Add. 3	**Course program for the first, second and third level (cycle) of studies**

1.	Course title	Programmable logic controllers				
2.	Code	260				
3.	Study group(s)	ACS , MehT				
4.	The organizer of the study program (unit, institute, department)	Faculty of Mechanical Engineering - Skopje, Ss. Cyril and Methodius University in Skopje				
5.	Level (first, second, third)	First				
6.	Academic year / semester	winter	7.	ECTS credits	6	
8.	Instructor	prof. d-r AtanaskoTuneski				
9.	Prerequisites	Systems and control - passed				
10.	Course objectives (competences): Learning the parts of the PLC (programmable logic controller), processing of the PLC inputs and outputs, connection of sensors and output devices, Ladder diagram, programming of PLC controllers, practical application examples, PLC diagnostics.					
11.	Course content: Introduction programmable logic control. - Integral parts of programmable logic controllers (PLC) - PLC inputs and outputs, connection of sensors and output devices - Architecture and memory map of the PLC. - Programming of PLC using Ladder diagram, open and closed contacts, functions - Modes of operation of PLC, program execution - PLC instructions, Diagnostic functions - Practical application examples of PLC.					
12.	Study methods: Interactive teaching, laboratory and/or auditory exercises, standalone and/or team project work, standalone learning.					
13.	Total hours	6ECTSx30 classes = 180 hours				
14.	Hours allocation per activity:	30 + 30 + 30 + 30 + 60 = 180 hours				
15.	Lectures/Lab	15.1.	Lectures	30 hours		
		15.2.	Lab (student work)	30 hours		
16.	Project Work/Assignments	16.1.	Project assignments	30 hours		
		16.2.	Individual assignments	30 hours		
		16.3.	Self-study	60 hours		
17.	Points/Marks:					
	17.1.	Tests	70 points			
	17.2.	Projects	20 points			
	17.3.	Attendance	10 points			
18.	Grading scale	Under 50	5 (five) (F)			
		51 - 60 points	6 (six) (E)			
		61 - 70 points	7 (seven) (D)			
		71 - 80 points	8 (eight) (C)			
		81 - 90 points	9 (nine) (B)			
		91 - 100 points	10 (ten) (A)			
19.	Prerequisites for taking the final exam	Finished seminar assignments				
20.	Language of Instruction	Macedonian				
21.	Course evaluation	Student questionnaire				

22.	Textbooks					
	22.1.	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	A. Tuneski, D. Babunski	Programmable memory control (internal script)	Faculty of Mechanical	2009

					Engineering - Skopje	
		2.	N. Matic	Introduction to industrial PLC	Mikroelektronika Beograd	2001
		3.	W. Bolton	Programmable Logic Controllers	Butterworth – Heinemann Linacre House	2001
	22.2.	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.				