GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00059986		
Field of study	Environmental Engineering		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2023/2024
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	dr inż. Wojciech Szpakowski dr hab. inż. Katarzyna Weinerowska-Bords Jarosław Gajewski	

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

Additional information:
The course activities are covered by the grant: "UNDER THE SUPERVIOSION OF A SPECIALIST - IT'S TIME FOR A MENTOR. PROJECT CLASSES UNDER THE CARE OF PRACTITIONERS", implemented as part of the KID competition, edition 2023 (IDUB task III.1, project 037013).In accordance with the assumptions of the above-mentioned project, the classes are co-conducted by specialists from outside the university - long-time practitioners who serve as co-teachers, mentors and consultants during the classes. A consultant from outside GUT also takes part in the assessment of the project task and may provide opinions on the final test.

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_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_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 [SU1] Assessment of task fulfilment
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
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

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
Final test	60.0%	50.0%
Project task	80.0%	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	Uzupełniające 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	