	45 hours
16.	Other activity forms	16.1.	Project Tasks	15 hours
		16.2.	Independent Learning Tasks	15 hours
		16.3.	Home learning	75 hours

17.	Assessment methodology		
	17.1.	Tests	0 points
	17.2.	Seminar paper/project (presentation: written and oral)	30 points
	17.3.	Activity and learning	0 points
	17.4.	Final exam	70 points

18.	Assessment criteria (points/grade)	up to 50 points	5 (five) (F)
		51 to 60 points	6 (six) (E)
		61 to 70 points	7 (seven) (D)
		71 to 80 points	8 (eight) (C)
		81 to 90 points	9 (nine) (B)
		91 to 100 points	10 (ten) (A)
19.	Course completion and final exam requirements	Realized activities 15.1 and 15.2	
20.	Teaching Language	Macedonian and English	
21.	Teaching quality evaluation method	Internal evaluation mechanisms and questionnaires	

22. Course Material

22.1. Mandatory course material

No.	Author	Title	Publisher	Year
1	Rafael C. Gonzalez, Richard E. Woods	Digital Image Processing (4th Edition)	Pearson	2017
2	Prateek Joshi	OpenCV with Python By Example	Packt Publishing	2015

22.2. Additional course material

	No.	Author	Title	Publisher	Year