



Subject card

Subject name and code	, PG_00059954						
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 Subject group related to scientific research 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			4.0		
Learning profile	general academic profile	Assessment form			assessment		
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	Natalia Dąbrowska prof. dr hab. inż. Ewa Wojciechowska					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	15.0	0.0	60
	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	60		5.0		38.0	103
Subject objectives	The aim of this subject is to present the current problems and advances in management of storm water in urban areas.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_U12	Student selects proper methods and technical solutions for storm water drainage, depending on topography and land development.			[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment		
	K7_W09	Student understands problems with water cycle in urban areas. Student understands the role of proper storm water management in mitigation of climate change, flash floods and droughts.			[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation		
	K7_W06	Student designs storm water drainage systems and devices for local storm water retention and infiltration.			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
	K7_U11	Student understands economic, social and environmental aspects of urban storm water drainage. Student knows legislative and administrative conditions of functioning of urban drainage systems.			[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task		

Subject contents	<p>Lecture:</p> <p>1. Water and climate change. Hydrological cycle in the city. Virtual water, water footprint. Water deficit in the world. Floods and droughts. 2. Gdańsk and Żuławy Wiślane as an example of areas at risk of flooding. 3. Symptoms of climate change and related threats on different continents. Work in groups. Presentation. Summary: what picture emerges from this? 4. Dealing with rainwater. Gray, green, blue-green infrastructure. Ecosystem functions and services. Rainwater retention and infiltration. Impact on the hydrological cycle and climate change. 5. Alternative water sources: what are they and what can they be used for? What are the requirements for irrigation water, for example? 6. Quantity and quality of rainwater and the possibilities of its economic use. Water from roof slopes, water from the sewage system. 7. Gray water and its use 8. Possibilities of using treated sewage 9. Green roofs and green walls 10. Hydrophyte and FTW systems 11. Basics and rules of ecohydrology. Restoration of rivers and streams. Melioration in rural areas. Reducing runoff from agricultural fields. 12. Reclamation of water reservoirs. Exercises As part of the exercises, students become familiar with the principles of designing and implementing storm sewage and drainage networks in larger urban centers. They learn the principles of creating design and as-built documentation. The classes will discuss the implementation of small retention facilities in the immediate vicinity, the types and role of municipal institutions in the field of rainwater drainage, and typical materials offered on the market along with the method of their installation. Design The design part of the course focuses on your own work. As part of the course, students develop a rain garden design with an overflow based on selected locations. The prepared documentation will include a land development plan, visualizations, stormwater drainage network profiles, well diagrams and a technical description with a calculation part. While creating documentation, the course participant encounters typical obstacles that participants of the construction process face on a daily basis and must use the knowledge acquired so far to solve the problem that occurred during the implementation of the project on the construction site. The design part of the course is intended to illustrate the responsibility associated with author's supervision over the investment.</p>														
Prerequisites and co-requisites															
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 826 794 857">Subject passing criteria</th> <th data-bbox="799 826 1137 857">Passing threshold</th> <th data-bbox="1142 826 1481 857">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 864 794 891">test</td> <td data-bbox="799 864 1137 891">50.0%</td> <td data-bbox="1142 864 1481 891">25.0%</td> </tr> <tr> <td data-bbox="456 898 794 972">own presentations of selected themes connected with water in urban areas (in groups)</td> <td data-bbox="799 898 1137 972">50.0%</td> <td data-bbox="1142 898 1481 972">25.0%</td> </tr> <tr> <td data-bbox="456 978 794 1010">design of raingarden</td> <td data-bbox="799 978 1137 1010">50.0%</td> <td data-bbox="1142 978 1481 1010">50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	test	50.0%	25.0%	own presentations of selected themes connected with water in urban areas (in groups)	50.0%	25.0%	design of raingarden	50.0%	50.0%
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Example issues/ example questions/ tasks being completed	Wykonanie projektu ogrodu deszczowego z przelewem wraz projektem zagospodarowania terenu, wizualizacją, profilami sieci kanalizacji deszczowej, schematami studni oraz opisem technicznym z częścią obliczeniową.														
Work placement	Not applicable														