



Course ID: HDAH12	Course name: ANALYSIS OF TRACE ELEMENTS		
Cycle: THIRD	Year: FIRST	Semester: I	ECTS credits: 15
Course status: ELECTIVE	Total course hours: 90 Lectures: 45 Laboratory: 45		
Teaching participants:	Teachers and associates with expertise in the field to which the subject belongs [do not enter names in this section. Leave the wording as indicated in this section]		
Prerequisite for enrollment:	-		
Course aims:	The aim is to train the students to independently perform a complete analysis procedure of trace elements, by learning about all protocols that must be taken to prevent contamination of the sample.		
Thematic course units:	<ol style="list-style-type: none">1. Definitions and functions of trace elements.2. Inorganic trace analysis: Traces and ultra traces, the need for determination of metal trace, influence of matrix and concentration, analysis planning.3. Working environment for analysis performing: Sources of contamination control of the atmosphere, laboratory and the human as a contamination source, approaches for cleaning the working environment.4. Laboratory materials: chemical and physical properties, types of materials used, selection of reagents.5. Sampling and storage of samples: specific factors in sample collection, factors influencing stability, vessels for storage and protection of samples during the storage.6. Reagents for the analysis: Grade of purity, selection and preservation of reagents.7. Purification of liquid organic and inorganic reagents.8. Purification of solid and gas reagents.9. Water for analysis: Characteristics and control of water used in the trace analysis.10. Working procedure: planning of the analysis, sample preparation for analysis, sieving, drying, bringing samples into solution.11. Separation and concentration, calibration solutions and selection of the blank; Errors during work;12. Matrix and the influence of the matrix on the analyte;13. Quality control, CRM		

	14. Techniques for trace elements analysis																				
Learning outcomes:																					
Teaching methodology:																					
Assessment methods and grading system¹:	Grading criteria																				
	<table border="1"> <thead> <tr> <th>Criteria</th> <th>Maximal score</th> <th>Required score</th> </tr> </thead> <tbody> <tr> <td>1. Seminar paper</td> <td>25</td> <td>13</td> </tr> <tr> <td>2. Midterms</td> <td>2x25</td> <td>28</td> </tr> <tr> <td>3. Final exam</td> <td>25</td> <td>14</td> </tr> <tr> <td>Total</td> <td>100</td> <td>55</td> </tr> </tbody> </table>	Criteria	Maximal score	Required score	1. Seminar paper	25	13	2. Midterms	2x25	28	3. Final exam	25	14	Total	100	55					
	Criteria	Maximal score	Required score																		
	1. Seminar paper	25	13																		
	2. Midterms	2x25	28																		
	3. Final exam	25	14																		
	Total	100	55																		
	* Class activity is scored through the engagement of students in exercises.																				
	Scores and grading																				
	<table border="1"> <thead> <tr> <th>Score</th> <th>Grade (B&H)</th> <th>Grade (ECTS)</th> </tr> </thead> <tbody> <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>	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
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																			
Literature²:	<p>Mandatory literature:</p> <ol style="list-style-type: none"> - <p>Supplementary literature:</p> <ol style="list-style-type: none"> Howard A.G. and Statham P.J. (1995), Inorganic trace analysis- philosophy and practice, JOHN WILEY & SONS Vandecasteele C. and Block C.B., (1995) Modern Methods for Trace Element Determination, JOHN WILEY & SONS Les Ebdon, Les Pitts, Rita Cornelis, Helen Crews, O.F.X. Donard, Philippe Quevauviller, (2001), Trace Element Speciation for Environment, Food and Health, The Royal Society of Chemistry , Cambridge CB4 OWF, UK 																				

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