1.	Course title	**Microprocessor systems**		
2.	Course code	CSEW502		
3.	Study program	**IKI, KNI, MT, INFO, ASI, IT**		
4.	Unit offering the course	**FCSE**		
5.	Undergraduate/postgraduate/PhD	**Undergraduate**		
6.	Year/semester **3/winter/compulsory**	7. ECTS: **6**		
8.	Teacher(s)	Prof. Dimitar Trajanov, Assist. Prof. Nevena Ackovska, Assist. Prof. Sonja Filiposka, Assist. Prof. Anastas Mishev, Assist. Prof. Igor Mishkovski		
9.	Course prerequisites	Computer Architecture		
10.	Goals (competences): Understanding the architecture of 16 bit microprocessors, integrated components for I/O devices and assembler programming. Comprehension of the basics of the architecture and organization of microprocessors as well as the existing techniques for their programming. Similarities and differences with microcontrollers.			
11.	Course content: Architecture and instruction set of Intel x86, assembler programming, internal processor architecture, interrupts, BIOS, system calls by the Operating System, interrupt-driven processing, Windows system call on x86, examples of I/O circuits, microcontrollers, embedded systems, ubiquitous computing. Microcomputer system architecture. I/O controllers, memory types, programming I/O devices, DMA controllers, serial and parallel controllers, video and disk controllers. Programming with limited resources. Programming of programmable devices with embedded microcontrollers. Programming microcontrollers with high-level language.			
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 h = 180 h		
14.	Distribution of the available time	30 + 15 + 135 = 180 h		
15.	Teaching activities	15.1.	Lectures	30 hours
		15.2.	Training (labs, problem solving), seminar and team work	45 hours
16.	Other activities	16.1.	Project work	25 hours
		16.2.	Self study	40 hours
		16.3.	Home work	40 hours
17.	Grading			
	17.1.	Tests		80 points
	17.2.	Seminar work/project (written or oral presentation)		15 points
	17.3.	Active participation		5 points

					to 49 points	5 (five) (F)
18.	Grading criteria				from 50 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 91 to 100 points	10 (ten) (A)
19.	Final exam prerequisites				Successful completion of activities 15.1 and 15.2	
20.	Course language				Macedonian and English	
21.	Quality assurance methods				Internal evaluation mechanisms supported by student polls	

	Literature					
22.	22.1.	Compulsory				
		No.	Authors	Title	Publisher	Year
		1.	Brian Brey	The Intel Microprocessors - 8086/8088, 80186/80188, 80286,80386, 80486, Pentium,Pentium Pro Processor, Pentium II, Pentium III, Pentium IV – 7th edition	Prentice Hall	2005
		2.	M. Morris Mano, Charles Kime	Logic and Computer Design Foundamentals 4th edition	Prentice Hall	2007
		3.	Patterson and John L. Hennessy	Computer Organization & Design, Patterson, 4th edition	Morgan Kaufmann	2011
		4.	Milan Verle	PIC Microcontrollers - Programming in C	mikroElektronika; 1st edition	2009
		5.	Randall Hyde	The Art of Assembly programming		
	22.2.	Additional				
		No.	Authors	Title	Publisher	Year
		1.		8086 User's Manual and Programming	Intel Corp.	1982
		2.				
		3.				