

1.	Course title	Multimedia Systems		
2.	Course code	CSEW521		
3.	Study program	Computer Science and Engineering		
4.	Unit offering the course	FCSE		
5.	Undergraduate/postgraduate/PhD	Undergraduate		
6.	Year/semester 3-4/summer	7. ECTS: 6		
8.	Teacher(s)	dr. Danco Davcev, dr. Sonja Gievska, dr. Slobodan Kalajdziski, dr. Goran Velinov, dr. Ivica Dimitrovski		
9.	Course prerequisites			
10.	Goals (competences): The aim of the course is to provide introductory knowledge on selected topic in the field of multimedia systems. It introduces the basic concepts, design and processing of multimedia data. Students will learn and acquire a deeper understanding of the concepts and design of multimedia applications and with the provided assignments they will be trained to develop practical skills for modelling multimedia, use of content-based retrieval techniques and designing multimedia applications.			
11.	Course content: Introduction. Organization of multimedia data. Multimedia standards. Techniques for digitalization. Modelling and management of multimedia data. Multimedia representation and processing. Compression techniques for multimedia (text, image, video and audio). Representation, description and management of multimedia content. MPEG -7 description scheme. Content-based retrieval and filtering. Visual descriptors. Texture-based descriptors for multimedia retrieval. Region- and shape-based descriptors for retrieval. Descriptors for 3D objects retrieval. Motion-based multimedia descriptors. Indexing and retrieval of audio data. Distributed sensor multimedia systems. Multimedia communications: transfer, protocols, interfaces, standards, and exchange formats. MPEG-4 standard. Quality of service (QoS) parameters for multimedia communications. Synchronization and real-time presentations. Interactive multimedia systems. Cloud multimedia computing (processing, communication and QoS). Design of multimedia applications. Discussion and case-studies of application domains: medicine and education. Other topics.			
12.	Teaching methods: lectures with presentations, interactive lectures, lab classes, exercises, team work, invited guest lectures, student projects and homework			
13.	Total available time	6 ECTS x 30 h = 180		
14.	Distribution of the available time	30 + 60 + 20 + 40 + 30 = 180 =180		
15.	Teaching activities	15.1.	Lectures	30 hours
		15.2.	Training (labs, problem solving), seminar and team work	60 hours
16.	Other activities	16.1.	Project work	40 hours

		16.2.	Self study	30 hours	
		16.3.	Home work	20 hours	
17.	Grading				
	17.1.	Tests		60 points	
	17.2.	Seminar work/project (written or oral presentation)		30 points	
	17.3.	Active participation		10 points	
18.	Grading criteria		to 50 points	5 (five) (F)	
			from 51 to 60 points	6 (six) (E)	
			from 61 to 70 points	7 (seven) (D)	
			from 71 to 80 points	8 (eight) (C)	
			from 81 to 90 points	9 (nine) (B)	
			from 91s to 100 points	10 (ten) (A)	
19.	Final exam prerequisites	completed 15.2, 16.1 and 16.2			
20.	Course language	Macedonian and English			
21.	Quality assurance methods	Internal evaluations and surveys			
22.	Literature				
	22.1.	Compulsory			
		No.	Authors	Title	Publisher
		1.	Ralf Steinmetz, Klara Nahrstedt	Multimedia Fundamentals: Media Coding and Content Processing	Prentice Hall
		2.	Ralf Steinmetz, Klara Nahrstedt	Multimedia Systems	Springer
		3.	B. S. Manjunath, P. Salembier, T. Sikora	Introduction to MPEG-7	Wiley
		2002			
	22.2.	Mandatory			
		No.	Authors	Title	Publisher
		1.	Shih Timothy	Distributed Multimedia Databases: Techniques and Applications	Idea Group Publishing
2.		D. Davcev	Multimedia Systems	Medis Informatics, Скопје	