

1.	Course	<i>Large-Scale Image Retrieval and Classification</i>		
2.	Code	KNI_E29		
3.	Study programme	Computer Science and Engineering PhD study programme		
4.	Study programme organized by	FCSE		
5.	Cycle	Third – PhD		
6.	Academic year / semester winter/summer/elective	7. ECTS credits 7,5		
8.	Teacher	Prof. d-r Ivica Dimitrovski		
9.	Prerequisites	None		
10.	Course programme goals (competences): The goal of the course is to introduce the students to the classification/categorization approaches and image and video searching. Upon course completion the students will be able to implement algorithms that will support scalable retrieving and classification of large-scale images and videos.			
11.	Course syllabus: Retrieving visual characteristics from images and videos. Global descriptors. Local descriptors. Generating visual words dictionary algorithms. K-means, approximate k-means, hierarchical k-means. Specific and generic visual object categories classification algorithms. TF-IDF weighing. Scalable techniques and algorithms for efficient image and video retrieval and classification. Practical examples: searching large-scale images and videos, organization and classification of large-scale image and video collections according to pre-defined visual class/object hierarchies, mobile platforms image and video processing.			
12.	Teaching methods: Classes supported with slide presentations, interactive teaching, lab equipment and other software packages, teamwork, case studies, invited guest lecturers, presentations of project works, e-learning materials, forums and consultations.			
13.	Total fund of work hours	7,5 EKTC x 30 h = 225 h		
14.	Available hours distribution	45+30+150 = 225		
15.	Teaching activities	15.1.	Theoretical classes	45 h
		15.2.	Practical classes (labs, exercises), seminars, team work	30 h
16.	Other activities	16.1.	Project tasks	50 h
		16.2.	Self study	50 h
		16.3.	Homework	50 h
17.	Grading			
	17.1.	Tests		40 points
	17.2.	Seminar work/ project (presentation: written and oral)		50 points
	17.3.	Active participation		10 points
18.	Grading criteria (points/grade)	to 59 points		5 (five) (F)
		from 60 to 68 points		6 (six) (E)

		from 69 to 76 points	7 (seven) (D)			
		from 77 to 84 points	8 (eight) (C)			
		from 85 to 92 points	9 (nine) (B)			
		from 93 to 100 points	10 (ten) (A)			
19.	Conditions for attending the final exam	Successful completion of activities 15.1 and 15.2				
20.	Language	Macedonian or English				
21.	Quality assessment	Internal evaluation and student pools				
22.	Literature					
	22.1.	Compulsory				
		No.	Author	Title	Publisher	Year
		1.	J. Philbin, O. Chum, M. Isard, J. Sivic and A. Zisserman	Object retrieval with large vocabularies and fast spatial matching	CVPR	2007
		2.	F. Perronnin, J. Sánchez and T. Mensink	Improving the Fisher kernel for large-scale image classification	ECCV	2010
	3.	J. Deng, W. Dong, R. Socher, L.-J. Li, K. Li and L. Fei-Fei	ImageNet: A large-scale hierarchical image database	CVPR	2009	
	22.2.	Additional				
		No.	Author	Title	Publisher	Year
		1.	H. Jégou, M. Douze and C. Schmid	Improving bag-of-features for large scale image search	IJCV	2010
		2.	D. Nister and H. Stewenius	Scalable recognition with a vocabulary tree	CVPR	2006
3.	J. Sivic and A. Zisserman	Video Google: A Text Retrieval Approach to Object Matching in Videos	ICCV	2003		