



<b>Course ID:</b> HFH481	<b>Course name: CATALYSIS OF CHEMICAL REACTION</b>		
<b>Cycle: FIRST</b>	<b>Year: FOURTH</b>	<b>Semester: VII</b>	<b>ECTS credits: 4</b>
<b>Course status: MANDATORY</b>		<b>Total course hours:</b> Lectures: 30 Laboratory: 30	
<b>Teaching participants:</b>	<b>Teachers and associates with expertise in the field to which the subject belongs</b>		
<b>Prerequisite for enrollment:</b>	-		
<b>Course aims:</b>	Explaining the phenomenon of catalysis of chemical reactions through basic concepts, laws and achievements in this field of physical chemistry.		
<b>Thematic course units:</b>	<ol style="list-style-type: none"><li>1. Basic laws of catalysis. Significance and division of catalytic processes.</li><li>2. Homogeneous catalysis. Homogeneous catalysis in the gaseous phase.</li><li>3. Homogeneous catalysis in the liquid phase. Acid- base catalysis.</li><li>4. Brönsted catalysis law. Acidity functions. Hammett equations.</li><li>5. Catalysis in non-aqueous solvents. Catalysis by electron and groups transfer. Catalysis by ions and compounds of transition metals.</li><li>6. Autocatalysis. Oscillating reactions.</li><li>7. Enzymes as catalysts. The kinetics of reactions catalyzed by enzymes.</li><li>8. The effects of substrates, pH, temperature and inhibitors on the reaction catalysed by enzymes.</li><li>9. Experimental technique in enzyme catalysis. Some mechanisms of reactions catalyzed by enzymes.</li><li>10. Heterogeneous catalysis. Classification of heterogeneous catalysts. Adsorption. The adsorption isotherms. Influence of surface.</li><li>11. The kinetics and mechanisms of heterogeneous reactions. Theories on the catalytic activity of heterogeneous catalysts.</li><li>12. Activity, selectivity and stability of the heterogeneous catalyst.</li><li>13. Holders of a catalyst. Promoters. Activators. Catalytic poisons.</li><li>14. Metals, semiconductors and insulators as catalysts. Preparation of the catalysts.</li><li>15. Experimental testing methods in heterogeneous catalysis.</li></ol>		
<b>Learning outcomes:</b>	<b>Knowledge:</b> Acquired basic knowledge about the principle of action of catalysts in chemical reactions and expanding knowledge about the importance of catalysts for industry and sustainable development. <b>Skills:</b> The student will be able to describe the types of catalysts, explain the principle of catalysts in chemical reactions, explain catalyst preparation procedures, give examples of catalysts in real systems, explain the importance of catalysts for industry and sustainable development, interpret experimental and computational data.		

	<p><b>Competences:</b> Determining key variables for the preparation of a better catalyst.</p>																					
<b>Teaching methodology:</b>	<p>Lectures (oral presentation and interactive classes) Laboratory exercises</p>																					
<b>Assessment methods and grading system<sup>1</sup>:</b>	<b>Grading criteria</b>																					
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<b>Literature<sup>2</sup>:</b>	<p><b>Mandatory literature:</b></p> <ol style="list-style-type: none"> <li>Sabina Gojak-Salimović, <i>Kinetika i kataliza</i>, Prirodno-matematički fakultet, Sarajevo, 2017.</li> </ol> <p><b>Supplementary literature:</b></p> <ol style="list-style-type: none"> <li>James E. House, <i>Principles of Chemical Kinetics</i>, 2nd ed., Elsevier, 2007.</li> <li>I. Chorkendorf, J.W. Neimantsverdriet, <i>Concepts of Modern Catalysis and Kinetics</i>, WILEY-VCH, 2003.</li> </ol>																					

<sup>1</sup>The grading structure for each subject is determined by the Council of the organizational unit before the beginning of the academic year in which the subject is taught as per Article 64, paragraph 6 of the Law on Higher Education of Sarajevo Canton

<sup>2</sup>The Senate of the higher education institution, as an institution, or the Council of the organizational unit of the higher education institution, as a public institution, determines by a special decision, which is published on its website before the beginning of the academic year obligatory, mandatory and recommended textbooks and manuals, as well as other recommended literature based on which exams are prepared and taken as per Article 56, paragraph 3 of the Law on Higher Education of the Sarajevo Canton