



## Subject card

Subject name and code	, PG_00061727						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2024/2025		
Education level	second-cycle studies		Subject group		Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Part-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department of Sanitary Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Ryszard Orłowski				
	Teachers		dr inż. Maria Orłowska-Szostak				
			dr inż. Ryszard Orłowski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	10.0	10.0	0.0	0.0	40
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	40		6.0		88.0	134
Subject objectives	The aim of the course is to provide students with structured, possibly complete knowledge and skills enabling them to perform design and analytical work for sanitary and storm sewage systems using professional computer software. In particular, the aim of the course is to teach students how to properly use this software based on in-depth knowledge of the simultaneity of sewage outflow from facilities, as well as the field of hydraulics and technical solutions used in sewage systems.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_U07	when assessing existing sanitary and storm sewage systems and designing such systems, it uses simulations of these systems based on appropriate computer models	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
	K7_U10	Is able to design and comprehensively analyze the functioning of sanitary sewage systems and water drainage from urban catchment areas using computer modeling.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
	K7_W06	has structured knowledge of hydraulics in connection with technical issues specific to sewage systems	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	K7_U06	Is able to use the acquired computer models to solve analysis or design tasks of sewage systems	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
Subject contents	K7_W04	Has knowledge of computer modeling methods of sewage networks, control and automation methods as well as optimization methods and reliability analysis of engineering systems	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
	LECTURES (A) Mathematical methods in modeling and dimensioning of sewage transport systems. Gravity network of sanitary sewage systems: Contents of a set of calculations: (amounts of sewage flowing into the sewage system, hydraulic calculations), division of methods used in sanitary sewage systems and storm sewage systems. Method of summing expenses in nodes and uniform flow. Method of summing expenses in nodes and determining accumulation curves. Computer modeling of unsteady flows in the network. Gravity stormwater drainage network: Constant rain intensity method. Limit intensity method. Computer modeling of unsteady runoff in an urban catchment. Sanitary sewage systems other than gravity: Dimensioning of pressure sewage systems by simulating extreme situations. Dimensioning of vacuum sewage systems by simulating extreme situations. (B) Mathematical methods in the optimization of sewage systems. The task of global optimization of the sewage system. Optimization of the gravity-pressure sewage transport system with given network routes. AUDITORY EXERCISES Review of professional software used for computer-aided sewage design. Principles and examples of using this software in the design of sewage networks and pumping stations. LABORATORY Individual designs of parts of sewage networks made using professional company software equipped with catalogs of selected devices.		
Prerequisites and co-requisites	Passed the basic program of the subject Sewerage. Knowledge of the basics of hydraulics, description of flow in channels. Basic knowledge of numerical methods, including general knowledge of methods for solving systems of nonlinear equations. Knowledge of Auto Cad program.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written exam	65.0%	55.0%
	execution and completion of the project	65.0%	45.0%

Recommended reading	Basic literature	1. Błaszczyk Wł. i in. Kanalizacje t. I: Sieci i pompownie, Warszawa: Arkady 1979r. i kolejne wznowienia 2. wyd. WILO: Kanalizacja ciśnieniowa w systemie WILO PORADNIK dla projektantów, Warszawa 2002r. 3. wyd. ROEDIGER POLSKA: System kanalizacji próżniowej przeznaczony do odprowadzania ścieków z obszarów zabudowanych, Białystok, Gdańsk, Bielsko-Biała, 2001r. 4. Katalogi firmowe / poradniki dla projektantów dostępne w Internecie: PipeLife, WAVIN, HOBAS, GRUNDFOS, WILO in. 5. Orłowska M., Orłowski R.: Wymiarowanie kanalizacji ciśnieniowej. W: materiałach II Konferencji Naukowo Technicznej INSTALACJE WODOCIĄGOWE I KANALIZACYJNE PROJEKTOWANIE WYKONAWSTWO EKSPLOATACJA. Warszawa Dębe, 15-16.05.2007r.
	Supplementary literature	1. Findeisen, Wł. (1985). Analiza systemowa. PWN, Warsaw, Poland. 2. Szymkiewicz R.: Metody numeryczne w inżynierii wodnej, Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2007  2. Nowogoński Ireneusz: Epa SWMM 5.1 Wykorzystanie i rozbudowa modelu sieci kanalizacyjnej, 2018-04-25
	eResources addresses	Podstawowe <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=32471">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=32471</a> - Address on the eNauczanieKanalizacje platform (with a computer project) - niestacjonar_2023/2024 - Moodle ID: 32471 Adresy na platformie eNauczanie: Kanalizacje (z projektem komputerowym) - niestacjonar_2024/2025 - Moodle ID: 40350 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40350">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40350</a>
Example issues/ example questions/ tasks being completed	Dimensioning of pressure sewage systems by simulating extreme situations.Design of a fragment of the sewage network made using professional software.  Design of a fragment of the sewage network made using professional software.	
Work placement	Not applicable	

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