



Subject card

Subject name and code	, PG_00059986						
Field of study	Environmental Engineering						
Date of commencement of studies	February 2025	Academic year of realisation of subject				2025/2026	
Education level	second-cycle studies	Subject group				Obligatory subject group in the field of study	
Mode of study	Full-time studies	Mode of delivery				at the university	
Year of study	1	Language of instruction				Polish	
Semester of study	2	ECTS credits				3.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Department of Geotechnical and Hydraulic Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Katarzyna Weinerowska-Bords				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	30.0	0.0	45
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	45		5.0		30.0	80
Subject objectives	Learning about computational methods and ways of designing urban retention and drainage facilities (theory + practical applications).						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_U06	The student is able to critically analyze the case under consideration, select a solution to ensure optimal rainwater management and select computational methods for the proposed technical solutions.			[SU4] Assessment of ability to use methods and tools		
	[K7_K02] understands the need to formulate and communicate to the public information and opinions on the achievements in the environmental engineering and other aspects of the engineering activity in the sanitary sector; is aware of the importance and understands non-technical aspects and effects of engineering activities; strives to convey such information and opinions in a universally understandable manner, presenting various points of view	The student understands the importance of the problem of proper management of rainwater resources, knows the context of an engineer's work, including - understands the non-technical conditions of an engineer's work (social and economic aspects). Is able to consider the consequences of engineering projects and select the optimal solution for local conditions.			[SK5] Assessment of ability to solve problems that arise in practice		
	K7_W09	The student knows hydrological processes and computational models used in designing solutions for stormwater retention, drainage or irrigation of urban areas.			[SW1] Assessment of factual knowledge		
K7_W01	The student has extended and in-depth knowledge of the description, calculations and applications of selected mathematical models used to design urban retention and drainage.			[SW1] Assessment of factual knowledge			

Subject contents	Rational management of rainwater - general assumptions. The role of retention, drainage and irrigation of areas in stormwater management. Rainwater balance and hydrological processes determining runoff. Standards for stormwater management in cities and general methodology for calculating retention and drainage. Rules for calculating retention facilities. Micro, small and large retention and computational methods. Rules for calculating objects for infiltration. Principles of designing and implementing drainage systems for roads, tunnels (underpasses) and bridges. Designing rainwater management on a single property, in industrial areas, in sports and recreational areas. Design of drainage areas and construction excavations, drainage design. Effective irrigation using rainwater. Designing green roofs and rain gardens.		
Prerequisites and co-requisites	Basic knowledge of hydrology; knowledge of urban hydrology		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project task	80.0%	50.0%
	Final test	60.0%	50.0%
Recommended reading	Basic literature	[1] Geiger W., Dreseitl H. (1999): Nowe sposoby odprowadzania wód deszczowych. Poradnik retencjonowania i infiltracji wód deszczowych do gruntu na terenie zabudowanym. Oficyna Wydawnicza Projprzem-EKO, Bydgoszcz.[2] Królikowska J., Królikowski A. (2019): Wody opadowe. Odprowadzanie, zagospodarowanie, podczyszczanie i wykorzystanie. Wydawnictwo Seidel-Przywecki Sp. z o.o., Warszawa.[3] Kotowski A. (2011): Podstawy bezpiecznego wymiarowania odwodnień terenów, Wydawnictwo Seidel-Przywecki Sp. z o.o., Warszawa.[4] Słyś D. (2008): Retencja i infiltracja wód deszczowych, Oficyna Wydawnicza Politechniki Rzeszowskiej, Rzeszów.[5] Wojciechowska E. i in. (2015), Zrównoważone systemy gospodarowania wodą opadową, Wyd. PG, Gdańsk[6] Zasady projektowania i wykonywania zielonych dachów i żyjących ścian Poradnik dla gmin, praca zbiorowa, Stowarzyszenie Gmin Polska Sieć Energie Cités, Kraków 2013.[7] Ogród deszczowy w 5 krokach. Broszura informacyjna Gdańskich Wód.Artykuły:[8] Suchanek E., Mrowiec M. (2015): Zastosowanie metody wymiarowania niecek infiltracyjno-retencyjnych do zagospodarowania wód opadowych, Inżynieria Ekologiczna, Vol. 41, 2015, 160165, DOI: 10.12912/23920629/1845[9] Suligowski Z. (2008): Alternatywa dla wód opadowych, Wodociągi i Kanalizacja 4(50)/2008, 54-55.[10] Wagner I., Krauze K. (2014): Jak bezpiecznie zatrzymać wodę opadową w mieście? Narzędzia techniczne., Zrównoważony Rozwój Zastosowania, nr.5, 2014	
	Supplementary literature	Articles in industry magazines, e.g.: Instal, Dachy zielone, GWiTS, Inżynieria Ekologiczna; Rynek Instalacyjny; Przegląd Naukowy Inżynieria i Kształtowanie Środowiska; Water Science and Technology	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Example topics of design tasks:1. The concept of rainwater management in the area of an industrial plant, along with basic calculations of infiltration and retention devices.2. The concept of rainwater management in the area of the service and commercial complex, along with basic calculations of infiltration and retention devices.Sample questions for the final exam:1. Please verify the presented example of calculations for the retention facility and indicate any errors or doubts.2. Please identify the type of object shown in the photo and provide the basic assumptions for its design.		
Work placement	Not applicable		

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