



Subject card

Subject name and code	Sewerage Systems, PG_00048005						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2023/2024		
Education level	first-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	4	Language of instruction			Polish		
Semester of study	7	ECTS credits			6.0		
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	prof. dr hab. inż. Ewa Wojciechowska					
	Teachers	prof. dr hab. inż. Ewa Wojciechowska Natalia Dąbrowska					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	20.0	0.0	10.0	0.0	50
	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	50		8.0		110.0	168
Subject objectives	The aim of this subject is to provide basic knowledge on construction, design and maintenance of sewerage and drainage systems, including pipe materials and necessary equipment. Realization of the subject should lead to gaining abilities of designing, computations, selection of equipment, proper usage of terminology, data bases and literature and catalogues supported by insight into environmental and social aspects of sewerage and drainage systems functioning at urban areas.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W07] has a structured and theoretically founded knowledge in the field of materials used in the sanitary industry, their physico-chemical properties; knows and understands the basic processes of their production	Student knows new and traditional technologies applied in sewerage systems.	[SW1] Assessment of factual knowledge
	[K6_W09] has ordered, theoretically founded knowledge in the field of water supply, sewage, heating, ventilation and air conditioning, and the principles of shaping the microclimate of rooms; knows legal regulations, standardization issues and recommendations for the design of water supply, sewage, heating and gas networks and installations	Student has specific knowledge on the sewerage systems work, design and computation.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	[K6_U13] knows the rules of application and can choose the materials of the sanitary industry	Student is acquainted with application of materials in sanitary constructions, principles of material selection in sewerage and drainage systems.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
	[K6_U12] can design installations, networks and facilities: water supply, sewage, heating and gas	During realisation of design projects students work in 2-person teams, plan subsequent stage of project realisation according to the schedule.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
[K6_U03] can prepare documentation regarding the implementation of an engineering task/project and prepare a text or presentation including a discussion of the results of the implementation	Student is able to prepare design project of a sewerage system of any size.	[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject	
Subject contents	<p>Lectures: Classification and division of sewerage systems for wastewater and stormwater transportation. Gravitational, pressure and vacuum sewers. Quantative assessments of household and industrial wastewater and stormwater. Types and shapes of pipe's cross-sections. Sewer pipes' materials and construction (traditional and new). Hydraulic computations for gravitational sewers. Sewer equipment: manholes, cascade manholes, stormwater inlets, stormwater overflows, separators, siphones. Pumping stations. Maintenance aspects. Trenchless technologies for construction and renovation of sewers. Sustainable stormwater management.</p> <p>PROJECT: Design project of separate gravitational flow sewerage and drainage system for a city. Principles of sewer routing, location of wastewater treatment plant, location of computation nodes. Division of catchment into sub-catchments. Computation of flow rates in sanitary sewers and in storm drains. Sewer profiles and hydraulic computations. Project of pumping stations. Technical description.</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	egzamin	50.0%	50.0%
	wykonanie i obrona projektu	50.0%	50.0%
Recommended reading	Basic literature	<p>Edel R.: Odwodnienia drogowe. WKiŁ Warszawa 2008 Imhoff K., Imhoff K.-R.: Kanalizacja miast i oczyszczanie ścieków. Poradnik. Projprzem-EKO, Bydgoszcz 1996 Kotowski A.: Podstawy bezpiecznego projektowania kanalizacji. Wydawnictwo Seidel Przywecki, Warszawa 2012 Weinerowska Bords K.: Rola uproszczeń w modelach obliczeniowych kanalizacji deszczowej. Wydawnictwo Politechniki Gdańskiej, Gdańsk 2010 Kanalizacja. Praca zbiorowa pod red. Z.Suligowskiego. Wydawnictwo Seidel Przywecki, Warszawa 2012 Technologie bezwykopowe w inżynierii środowiska. Praca zbiorowa pod red. A.Kuliczowskiego. Wydawnictwo Seidel Przywecki, Warszawa 2010</p>	

	Supplementary literature	<p>Kotowski A., Kaźmierczak B., Damcewicz A.: Modelowanie opadów do wymiarowania kanalizacji Polska Akademia Nauk. Komitet Inżynierii Łądowej i Wodnej. Instytut Podstawowych Problemów Techniki. Studia z zakresu inżynierii. Nr 68. Warszawa 2010</p> <p>Dziopak J.: Analiza teoretyczna i modelowanie wielokomorowych zbiorników kanalizacyjnych. Politechnika Krakowska, Kraków 1992</p> <p>Kisiel A.: Hydrauliczna analiza działania grawitacyjno - podciśnieniowych zbiorników kanalizacyjnych. Politechnika Krakowska, Kraków 1998</p> <p>Kwietniewski M.: GIS w wodociągach i kanalizacji. PWN Warszawa 2008</p> <p>Licznar P.: Generatory syntetycznych szeregów opadowych. Wydawnictwo Uniwersytetu Przyrodniczego, Wrocław 2009</p> <p>Mielcarzewicz E.: Odwadnianie terenów zurbanizowanych i przemysłowych. Systemy odwadniania. PWN, Warszawa 1990</p> <p>Dziopak J.: Modelowanie wielokomorowych zbiorników retencyjnych w kanalizacji. Monografia Politechniki Rzeszowskiej. Rzeszów, 2004</p> <p>Kuliczkowski A.: Rury kanalizacyjne t. I: Własności materiałowe. Politechnika Świętokrzyska - Monografie, Kielce 2001</p> <p>Weismann D.: Komunalne przepompownie ścieków. Seidel Przywecki, Warszawa 2000</p>
	eResources addresses	<p>Adresy na platformie eNauzanie:</p> <p>Kanalizacja NSTN 2023/24 - Moodle ID: 26819</p> <p>https://enauzanie.pg.edu.pl/moodle/course/view.php?id=26819</p>
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	