	UNIVERSITY OF EAST SARAJEVO Faculty of Technology Zvornik	
	Study programme: *Chemical Engineering and Technology*	
	Cycle I / Year III	

Course title	**TECHNOLOGY OF PROTECTIVE METAL COATINGS**
Department	Department for Physical Chemistry, Electrochemical Engineering and Materials– Faculty of Technology Zvornik

Course code	**Course status**	**Semester**	**ECTS**
04-2-047-7	Elective	VII	4

Teacher	Milorad Tomić, PhD, full professor
Teaching assistant	Marija Mitrović, PhD, assistant professor

Number of hours/ teaching workload (per week)			**Individual student workload (in hours per semester)**			**Student workload coefficient S_o**
Lectures	**Auditory exercises**	**Laboratory exercises**	**Lectures**	**Auditory exercises**	**Laboratory exercises**	**S_o**
2	0	2	30	0	30	1,0
2*15 + 0*15 +2*15 = 60hours			(2*15*1 + 0*15*1 + 2*15*1)=60 hours			
Total course workload 90 + 120 = 210 hours per semester						

Learning outcomes	After finishing the course, students will be able to: 1. understand the rules for dissolving and depositing metal coatings; 2. be able to demonstrate and utilize the knowledge and understanding of the potential of reduction, oxidation and overvoltage; 3. be able to demonstrate and utilize the knowledge of the influence of certain factors on the metal coating, as well as to apply them in the case of concrete deposition of the metal coating; 4. select anode materials for performing different deposition processes; 5. control electrolytes before, during and after deposition of the metal coating; 6. remove harmful impurities from the electrolyte; 7. work with different electrolysis current-voltage regimes.
Prerequisites	No prerequisites
Teaching methods	Lectures, laboratory classes, seminar paper, practical work on deposition and dissolution of metals.
Syllabus outline per week	*List of teaching units per weeks* 1. Introduction. Damage and protection of construction materials. 2. Corrosion behavior of materials in different environments. 3. Construction materials protection procedures. 4. Technologies of electrolytic deposition of metals. General properties of electrolytes and types of solutions used in electrolytic deposition of metals. 5. Metal deposition on the cathode. Distribution of current and metal deposit on the cathode. 6. Physical properties of electrolytic metal coatings. Preparation of substrate for coatings. 7. Copper, nickel, chrome, silver and gold coatings. 8. Alloy coatings. Coatings on aluminum and its alloys. (Mid-term test/Colloquium I) 9. Anodization. Galvanotechnics. Electroplating. 10. Technologies of metal protection by hot procedures. Obtaining metal coatings by immersing objects in liquid metal or by spraying liquid metal. Zinc coatings. Tin coatings. 11. Metal protection by diffusion procedures. Alliteration. Diffusion chrome plating. 12. Berylization. Silicification. Diffusion metallization with zinc. Protection of construction materials by spraying with molten metal. 13. Other types of metal protection. Enamelling. Browning. Phosphating. Chromatization. Patination. Organic protective coatings. Plasticization. Gumming. Conservation. 14. Industrial visit. 15. Mid-term test/ colloquium II

Main literature			
Author	**Title, publisher**	**Year**	**Pages**

Dini, JW.	Electrodeposition. The Materials Science of Coatings and Substrates	1994	1-378
Lambourne, R.,Strivens, T.A.	Paint and Surface Coatings: Theory and Practice	1999	1-798
Tracton A. A.	Coatings Technology: Fundamentals, Testing, and Processing Techniques	2007	

Additional reading

Author	Title, publisher	Year	Pages
Carter, V. E.	Metallic Coatings for Corrosion Control	1977	1-187
Cavaleiro, A., Hosson, J.T.	Nanostructured Coatings	2006	1-671

	Type of student evaluation	Grade points	Percentage
Obligations, assessment methods and grading system	Pre-exam obligations		
	Attendance	6	6 %
	Laboratory exercises	20	20 %
	Tests/colloquia	44	44 %
	Final examination (oral)	30	30 %
	Total	100	100 %
Web page	www.tfzv.ues.rs.ba		
Date			