



1. GENERAL INFORMATION			
1.1. Course teacher	Prof. Ana Lončarić Božić, PhD Prof. Ana Vrsalović Presečki, PhD		1.6. Year of the study 1 <sup>st</sup> (1 <sup>st</sup> semester)
1.2. Name of the course	Environmental Engineering		1.7. ECTS credits 5
1.3. Associate teachers	Josipa Papac, mag. ing. oecoing. Dino Skendrović, mag. ing. oecoing.		1.8. Type of instruction (number of hours L + E + S + e-learning) Total 60 (L: 30, E: 15, S: 15)
1.4. Study programme (undergraduate, graduate, integrated)	graduate		1.9. Expected enrolment in the course 20
1.5. Status of the course	<input checked="" type="checkbox"/> mandatory	<input type="checkbox"/> elective	1.10. Level of application of e-learning (level 1, 2, 3), percentage of online instruction (max. 20%) 2
2. COUSE DESCRIPTION			
2.1. Course objectives	Introduce students to environmental problems and environmental engineering tools: <ol style="list-style-type: none"> <li>To teach practical application of fundamental concepts of mass and energy balance and transfer to environmental problems</li> <li>To develop understanding of environmental processes and the application of mathematics of growth</li> <li>To develop understanding of air and water pollution and control</li> <li>To instil methodology of risk assessment</li> <li>To instil principles of waste management</li> </ol>		
2.2. Enrolment requirements and/or entry competences required for the course	-		
2.3. Learning outcomes at the level of the programme to which the course contributes	<ul style="list-style-type: none"> <li>Compile and apply advanced knowledge of natural and technical sciences, particularly chemical engineering and environmental engineering in solving scientific, professional and general social problems.</li> <li>Solve engineering problems using the scientific method combining expert knowledge from chemistry, environmental, and chemical engineering as well as material science and engineering.</li> <li>Correlate expert knowledge from chemistry, chemical engineering and material engineering with awareness of influence on society, economy and environment.</li> <li>Utilise advanced laboratory procedures and instruments for synthesis of new products, create sustainable processes, and solve problems of water, air and soil pollution.</li> <li>Independently organise and plan timelines, apply a general methodology for project planning and management in a business environment</li> </ul>		



	<ul style="list-style-type: none"> <li>Demonstrate independence and reliability in independent work, as well as effectiveness, reliability and adaptability in team work</li> <li>Outline results of independent and teamwork in a written and oral form to non-experts and experts in a clear and coherent way.</li> </ul>								
2.4 Expected learning outcomes at the level of the course (3 to 10 learning outcomes)	<ol style="list-style-type: none"> <li>Achieve understanding of environmental problems and sources</li> <li>Identify and evaluate impacts of pollutants on water, air and soil</li> <li>Assess environmental changes by mathematics of growth</li> <li>Apply methodology of environmental and health risk assessment</li> <li>Correlate sources and available technologies for pollution minimization and control</li> </ol>								
2.5 Course content (syllabus)	<p><b>WEEK 1.</b> Introduction to environmental engineering  <b>WEEK 2.</b> Mass Transfer and balance  <b>WEEK 3.</b> Energy Transfer and balance  <b>WEEK 4.</b> Introduction to Environmental chemistry  <b>WEEK 5.</b> Environmental Chemistry  <b>WEEK 6.</b> Mathematics of Growth  <b>WEEK 7.</b> Air pollution  <b>WEEK 8.</b> Partial exam  <b>WEEK 9.</b> Water pollution  <b>WEEK 10.</b> Water quality control  <b>WEEK 11.</b> Global atmospheric change  <b>WEEK 12.</b> Risk assessment  <b>WEEK 13.</b> Solid waste management  <b>WEEK 14.</b> Waste Recovery  <b>WEEK 15.</b> Partial exam.</p>								
2.6 Format of instruction:	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> online in entirety <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work				<input type="checkbox"/> independent assignments <input type="checkbox"/> multimedia and the internet <input checked="" type="checkbox"/> laboratory <input type="checkbox"/> work with mentor <input type="checkbox"/> (other)		2.7 Comments:		
	No comments								
2.8 Student responsibilities	Attendance and participation in lectures (75% min), seminars (75%) and lab (100%). Written laboratory reports. Teamwork: seminar project and presentations:								
2.9 Monitoring student work	Class attendance	YES		Research		NO	Oral exam		NO
	Experimental work	YES		Report	YES		(other)		
	Essay		NO	Seminar paper	YES		(other)		
	Preliminary exam	YES		Practical work	YES		(other)		
	Project		NO	Written exam	YES		ECTS credits (total)	5	



	Title	Number of copies in the library	Availability via other media
2.1. Required literature (available in the library and/or via other media)	Introduction to Environmental Engineering and Science, Gilbert M. Masters Wendell P. Ela, Pearson Education Limited, 2014	2	
	Course materials prepared by the course teachers for lectures, seminars and laboratory exercise.		<a href="http://www.fkit.unizg.hr">www.fkit.unizg.hr</a>
2.11. Optional literature			
2.12. Other (as the proposer wishes to add)			