No. 54

Course syllabus for First cycle studies						
1.	**Course title**	Surface Engineering				
2.	**Code**	MDE6E2				
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				
6.	**Academic year / semester**	3 year 6 semester	7.	**Number of ECTS**	4	
8.	**Instructors**	Prof. Irena Mickova, Ph.D.				
9.	**Prerequisites for course enrollment**					
10.	**Objectives of the course syllabus (competences):** The objective of the course program is for students to acquire basic knowledge in surface engineering. **Acquired skills (competences):**					
11.	**Content of the course:** Surface structure of metallic and non-metallic materials. Surface properties and characteristics of materials. Surface texture, roughness, friction, wear, and lubrication. Surface treatments. Mechanical surface treatments. Surface cleaning. Selection of fluids for surface treatment. Mechanical plating. Carburizing and surface hardening. Thermal spraying. Physical and chemical vapor deposition. Ion implantation and diffusion coating. Laser treatments. Chemical and electrochemical methods for processing metal surfaces. Electrochemical polishing and etching. Electroplating, electroless plating, and electroforming. Convertible coatings. Hot dipping. Galvanization. Porcelain enameling, inorganic, and organic coatings.					
12.	**Study methods:** Lectures, exercises, consultations, project assignments (homework, seminar papers), and self-study (exam preparation).					
13.	**Total available time**	120 hours				
14.	**Allocation of available time**					
15.	**Teaching activities**	15.1	Lectures-theoretical teaching	30 hours		
		15.2	Exercises (laboratory, practice classes), seminars, teamwork	30 hours		

16.	**Other types of activities**	16.1	Project assignments	10 hours
		16.2	Individual tasks	10 hours
		16.3	Homework and self-learning	40 hours

17.	**Grading system**		
	17.1.	Tests	80 points
	17.2.	Final Exam	10 points
	17.3.	Homework /Seminar work (project, written and oral presentation)	10 points
	Grading criteria (points/grade)	Up to 61 points	5 (five) (F)

18.	**Grading criteria (points/grade)**	From 61 to 69 points	6 (six) (E)
		From 70 to 79 points	7 (seven) (D)
	Prerequisites for taking the finalexam	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**	
20.	**Language in which lectures are conducted**	Macedonian and English
21.	**Method for monitoring the quality of lectures**	Self-evaluation and surveys

22. **LITERATURE**

22.1. Compulsory literature

No.	Author	Title	Publisher	Year
1.	И.Мицкова	Инженерство на површини (интерна скрипта)	ТМФ-Скопје	
2.	D. Krumes	Povrшinske toplinske obrade i inжenjerstvo povrшina	Sveuчiliшte u Osijeku, Strojarski fakultet, Slavonski Brod	2004
3.	В. Ковачевич Д. Врсаљко	Инжењерство површина	Факултет кемијског инжењерства и технологије, Загреб	2011

22.2. Additional literature

No.	Author	Title	Publisher	Year
1.	Ramnarayan Chattopadhyay	Advanced hermally assisted Surface Engineering	Kluwer Acadaemic Publishers, Norwell, Massachussets, USA	2004
2.	T.Burakowski	Surface Engineering of	CRC Press	1998

			T.Wierzchon	Metals: Principles, Equipment, Technologies	Boca Raton,London, New York, Washington.D.C.	