

Add. 3		Course program for the first, second and third degree of studies			
1.	Course title	Structures and joining			
2.	Code	178			
3.	Study group(s)	PE, TML, TE, HEWM, MJSE, IEM, MV, EE, Mech, ACS			
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	7.	Number of ECTS credits	6
8.	Professor	Prof. Marjan Gavriloski, PhD Prof. Dobre Runchev, PhD			
9.	Preconditions for enrolling the course	none			
10.	Purpose of the course program (competences): Introduction to designing methods and calculation of main load bearing elements and joints. Design of welded joints (butt and fillet). Types of joining: welding, brazing and adhesive bonding, basic characteristics, techniques of work and application.				
11.	Contents of the course program: Basic types of load bearing structures, calculation of joints and stress-strain control. Review of types of welded joints (butt and fillet). Stress-strain analysis and design examples of butt and corner welded joints in accordance with current norms and regulations. Fundamentals of modern techniques of joining: welding, brazing and adhesive bonding. Modern trends in joining with electric arc, with electric resistance and other electric power sources. Laser welding, hybrid welding, friction welding. The symbolic representation of joining techniques on drawings				
12.	Study methods: interactive lectures, auditory practice and/or laboratory practice, self running and/or team work projects, self learning				
13.	Total available time period	6 ECTS x 30 hours = 180 hours			
14.	Available time assessment	30 + 30 + 0 + 8 + 112 = 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	0 hours	
		16.2.	Selfrunning assignments	8 hours	
		16.3.	Home studying	112 hours	
17.	Evaluation methods				
	17.1.	Tests			80 points
	17.2.	Projects			10 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	tasks 15.1, 15.2 and 16.2 competed			
20.	Language used for performing the teaching	Macedonian language			
21.	Method used for following the teaching	Questionnaire and other type of continuum evaluation			

quality	
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22.	References				
	Main references				
	No.	Author	Title	Publisher	Year
22.1.	1.	С. Стојмановски	Заварени врски и конструкции - скрипта	Машински факултет - Скопје	2006
	2.	Добре Рунчев	Техники на заварување-скрипта	Машински факултет - Скопје	2011
	3.	Добре Рунчев	Неконвенционални постапки на спојување	Универзитет Св. Кирил и Методиј во скопје	2004
	Additional references				
	No.	Author	Title	Publisher	Year
22.2.	1.	Helmut Richter, u.a.	Fügetechnik, Schweißtechnik	DVS Verlag	1995
	2.	Richard A. Strah	Introduction to Welding Engineering	Kendall Hunt Pub Co	2009
	3.	Р. Македонија	Норми и стандарди	Р. Македонија	