

Add. 3		Course program for the first, second and third degree of studies			
1.	Course title	Automated Production and Robotics			
2.	Code	105			
3.	Study group(s)	Production Engineering, Design of Construction			
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	winter 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 elements of the Automated Production. Recognition with the elements of Automated Production and justification of their practical application. Introduction with the basic elements of the robots and their application.				
11.	Contents of the course program: Introduction in automation. Application of automation in production. Basic elements of automated systems. Advanced functions in automation. Levels of automation. History of automation. Automation in production systems. Principles and strategies in automation. Economic and social aspects of automation. Programmable Logical Controllers and their application. Flexible Manufacturing Systems (FMS). Components of FMS. Application of FMS and their advantages. Planning and implementation of FMS. Computer Integrated Manufacturing (CIM). Industrial robots. History of robots. Components of robots. Classification of robots. Robots drives. Robots sensors. Wrist and robot tools. Application of robots.				
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

		1.	Zoran Pandilov	Lecture notes in Automated Production and Robotics	Faculty of Mechanical Engineering Skopje	
		2.	Bruno Siciliano and Oussama Khatib	Handbook of Robotics	Springer	2008
		3.	Mikell P. Groover	Automation, Production Systems, and Computer-Integrated Manufacturing (3rd Ed)	Prentice Hall	2007
	22.2.	Additional references				
		No.	Author	Title	Publisher	Year
		1.	Shimon Y. Nof (Editor)	Handbook of Automation	Springer	2009
		2.	John J. Craig	Introduction to Robotics: Mechanics and Control (3rd Edition)	Prentice Hall	2004
		3.	Tullio Tolio	Design of Flexible Production Systems: Methodologies and Tools	Springer	2009