No. 23

Course syllabus for First cycle studies						
1.	**Course title**	**NANOSENSORS**				
2.	**Code**	MDE8E6				
3.	**Study Program**	Metallurgical Digital Engineering				
4.	**Study program organizer (unit, institute, department, division)**	Faculty of Technology and Metallurgy				
5.	**Degree (first, second, third cycle)**	First cycle				
6.	**Academic year / semester**	IV / VIII	7.	**Number of ECTS**	6	
8.	**Instructors**	d-r Anita Grozdanov, full prof.				
9.	**Prerequisites for course enrollment**	Passed the course Introduction to Materials Engineering				
10.	**Objectives of the course syllabus (competences):** **1. To gain basic knowledge about these materials and their applications** **Acquired skills (competences):** **2. Completed High School**					
11.	**Content of the course:** Overview of the main nanostructures and materials used to obtain sensors and actuators (conductors, semiconductors and dielectrics). Structural characteristics, Electrical and Magnetic properties. Technologies in processing and engineering of materials for the production of nanosensors. Thin film deposition, Selective etching, Lithography, Epitaxial growth, Drop method, Electropolymerization. Gas sensors, Chemical sensors, Biosensors, Electrochemical sensors, Temperature sensors, Pressure sensors.					
12.	**Study methods:** Lectures and exercises, consultations, project (homework, seminar) assignment, home study (exam preparation)					
13.	**Total available time**	180				
14.	**Allocation of available time**					
15.	**Teaching activities**	15.1.	Lectures- theoretical classes. hours	45		
		15.2.	Exercises (laboratory, classroom), seminars, teamwork: classes	45		
			Practice: hours	10		
16.	**Other types of activities**	16.1.	Project assignments: hours	10		
		16.2.	Independent assignments: hours	10		
		16.3.	Homework - assignments	60		
17.	**Grading system**					
	17.1.	Tests: points		10		
	17.2.	Seminar work/project, written and oral presentation: points		10		

	17.3.	Final exam: points			80
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 45 points from the			
20.	**Language in which lectures are conducted**	English			
21.	**Method for monitoring the quality of lectures**	Anonymous survey of students			
22.	**LITERATURE**				
	22.1.	Compulsory literature			
		No.	Author	Title	Publisher	Year
		1.	Anita Grozdanov	Nanosensors	Faculty of Technology and Metallurgy	2023
		2.				
		3.				
	22.2.	Additional literature			
		No.	Author	Title	Publisher	Year
		1.	Fraden, Jacob,	Handbook of modern sensors: physics, designs, and applications–3rd ed.,	SpringerVerlag New York.	2004
		2.				
		3.				