1.	Course Title	Software for embedded systems
2.	Code	F18L3W048
3.	Study program	Software engineering and information systems
4.	Study Program Organizer	Faculty of Computer Science and Engineering
5.	Degree (first, second, third cycle)	first cycle
6.	Academic year / semester 4 / winter / optional	7. ECTS credits 6
8.	Teacher	associate professor Igor Mishkovski, assistant professor Miroslav Mirchev, assistant professor Vladimir Zdraveski
9.	Course enrollment prerequisites	Вградливи микропроцесорски системи
10.	Course program goals (competencies): Students will obtain knowledge to create applications for microcontrollers that will work with I/O devices. Students will be able to implement and manage different software configurations.	
11.	Course program content: (1) Using development environment, writing, compiling and debugging embedded programs (1) Understanding hardware aspects for the different behavior of embedded systems (1) Performances, power consumption and cost of embedded systems. (2) Basic software techniques for creating embedded apps (1) Debugging techniques for embedded applications (1) Writing programs that execute multiple I/O operations (1) Software queues for buffered data streams (1) Writing programs for periodic interrupts and clock signals (1) Writing programs for monitoring physical properties, using sensor data and actuators (1) Structured approach for writing complex embedded applications (1) Creating programs that use state-machines and RTOS for system applications in embedded systems (1) Embedded software security	
12.	Learning methods: Lectures using presentations, interactive lectures, exercises (using equipment and software packages), teamwork, case studies, invited guest lecturers, independent preparation and defense of a project assignment and seminar work.	
13.	Total available time	6 ECTS x 30 hours = 180 hours
14.	Distribution of the available time	30 + 45 + 15 + 15 + 75 = 180 hours

15.	Teaching activity forms	15.1.	Lectures – theoretical teaching	30 hours
		15.2.	Exercises (laboratory, auditory), seminar papers, teamwork	45 hours
16.	Other activity forms	16.1.	Project Tasks	15 hours
		16.2.	Independent Learning Tasks	15 hours
		16.3.	Home learning	75 hours

17.	Assessment methodology		
	17.1.	Tests	10 points
	17.2.	Seminar paper/project (presentation: written and oral)	10 points
	17.3.	Activity and learning	10 points
	17.4.	Final exam	70 points

18.	Assessment criteria (points/grade)	up to 50 points	5 (five) (F)
		51 to 60 points	6 (six) (E)
		61 to 70 points	7 (seven) (D)
		71 to 80 points	8 (eight) (C)
		81 to 90 points	9 (nine) (B)
		91 to 100 points	10 (ten) (A)
19.	Course completion and final exam requirements	Realized activities 15.1 and 15.2	
20.	Teaching Language	Macedonian and English	
21.	Teaching quality evaluation method	Internal evaluation mechanisms and questionnaires	
22.	Course Material		
	22.1.	Mandatory course material	

	No.	Author	Title	Publisher	Year
	1	Derek Molloy	Exploring Raspberry Pi: Interfacing to the Real World with Embedded Linux	Wiley	2016
	2	Simon Monk	Programming the Raspberry Pi, Second Edition: Getting Started with Python	McGraw-Hill Education	2015
	3	David Russel	Introduction to Embedded Systems: Using ANSI C and the Arduino Development Environment	Morgan & Claypool	2010

22.2. Additional course material

No.	Author	Title	Publisher	Year