No. 47

Course syllabus for First cycle studies					
1.	**Course title**	**Wastewater treatment in metallurgy**			
2.	**Code**	MDE6E2			
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**	4
8.	**Instructors**	D-r Katerina Atkovska, assoc. prof.			
9.	**Prerequisites for course enrollment**	/			
10.	**Objectives of the course syllabus (competences):** Defining the basic terms in the wastewater treatment and studying the operations, processes and procedures for wastewater treatment in general, as well as with special attention to wastewaters obtained from the metallurgical industry.				
11.	**Content of the course:** - Origin and types of wastewater – municipal, atmospheric, industrial /wastewaters in metallurgy - Characteristics of wastewater – physical, chemical and biological - Wastewater treatment procedures – mechanical (flow measurement, equalization, screens), primary treatment (primary clarifiers, coagulation and flocculation, chemical precipitation), secondary treatment – biological treatment (aerobic and anaerobic processes), tertiary treatment (removal of phosphorus and nitrogen compounds), disinfection - Types of sludge formed – sludge treatment, disposal and use				
12.	**Study methods:**				
13.	**Total available time**	120			
14.	**Allocation of available time**				
15.	**Teaching activities**	15.1.	Lectures	30	
		15.2.	Exercises (laboratory, computational), teamwork	30	
16.	**Other types of activities**	16.1.	Project assignments	10	
		16.2.	Independent assignments	10	
		16.3.	Home study	40	
17.	**Grading system**				
	17.1.	Final exam: pts		80	
	17.2.	Seminar work/project, written and oral presentation: pts		10	
	17.3.	Activity: pts		10	
18.	**Grading criteria (points/grade)**	Up to 61 points		5 (five) (F)	
		From 61 to 69 points		6 (six) (E)	
		From 70 to 79 points		7 (seven) (D)	

		from 80 to 89 points	8 (eight) (S)
		From 90 to 95 points	9 (nine) (B)
		from 95 to 100 points	10 (ten) (A)
19.	**Prerequisites for taking the final exam**	Minimum 11 pts from activities 17.2 and 17.3	
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.	M.K. Purkait, P.Mondal,P. P.Das, Deepti	Wastewater treatment in steel industries: case studies, advances and prospects	CRC Press	2024
2.	Metcalf & Eddy	Wastewater engineering, Treatment and resource recovery, Fifth Edition	McGraw-Hill Education, New York	2014

22.2. Additional literature

No.	Author	Title	Publisher	Year
	G. Ruseska, B. Boskovski, K. Atkovska	Wastewater treatment (internal lectures)	Faculty of technology and metallurgy, Skopje	2017