



Course ID: HAH486	Course name: WASTEWATER AND WASTE GAS TREATMENT		
Cycle: FIRST	Year: FOURTH	Semester: VIII	ECTS credits: 6
Course status: MANDATORY		Total course hours: 75 Lectures: 30 Laboratory: 45	
Teaching participants:	Teachers and associates with expertise in the field to which the subject belongs		
Prerequisite for enrollment:	-		
Course aims:	Acquisition of knowledge about the sources of air and water pollution. Acquisition of theoretical and practical knowledge about the Best Available Techniques - BAT for purification and quality control of treated wastewater and waste gases.		
Thematic course units:	<ol style="list-style-type: none">1. Introduction, general terms, classification of wastewater and waste gas2. Natural and anthropogenic sources of pollutants into the air and water3. Control techniques in preventing water pollution4. Best Available Techniques (BAT) and wastewater treatment plants5. Mechanical wastewater treatment6. Physico-chemical treatment of wastewater7. Biological treatment of wastewater8. Midterm9. Quality control of purified water10. Wastewater sludge treatment11. Best Available Techniques (BAT) and waste gas treatment plants12. Control techniques for emission of waste gas13. Waste gas treatment14. Waste gas treatment15. Quality control of purified gas		
Learning outcomes:	After completing the course, the student will be able to: <ul style="list-style-type: none">- define inorganic and organic pollutants of air and water- define wastewater and waste gas- select and apply techniques and devices for the treatment of waste gas- select and apply techniques and devices for the treatment of		

	<p>wastewater</p> <ul style="list-style-type: none"> - select and apply techniques and devices for the treatment of wastewater sludge - select and apply techniques and devices for the quality control of waste gas and wastewater - evaluate the technique for wastewater and waste gas treatment during the design of the plant 																																													
Teaching methodology:	<p>Lectures Laboratory exercises Field work</p>																																													
Assessment methods and grading system¹:	<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. Midterms</td> <td>40</td> <td>22</td> </tr> <tr> <td>4. Final exam</td> <td>40</td> <td>22</td> </tr> <tr> <td>Total</td> <td>100</td> <td>55</td> </tr> </tbody> </table> <p>* Class activity is scored through the engagement of students in laboratory exercises</p> <table border="1"> <thead> <tr> <th colspan="3">Scores and grading</th> </tr> <tr> <th>Score</th> <th>Grade (BiH)</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>	Grading criteria			Criteria	Maximal score	Required score	1. Class attendance	5	3	2. Class activities*	15	8	3. Midterms	40	22	4. Final exam	40	22	Total	100	55	Scores and grading			Score	Grade (BiH)	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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Literature²:	<p>Mandatory literature:</p> <ol style="list-style-type: none"> 1. Muhić-Šarac Tidža, Uvod u hemiju životne sredine, PMF, Sarajevo 2011. 2. D. Tuhtar, Zagađenje zraka i vode, Svjetlost, Sarajevo, 1984. J. Đuković, V. Bojanić, Aerogagađenje, D.P. Institut zaštite i ekologije, Banja Luka, 2000. 3. A. Raković, Zagađivanje i prečišćavanje vazduha, Građevinska knjiga, Beograd, 1981. 4. Zh. Tan, Air Pollution and Greenhouse Gases - From Basic Concepts to Engineering Applications for Air Emission Control, Springer Science+Business Media, 																																													

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

Singapore, 2014

5. H. Simičić, Procesi obrade otpadnih voda, Javna biblioteka Lukavac, 2002
6. L. Knežić (urednik), Mehanička i fizičko-hemijska obrada otpadnih voda, Savez hemičara i tehnologa Srbije, Beograd, 1980

Supplementary literature:

1. T. Brinkmann, G. G. Santonja, H. Yükseler, S. Roudier, L. D. Sancho, Best Available Techniques (BAT) Reference Document for Common Waste Water and Waste Gas Treatment/Management Systems in the Chemical Sector; EUR 28112 EN; doi:10.2791/37535