

Add. 3		Course program for the first, second and third degree of studies			
1.	Course title	Components in Automation			
2.	Code	173			
3.	Study group(s)	Production Informatics			
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 degree)	First			
6.	Academic year / semester	summer semester	7.	Number of ECTS credits	6
8.	Professor	Prof. Dr. Zoran PANDILOV			
9.	Preconditions for enrolling the course	no			
10.	Purpose of the course program (competences): Introduction with the basic components used in automation				
11.	Contents of the course program: Sensors. Actuators. Mechanical systems for actuation. Electrical systems for actuation. Pneumatic and hydraulic systems.				
12.	Study methods: interactive lectures, auditory exercises and/or laboratory exercises, individual and/or team work on projects, individual learning				
13.	Total available time period	6 ECTS x 30 hours=180 hours			
14.	Available time assessment	30 + 30 + 40 + 20 + 60 = 180 hours			
15.	Educational activity module	15.1.	Teaching lectures	30 hours	
		15.2.	Practice, seminars, team work	30 hours	
16.	Other activity module	16.1.	Project assignments	40 hours	
		16.2.	Selfrunning assignments	20 hours	
		16.3.	Home studying	60 hours	
17.	Evaluation methods				
	17.1.	Tests			60 points
	17.2.	Projects			30 points
	17.3.	Activity and participation			10 points
18.	Evaluation criteria (points and marks)	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.	Signature and final exam requirements	Realized activities 17.2 and 17.3			
20.	Language used for performing the teaching	Macedonian language			
21.	Method used for following the teaching quality	Questionnaires, and other forms of continual evaluation			

22.	References					
	22.1.	Main references				
		No.	Author	Title	Publisher	Year
		1.	Zoran Pandilov	Lecture notes in Components in Automation	Faculty of Mechanical Engineering Skopje	
		2.	Shimon Y. Nof (Editor)	Handbook of Automation	Springer	2009
3.		W. Bolton	Mechatronics: A Multidisciplinary	Prentice Hall	2008	

				Approach (4th edition)		
	22.2.	Additional references				
		No.	Author	Title	Publisher	Year
		1.	Richard L.Shell, Ernest L. Hall	Handbook of Industrial Automation	Marcel Dekker, Inc.	2000
		2.	Dan Nesculescu	Mechatronics	Prentice Hall	2001
		3.	David M. Auslander, Carl J. Kempf	Mechatronics	Prentice Hall	1998