COURSE DESCRIPTION CARD

<table>
<tr><td colspan="11">Faculty of Civil Engineering and Environmental Sciences</td></tr>
<tr><td>Field of study</td><td colspan="6">Environmental Engineering</td><td colspan="2">Degree level and programme type</td><td>Bachelor’s degree</td></tr>
<tr><td>Specialization/ diploma path</td><td colspan="6">International School of Engineering</td><td colspan="2">Study profile</td><td>academic profile</td></tr>
<tr><td rowspan="2">Course name</td><td colspan="6" rowspan="2">Systems of Sewage Disposal</td><td colspan="2">Course code</td><td>19284217H</td></tr>
<tr><td colspan="2">Course type</td><td>obligatory</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 colspan="2">Semester</td><td>VI</td></tr>
<tr><td>15</td><td></td><td></td><td>30</td><td>15</td><td></td><td></td><td colspan="2">No. of ECTS credits</td><td>4</td></tr>
<tr><td>Entry requirements</td><td colspan="10">Basic knowledge of fluid mechanics</td></tr>
<tr><td>Course objectives</td><td colspan="10">By the end of this module students should be able to: characterize different types of wastewater collection systems and their components, calculate sewage budget for a community, apply appropriate methods for a design of sewers, design simple wastewater collection system using dedicated software.</td></tr>
<tr><td>Course content</td><td colspan="10">Lectures: General information on sewage disposal systems. Computation of sewage flows. Design principles of separated and combined sewage systems. Operation and design principles of pressure and vacuum sewage systems. Hydraulic calculations of sewers. Pipe materials and sewerage appurtenances.
Project: Engineering design of gravity sewer system for a small community (foul water only)
Specialized workshop – application of specialized computer software for hydraulic analysis of sewer system</td></tr>
<tr><td>Teaching methods</td><td colspan="10">Informational lectures (with multimedia presentations), design project (with example calculations)</td></tr>
<tr><td>Assessment method</td><td colspan="10">lecture – written test; project / specialized workshop – project / exercises completion, presentation and discussion</td></tr>
<tr><td>Symbol of learning outcome</td><td colspan="8">Learning outcomes</td><td colspan="2">Reference to the learning outcomes for the field of study</td></tr>
<tr><td>LO1</td><td colspan="8">Student is able to: explain how sewage disposal systems work and describe main elements of the system</td><td colspan="2">IS1_W05</td></tr>
<tr><td>LO2</td><td colspan="8">Student is able to design a gravity sewer system</td><td colspan="2">IS1_U11</td></tr>
<tr><td>LO3</td><td colspan="8">Student is able to access and apply data necessary for a design and analysis of sewer systems</td><td colspan="2">IS1_U14</td></tr>
<tr><td>LO4</td><td colspan="8">Student is ready to analyse problems related to sewage disposal</td><td colspan="2">IS1_K01</td></tr>
<tr><td>LO5</td><td colspan="8"></td><td colspan="2"></td></tr>
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Symbol of learning outcome	Methods of assessing the learning outcomes	Type of tuition during which the outcome is assessed
LO1	written exam	L
LO2	evaluation of submitted project and exercises from the workshop	P, SW
LO3	evaluation of submitted project / exercises	P, SW
LO4	discussion of submitted project	P

Student workload (in hours)		No. of hours
Calculation	lecture attendance	15
	participation in classes, laboratory classes, etc.	45
	working on projects, reports, etc.	25
	participation in student-teacher sessions related to the classes/seminar/project	5
	preparation for and participation in exam	10
	TOTAL:	100

Quantitative indicators	HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation	65	2,6
Student workload – practical activities	75	3

Basic references	1) P Bizier (ed.): Gravity Sanitary Sewer Design and Construction, 2nd edition ASCE Manuals and Reports on Engineering Practice No. 60, ISBN: 978-0-7844-0900-8 2) Metcalf & Eddy. Wastewater Engineering: Treatment, Disposal and Reuse, 3rd ed., McGraw-Hill, New York, 1991. 3) Viessman Jr.W.,Hammer M.J.: Water Supply and Pollution Control. Harper and Row Publishers Inc., 1996.
Supplementary references	1. Butler, D., Davies J.W.: Urban Drainage, 2nd edition, Spon Press, London And New York, 2000, available online: https://vannpiseth.files.wordpress.com/2015/07/urban-drainage-butler.pdf. 2) Heidrich Z.: Sewer Systems - textbook for technical schools (in Polish). Wyd.Szkolne i Pedagoficzne, Warszawa, 2006. 3) Kalenik M.: Water Supply and Sewage Disposal (in Polisch). Wyd. SGGW, Warszawa, 2009

Organisational unit conducting the course	Department of Water Supply and Sewage Systems	Date of issuing the programme
Author of the programme	Dariusz Andraka, PhD	2022.05.10

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