Add. 3		Course program for the first, second and third degree of studies			
1.	Course title	Programming of Numerically Controlled Machine Tools			
2.	Code	261			
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	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): Capability of Programming of Numerically Controlled Machine Tools				
11.	Contents of the course program: Numerically Controlled Machine Tools. Basic components of Numerically Controlled Machine Tools. Types of part programming of Numerically Controlled Machine Tools. Programming of Numerically Controlled Machine Tools with CAD/CAM softwares. G-codes for NC milling. M-codes for NC milling. Generation of NC milling programs for 2, 2.5 and 3 D parts with CAD/CAM software. G-codes for NC turning. M-codes for NC turning. Generation of NC turning programs for 2, 2.5 and 3 D parts with CAD/CAM software.				
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					
		Main references				
	22.1.	No.	Author	Title	Publisher	Year
		1.	Zoran Pandilov	Lecture notes in Programming of Numerically Controlled	Faculty of Mechanical Engineering	

			Machine Tools	Skopje	
		2.	Alan Overby	CNC Machining Handbook	McGraw-Hill	2011
		3.	Frank Nanfara, Tony Uccello, Derek Murphy	The CNC workshop	Prentice Hall (2nd edition)	2002
	22.2.	Additional references				
		No.	Author	Title	Publisher	Year
		1.	Lacalle L.N.L. de, Lamikiz A	Machine Tools for High Performance Machining	Springer	2008
		2.	Peter Smid	CNC Programming Handbook (2nd Edition)	Industrial Press Inc.	2003
		3.	James V. Valentino, Joseph Goldenberg	Introduction to Computer Numerical Control (4th Edition)	AAA Predator Inc.	2007