

1.	Course title	Biometric systems		
2.	Course code			
3.	Study program	Master studies of Information Science and Computer Engineering - Content-Based Search and Retrieval		
4.	Unit offering the course	FCSE		
5.	Undergraduate/master/PhD	Master		
6.	Year/semester 1/winter/elective	7. ECTS: 6		
8.	Teacher(s)	assist. prof. dr. Ivica Dimitrovski		
9.	Course prerequisites	None		
10.	Goals (competences): The aim of the course is to familiarize students with the basic principles used in biometric algorithms and systems. Upon completion of the course the candidates: will have profound knowledge of advanced technologies and methods used in biometric systems, they can choose an appropriate algorithm and system for a given application context, they will understand the complex relationships between biometric systems and the environmental conditions (light, variations in the position of the objects of interest, etc. .) will have an understanding of the principles of privacy and their influence on the design and configuration of the biometric systems.			
11.	Course content: Introduction and basic concepts in biometric systems. History of biometric systems. Requirements and properties of biometric systems. Image processing and extraction of visual features. Algorithms for classification. Fingerprints recognition. Veins recognition. Face recognition. Recognition of 3D faces. Iris recognition. Multi-modal biometric systems. Evaluation schemes for biometric systems testing performance and security aspects. e-Passport. Data privacy in biometric systems.			
12.	Teaching methods: Lectures supported by slide presentations, interactive lectures, trainings (using lab equipment and software packages), team work, case studies, invited guests and lectures, individual practical assignments presentations, seminar paper, e-learning (forums, consultations).			
13.	Total available time	6 ECTS x 30 hours = 180 hours		
14.	Distribution of the available time	80 + 0 + 100 = 180 hours		
15.	Teaching activities	15.1.	Lectures	80 hours
		15.2.	Training (labs, problem solving), seminar and team work	0 hours
16.	Other activities	16.1.	Project work	35 hours
		16.2.	Self study	35 hours
		16.3.	Home work	30 hours
17.	Grading			
	17.1.	Tests		45 points
	17.2.	Seminar work/project (written or oral presentation)		45 points
	17.3.	Active participation		10 points

18.	Grading criteria	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.	Final exam prerequisites	Successfully completed activities 15.1 and 15.2				
20.	Course language	Macedonian and English				
21.	Quality assurance methods	Internal evaluation and student questionnaires				
22.	Literature					
	22.1.	Compulsory				
		No.	Authors	Title	Publisher	Year
		1.	S. Li and A. Jain	Handbook of Face Recognition	Springer	2005
		2.	D. Maltoni, D. Maio, A. Jain and S. Prabhakar	Handbook of Fingerprint Recognition	Springer	2005
	3.	J. Wayman, A. Jain, D. Maltoni, D. Maio	Biometric Systems: Technology, Design and Performance Evaluation	Springer	2004	
	22.2.	Additional				
		No.	Authors	Title	Publisher	Year
		1.				
		2.				
3.						