

1.	Course title	<b>System on chip design techniques</b>		
2.	Course code	SOCD-Z-01		
3.	Study program	<b>System on Chip Design</b>		
4.	Unit offering the course	<b>FCSE</b>		
5.	Undergraduate/master/PhD	<b>Master</b>		
6.	Year/semester 1(2)/winter/compulsory	7. ECTS: <b>6</b>		
8.	Teacher(s)	Assist. Prof. Igor Mishkovski		
9.	Course prerequisites	None		
10.	Goals (competences): After successfully completing the course, the student is expected to know and use the methodologies for System on Chip development as well as to design platform specific components (network, video interface, wireless communication).			
11.	Course content: Introduction to embedded computer systems. History and overview. System on chip design. Architecture of embedded computer systems. System design models and methodologies. Balancing hardware and software. System on chip modelling and simulation. Functional-architecture co-design. Destination platform based design. Architecture mapping. Hardware description languages. (Verilog HDL, VHDL, SystemC). Design verification and embedded system testing. SoC and IP cores. Using IP cores for system on chip design. Energy efficient embedded systems design techniques. General input/output. Serial communication (I2C, SPI, IrDA, Uarts). Analogue input/output. Hardware-software interface, reconfigurable computing. Embedded system communications design. Interface synthesis.			
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	30 + 15 + 135 = 180 hours		
15.	Teaching activities	15.1.	Lectures	30 hours
		15.2.	Training (labs, problem solving), seminar and team work	15 hours
16.	Other activities	16.1.	Project work	60 hours
		16.2.	Self study	25 hours
		16.3.	Home work	50 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
		1.	J. Nurmi	Processor Design: System-on-Chip Computing for ASICs and FPGAs
		2.		Selected papers
	3.			
	22.2.	Additional		
		No.	Authors	Title
		1.		
		2.		
3.				