No. 12

Attachment No.3		**Course syllabus for First cycle studies**			
1.	**Course title**	**Theory of metal casting**			
2.	**Code**	MDE6M1			
3.	**Study Program**	Metallurgical digital engineering			
4.	**Study program organizer (unit,institute, department, division)**	Faculty of Technology and Metallurgy, University “Ss. Cyril and Methodius” in Skopje			
5.	**Degree (first, second, third cycle)**	First cycle			
6.	**Academic year / semester**	Third year, VI sem.	7.	**Number of ECTS**	6
8.	**Instructors**	D-r Blagoj Rizov, full professor			
9.	**Prerequisites for courseenrollment**	Physical metallurgy 1			
10.	**Objectives of the course syllabus (competencies):** To give the basic knowledge of metal casting production. To make the students familiar with the structure and the properties of liquid metals, physico-chemical principles of melting and interaction of liquid metal with atmosphere, refractory materials, slag and fluxes. To explain the mechanismes involved in the solidification process and formation of castings.				
11.	**Content of the course:** The principles of metal casting production. Physico-chemical principles of alloy melting. Liquid metal structure. Physical and technological properties of metal melts. Dissolution of components in liquid metal production. Interaction between liquid metal and gases. Nonmetalic inclusions. Modification of liquid metals. Solidification: Nucleation, Growth. Silidification of single-phase metals and alloys. Solidification of multiphase metals and alloys. Formation of the structure of castings. Solidification and schrinkage. Segregation. Internal stresses and cracks formation.				
12.	**Study methods:** Lectures and exercises, consultations, project (homework, seminar) assignments, home study (exam preparation)				
13.	**Total available time**	180			
14.	**Allocation of available time**				
15.	**Teaching activities**	15.1.	Lectures	45	
		15.2.	Exercises (laboratory, computational), teamwork	45	
		15.3	Industrial practice	0	
16.	**Other types of activities**	16.1.	Project assignments	20	
		16.2.	Independent assignments	20	
		16.3.	Home study	50	
17.	**Grading system**				
	17.1.	Tests: pts		80	
	17.2.	Seminar work/project, written and oral presentation: pts		10	
	17.3.	Final exam: pts		10	
18.	**Grading criteria (points/grade)**	Up to 51 points		5 (five) (F)	
		From 51 to 59 points		6 (six) (E)	
		From 60 to 69 points		7 (seven) (D)	
		from 70 to 79 points		8 (eight) (S)	

		From 80 to 89 points	9 (nine) (B)
		from 90 to 100 points	10 (ten) (A)
19.	**Prerequisites for taking the final exam**	Minimum 11 pts from activities 17.1 and 17.2	
20.	**Language in which lectures are conducted**	English	
21.	**Method for monitoring the quality of lectures**	Anonymous student survey	

22. **LITERATURE**

22.1. Compulsory literature

No.	Author	Title	Publisher	Year
1.	K. Pop Tonev	Theory and Technology of metal processing in liquid state (theoretical foundations)	University "Ss. Cyril and Methodius" in Skopje	1995
2.				
3.				

22.2. Additional literature

No.	Author	Title	Publisher	Year
1.	B. Cantor, K. O'Reilly	Solidification and Casting	IOP Publishing, Series in Materials Science and Engineering	2002
2.	I. Minkoff	Solidification and cast structure	John Wiley and Sons, Chichester	2003
3.	C. Flemings	Solidification Processing	Mc Graw-Hill, New York	1974