COURSE DESCRIPTION CARD

<table>
<tr><td colspan="10">Faculty of Civil Engineering and Environmental Sciences</td></tr>
<tr><td>Field of study</td><td colspan="6"></td><td>Degree level and programme type</td><td></td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="6"></td><td>Study profile</td><td>Academic profile</td></tr>
<tr><td rowspan="2">Course name</td><td colspan="6" rowspan="2">Waste recycling solutions</td><td>Course code</td><td>IS-FCEE-00214S</td></tr>
<tr><td>Course type</td><td>Erasmus</td></tr>
<tr><td rowspan="2">Forms and number of hours of tuition</td><td>L</td><td>C</td><td>LC</td><td>P</td><td>SW</td><td>FW</td><td>S</td><td>Semester</td><td>Summer</td></tr>
<tr><td>15</td><td></td><td></td><td></td><td>30</td><td></td><td></td><td>No. of ECTS credits</td><td>4</td></tr>
<tr><td>Entry requirements</td><td colspan="9">-</td></tr>
<tr><td>Course objectives</td><td colspan="9">-to acquaint students with social and ecological possibilities of recycling realization and its types; - to acquire skills of applying basic technologies of material recycling, taking into account environmental aspects; - to acquire skills of designing the system of selective waste collection and recycling in municipal sector in environmental, economic and social aspect.</td></tr>
<tr><td>Course content</td><td colspan="9"><u>Lecture</u>: Methods of recycling and recovery of secondary raw materials. Quality requirements for recycling products in terms of their use. Possibilities of obtaining alternative fuels. Recycling techniques for selected groups of products.
<u>Specialization workshop</u>: Construction and operation principles in landfilling. Waste quantity calculation. population prediction. Calculation of waste stream. Calculation of waste to be landfilled. Calculation of landfill area. Calculation of biogas quantity. Construction and operation principles in landfilling.</td></tr>
<tr><td>Teaching methods</td><td colspan="9">Informational lectures - multimedia presentations, specialization workshop - project discussion</td></tr>
<tr><td>Assessment method</td><td colspan="9">lecture – written test; specialization workshop – project completion, presentation and discussion</td></tr>
<tr><td>Symbol of learning outcome</td><td colspan="7">Learning outcomes</td><td colspan="2">Reference to the learning outcomes for the field of study</td></tr>
<tr><td>LO1</td><td colspan="7">Student has elementary knowledge in the design of waste recycling solutions</td><td colspan="2">EN_W08</td></tr>
<tr><td>LO2</td><td colspan="7">Student classifies basic processes and methods of recycling and recovery of products</td><td colspan="2">EN_W09, EN_U08</td></tr>
<tr><td>LO3</td><td colspan="7">Student is able to solve organizational and technical problems in the field of waste recycling systems, and understands their impact on the environment</td><td colspan="2">EN_U08, EN_U13</td></tr>
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LO4	Student is able to use knowledge to develop professional and ethical awareness and to take responsibility for their actions	EN_K02
LO5		
LO6	.	
Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO1	Test on the lecture content	L
LO2	evaluating the student's reports and performance in classes	SW
LO3	evaluating the student's reports and performance in classes	SW
LO4	evaluating the student's work during specialization workshop	SW
LO5		
LO6		

Student workload (in hours)		No. of hours	
Calculation	Lecture attendance	15	
	participation in classes	30	
	preparation for classes, projects, seminars, etc.	15	
	working on projects, reports, etc.	30	
	participation in student-teacher sessions related to the classes/seminar/project	5	
	implementation of project tasks		
	preparation for and participation in exams/tests	10	
	TOTAL:	105	
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		50	2
Student workload – practical activities		90	3,6

Basic references	1. Tchobanoglous George, Handbook on Solid Waste Management, Mcgraw Hill Book Co,2002; 2..Sengupta Debashish, Modelling Trends in Solid and Hazardous Waste Management, Springer-Verlag GmbH, 2017; 3. Yung-Tse Hung, Lawrence K Wang, Nazih K Shammas, , Handbook of Environment and Waste Management, 2014;
Supplementary references	1. Nicholas P. Cheremisinoff, Handbook of Solid Waste Managment and Waste Minimalization Technologies, Elsevier, 2003.

Organisational unit conducting the course	Department of Water Supply and Sewage Systems	Date of issuing the programme
Author of the programme	Maria Walery, PhD Eng.	4.03.2020

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar