GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	URBAN HYDROLOGY, PG_00039348						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2024		Academic year of realisation of subject	2025/2026			
Education level	second-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery	at the university			
Year of study	2		Language of instruction	English			
Semester of study	3		ECTS credits	4.0			
Learning profile	general academic profile		Assessment form	assessment			
Conducting unit	Department of 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	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	35.0	100

Subject objectives	Recognizing and understanding the problem of the influence of the urbanization on hydrological processes and formation of catchment runoff. Understanding the problems of the consequences of computational method selection on accuracy of the results. Ability of application of basic methods of runoff calculation.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U12] can design: developed water and sewage system, complex heat source, pool water treatment technology, mechanical ventilation installation or underground water intake, drainage of urban water catchment, reservoir control system during flood seizure or water treatment technology, domestic waste water treatment plant	Student can determine the amount of rainwater necessary to drain from the analyzed catchment. Student can assess the capacity of existing channels and propose a way of rainwater management.	
[K7_W08] has knowledge necessary to understand the social, economic, legal and other non-technical determinants of engineering activities and their incorporation in engineering practice	Recognizes and understands the non-technical aspects of engineering activities in determining the outflow of rainwater from the urbanized basin.	
[K7_U06] can use the known mathematical methods and models, if needed, to modify them, for: analysis and design of water systems and their components or water flows, migration of pollutants or water and wastewater treatment and sewage sludge handling	Applies selected computational methods to runoff calculation. Evaluates the influence of the choice of the method and computational simplifications on the efficiency and accuracy of the solution.	
[K7_U09] can choose tools (analytical or numerical) to solve engineering problems	Student can choose the method of estimation of the outflow from the basin, depending on the type of the problem being solved and the required accuracy of calculations.	
[K7_W09] has deepened, ordered, theoretically developed knowledge related to: hydrology, drainage, water management, flood protection or resource and water intake or water and sewage management	Student has in-depth knowledge of the mathematical description of processes conditioning the outflow of urbanized basins. Student knows simplified and more complex methods for determining the outflow from the catchment.	

Subject contents

The hydrological cycle in natural and modified environment. Urban catchment and its specificity. Impact of urbanization on the hydrology cycle and quantity of runoff". Definition of "rainfall-runoff" model. Classifications of hydrological models. Catchment characteristics and their influence on runoff formation. Rainfall as the basic factor determining runoff. IDF formulas. Time of runoff concentration. Global and integrated models for runoff calculations.

Prerequisites and co-requisites

Recommended prior holding of the course of Hydrology

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Tutorials - control exercise (test)	60.0%	30.0%
Project - 2 reports	60.0%	30.0%
Lecture - exam (theory)	60.0%	40.0%

Recommended reading

Basic literature	Akan, A.O., Houghtalen, R.J.: ***Urban Hydrology, Hydraulics and Stormwater Quality***. ***Engineering Applications and Computer Modeling***. John Wiley and Sons, Inc. (2003)
Supplementary literature	***1. Highway Hydrology.*** Publ. of US Department of Transportation (2002) ***2. Hydrologic Modeling System HEC-HMS. Technical Reference Manual*** (2000) 3. Chow, V.T.: ***Handbook of Applied Hydrology***. McGraw Hill Book Company, New York (1964)
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	Calculate maximal capacity of the analyzed channel. Calculate with use of rational method the peak value of outflow discharge in urban basin. Explain the impact of urbanization on particular processes determining stormwater outflow from the catchment. Explain the concept of 'time of runoff concentration". Calculate the time of runoff concentration in the analyzed basin.
Work placement	Not applicable