COURSE DESCRIPTION CARD

<table>
<tr><td colspan="11">Faculty of Civil Engineering and Environmental Sciences</td></tr>
<tr><td colspan="3">Field of study</td><td colspan="5"></td><td colspan="2">Degree level and programme type</td><td>BSc.</td></tr>
<tr><td colspan="3">Specialization/ diploma path</td><td colspan="5"></td><td colspan="2">Study profile</td><td>Academic profile</td></tr>
<tr><td colspan="3" rowspan="2">Course name</td><td colspan="5" rowspan="2">Facilities for wastewater treatment</td><td colspan="2">Course code</td><td>IS-FCEE-00040S</td></tr>
<tr><td colspan="2">Course type</td><td>Erasmus</td></tr>
<tr><td colspan="3" 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 colspan="2">Semester</td><td>Summer</td></tr>
<tr><td>30</td><td>-</td><td>-</td><td>30</td><td>-</td><td>-</td><td>-</td><td colspan="2">No. of ECTS credits</td><td>6</td></tr>
<tr><td colspan="3">Entry requirements</td><td colspan="8">Basic knowledge of: chemistry, ecology, biology, biotechnology</td></tr>
<tr><td colspan="3">Course objectives</td><td colspan="8">Types of facilities for wastewater treatment, systems, their elements and technology. Calculations of pollution loads, the efficiency of contaminants removal. Knowledge about types of treatment technologies, their advantages and disadvantages, types of wastewater linked to particular parameters. Identification of pollution parameters, analytical methods.</td></tr>
<tr><td colspan="3">Course content</td><td colspan="8"><u>Lecture:</u> Types, characteristics, technological parameters, application in real conditions of unit processes, methods and devices used for wastewater treatment technology. Wastewater characteristics. Legal regulations related to sewage management. Transformations of pollutants occurring in sewage, in aerobic and anaerobic conditions. Methods of sewage treatment. Technical and technological solutions. Systems for integrated removal of organic compounds, nitrogen and phosphorus. Devices for pre-treatment of selected types of wastewater. Systems of wastewater treatment facilities and equipment.
<u>Project:</u> Practical implementation of the lectures in the form of a project covering the issues of wastewater technology. The calculation of pollution loads, the efficiency of removal.</td></tr>
<tr><td colspan="3">Teaching methods</td><td colspan="8">Multimedia presentation (lecture), design of WWTP system (project)</td></tr>
<tr><td colspan="3">Assessment method</td><td colspan="8">lecture – written or oral exam;
project – implementation of the project, presentation and discussion</td></tr>
<tr><td colspan="3">Symbol of learning outcome</td><td colspan="7">Learning outcomes</td><td>Reference to the learning outcomes for the field of study</td></tr>
<tr><td colspan="3">LO1</td><td colspan="7">Student has knowledge of basic science, including chemistry and biology, essential to understanding the processes occurring in the environment or processes generated in connection with activities in the field of environment</td><td>ISCED_W01</td></tr>
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LO2	Student has an elementary knowledge of the materials used in wastewater treatment (facilities)	ISCED_W07
LO3	Student has a basic knowledge of the current situation and the latest development trends in environmental engineering. Student knows standards, specific rules and law conected with calculations of wastewater technology.	ISCED_W18
LO4	Student is able to obtain information from the literature and databases about different types of facilities for wastewater treatment, instalations etc. Student can compare knowledge from different sources, interpret data, make conclusions, formulate and justify own opinions.	ISCED_U18
LO5	Student is able to formulate systems and technological systems used in environmental engineering	ISCED_U21
LO6	Student is responsible for own work and can work in a team during study, takes responsibility for collaborative research.	ISCED_K02
Symbol of learning outcome	**Methods of assessing the learning outcomes**	**Type of tuition during which the outcome is assessed**
LO1	evaluating the student's reports, exam, design presentation	L, P
LO2	design form	P
LO3	exam, design form and presentation	L, P
LO4	evaluating the student's work during project	P
LO5	discussion of the student's design	P
LO6	evaluating the student's work during project	P
Student workload (in hours)		**No. of hours**
Calculation	lecture attendance	30
	participation in classes	45
	preparation for classes, projects, seminars, etc.	30
	working on projects, etc.	25
	participation in student-teacher sessions related to the classes/seminar/project	5
	implementation of project tasks	10
	preparation for and participation in exams/tests	10
	TOTAL:	**155**

Quantitative indicators	**HOURS**	**No. of ECTS credits**
Student workload – activities that require direct teacher participation	80	3
Student workload – practical activities	80	3

Basic references	**Ray, Chittaranjan, Jain, Ravi Drinking Water Treatment Wastewater, Springer 2011, James McGraw-Hill 2011, Engineering- treatment,disposal, reuse. Metcalf&Eddy-Mc-Graw Hill, 2003**	
Supplementary references	**Wastewater and biosolids treatment technologies, Pollution Engineering 2001**	
Organisational unit conducting the course	**Department of Environmental Engineering Technology**	**Date of issuing the programme**

Author of the programme	**Joanna Struk-Sokołowska, PhD**	**09.03.2021**

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