



Course ID: HNM361	Course name: DEMONSTRATION EXPERIMENTS IN CHEMISTRY II		
Cycle: FIRST	Year: THIRD	Semester: VI	ECTS credits: 6
Course status: MANDATORY		Total course hours: 90 Lectures: 30 Laboratory: 60	
Teaching participants:	Teachers and associates with expertise in the field to which the subject belongs		
Prerequisite for enrollment:	-		
Course aims:	Connecting theoretical and practical knowledge in the selection and implementation of demonstration experiments. Enabling students to perform and interpret selected demonstration experiments at three cognitive levels.		
Thematic course units:	<ol style="list-style-type: none">1. Scientific and chemical literacy2. Multiple representations of chemical concepts in chemistry teaching3. Learning at the macro level. The role of practical work in chemistry teaching4. Learning at the submicroscopic level. Specifics of teaching submicroscopic levels.5. The relationship between the macro level and the process at the submicroscopic level6. Use of diagrams and schemes in chemistry teaching7. Learning on a symbolic level. Specifics of teaching symbolic level.8. Connecting macro, submicroscopic, and symbolic levels9. The role of multimedia in teaching chemical concepts at three levels of representation10. Fundamental chemical laws at three levels of representation11. The role of the historical development of chemistry in the teaching of chemistry		
Learning outcomes:	Knowledge: <ul style="list-style-type: none">• Assess the role of multimedia in explaining the three levels of representation;• Give examples of the specifics of teaching macroscopic, submicroscopic, and symbolic levels in chemistry teaching;		

	<p>Skills:</p> <ul style="list-style-type: none"> • Explain the performed laboratory exercises on three levels of representation <p>Competences:</p> <ul style="list-style-type: none"> • Anticipate potential difficulties in teaching the three levels of representation and suggest possible solutions • Identify and address students' misconceptions on basic chemical processes 																																																
<p>Teaching methodology:</p>	<p>Oral presentation Discussion Research Practical exercises</p>																																																
<p>Assessment methods and grading system¹:</p>	<table border="1"> <thead> <tr> <th colspan="3">Grading criteria</th> </tr> <tr> <th>Criteria</th> <th>Maximal score</th> <th>Required score</th> </tr> </thead> <tbody> <tr> <td>1. Class attendance</td> <td>5</td> <td>3</td> </tr> <tr> <td>2. Class activities</td> <td>15</td> <td>8</td> </tr> <tr> <td>3. Midterm</td> <td>25</td> <td>14</td> </tr> <tr> <td>4. Seminar</td> <td>15</td> <td>8</td> </tr> <tr> <td>5. Final exam</td> <td>40</td> <td>22</td> </tr> <tr> <td>Total</td> <td>100</td> <td>55</td> </tr> <tr> <th colspan="3">Scores and grading</th> </tr> <tr> <th>Score</th> <th>Grade (B&H)</th> <th>Grade (ECTS)</th> </tr> <tr> <td>< 55</td> <td>5</td> <td>F, FX</td> </tr> <tr> <td>55–64</td> <td>6</td> <td>E</td> </tr> <tr> <td>65–74</td> <td>7</td> <td>D</td> </tr> <tr> <td>75–84</td> <td>8</td> <td>C</td> </tr> <tr> <td>85–94</td> <td>9</td> <td>B</td> </tr> <tr> <td>95–100</td> <td>10</td> <td>A</td> </tr> </tbody> </table>	Grading criteria			Criteria	Maximal score	Required score	1. Class attendance	5	3	2. Class activities	15	8	3. Midterm	25	14	4. Seminar	15	8	5. Final exam	40	22	Total	100	55	Scores and grading			Score	Grade (B&H)	Grade (ECTS)	< 55	5	F, FX	55–64	6	E	65–74	7	D	75–84	8	C	85–94	9	B	95–100	10	A
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<p>Literature²:</p>	<p>Mandatory literature</p> <ol style="list-style-type: none"> 1. Halaši, R., Kesler, M.(1976). <i>Metodika nastave hemije i demonstracioni ogledi</i>. Beograd: Naučna knjiga. 2. Zejnilagić-Hajrić, M., Zovko, E. (2009). <i>Demonstracioni praktikum iz hemije</i>. Sarajevo: Prirodno-matematički fakultet. <p>Supplementary literature:</p>																																																

¹ 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

² 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

1. Dragić, R., Zejnilagić, F. (1968). *Praktikum iz organske hemije*. Sarajevo: Zavod za izdavanje udžbenika.
2. Herak, J. (1980). *Građa prirode, Priručnik za nastavnike*. Zagreb: Školska knjiga.
3. Gilbert, J.K., Treagust, D. (Eds.) (2009). *Multiple Representations in Chemical Education*. Springer Science+Business Media B.V. Inc.