



Subject card

Subject name and code	, PG_00061727						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2025		Academic year of realisation of subject			2026/2027	
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 -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Maria Orłowska-Szostak				
	Teachers						
Lesson types	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_U06	He can use computer models for solving problems of analysis or design of the sewer systems. Modifying models enables him the optimum description of analysed and designed systems.	[SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
	K7_U07	He has some widened and deepened knowledge in a range of sewer systems design and the systems draining off water from the urbanized area; he knows modern technologies in the object systems and professional computer programs assisting the design. He is able to evaluate and choose the most appropriate, in given conditions, sewage system taking into account all the technical and economic aspects.	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
	K7_W04	The student has possibly complete knowledge and abilities enabling to perform optimal design and analytical works for the sewage and rain water systems with the use the professional software and taking into account the art of state operation of these systems.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects
	K7_U10	He is able to design the developed system of a sanitary sewage system and rain waters system from the area of the urbanized area..	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools
	K7_W06	He has an expanded and deepened the hydraulic knowledge necessary in the design of sewer systems; knows professional computer programs assisting the design.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
Subject contents	Course content – lecture 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. 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.		
	Course content – 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.		
	Course content – 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%	40.0%
	execution and completion of the project	65.0%	60.0%
Recommended reading	Basic literature	1. Heidrich Z., Kalenik M., Podedworna J., Stańko G.: Sanitacja wsi. Seidel-Przywecki, Warszawa 2008 2. Królikowska J., Królikowski A., Żaba T. : Kanalizacja. Podstawy projektowania, wykonawstwa i eksploatacji, Wydawnictwo Politechniki Krakowskiej, Kraków 2015 3. Kotowski A : Podstawy bezpiecznego projektowania kanalizacji, Wydawnictwo Seidel-Przywecki, Warszawa 2012 4. Praca zbiorowa pod red. Z. Suligowskiego. Kanalizacja - projektowanie, wykonanie, eksploatacja, 1.Wydawnictwo Seidel-Przywecki, Warszawa 2012 5. Nowakowska M., Kotowski A.: Metodyka i zasady modelowania odwodnieni terenów zurbanizowanych, Oficyna wydawnicza Politechniki Wrocławskiej, Wrocław 2017 6. Szeląg B. :Komputerowe wspomaganie modelowania sieci kanalizacji deszczowej. Zagadnienia wybrane., Wydawnictwo Politechniki Świętokrzyskiej, Kielce2017 7. Norma PN-EN 752-4 Zewnętrzne systemy kanalizacyjne 8. Błaszczyk Wł. i in. Kanalizacje t. I: Sieci i pompownie, Warszawa: Arkady 1979r. i kolejne wznowienia 9. WILO: Kanalizacja ciśnieniowa w systemie WILO PORADNIK dla projektantów, Warszawa 2002r. 10. 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. 11. wyd. ROEDIGER POLSKA: System kanalizacji próżniowej przeznaczony do odprowadzania ścieków z obszarów zabudowanych, Białystok, Gdańsk, Bielsko-Biała, 2001r. 12. Katalogi firmowe / poradniki dla projektantów dostępne w Internecie: PipeLife, WAVIN, HOBAS, GRUNDFOS, WILO in. 13. Podręcznik dla programu ArCADia BIM - https://www.intersoft.pl/index.php?pobierz=dokumentacje&qad source=1&qad campaignid=21521231 14. https://www.epa.gov/water-research/storm-water-management-model-swmm 15. https://www.epa.gov/water-research/epanet 16. www.instalsoft.com.pl	
	Supplementary literature	1. Puchalska E., Sowiński M. : Wymiarowanie kanałów ściekowych metodą krytycznych naprężeń stycznych, Ochrona Środowiska, 1984 2. Dąbrowski W.: Jak nowa norma zmienia projektowanie kanalizacji?, Ochrona Środowiska 5/2012 3. Findeisen, Wł. (1985). Analiza systemowa. PWN, Warsaw, Poland. 2. Szymkiewicz R.: Metody numeryczne w inżynierii wodnej, Wydawnictwo Politechniki Gdańskiej, Gdańsk, 2007 4. Nowogoński Ireneusz: Epa SWMM 5.1Wykorzystanie i rozbudowa modelu sieci kanalizacyjnej, 2018-04-25	
		eResources addresses	
Example issues/ example questions/ tasks being completed	Design of a section of the sewage system using professional software (ArCADia BIM 15 by InterSoft and NetSYSTEM by InstalSoft). Use of SWMM software to simulate storm water drainage. Dimensioning of pressure drainage systems by simulating extreme situations. Use of Epanet 2.2 software.		
Practical activities within the subject	Not applicable		