



Subject card

Subject name and code	Urban catchment hydrology, PG_00042522						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Optional subject group 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	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			3.0		
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	15.0	0.0	0.0	10.0	0.0	25
	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	25		4.0		55.0	84
Subject objectives	Understanding the specificity of the urbanized catchment and its impact on the implementation of engineering tasks related to broadly understood rainwater management. Knowledge and analysis of computational methods in the context of their relationship with hydrological processes. Sensitizing students to the issues of choosing the method to solve the problem, the role of the assumed values of parameters and the possibilities and limitations of typical calculation methods.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[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	Knows the non-technical conditions of the engineer's work in the context of rainwater management issues	
	[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	is able to perform calculations for the design of standard drainage systems, taking into account a more thorough analysis of hydrological conditions	
	[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	Knows the methods of calculating the amount of rainwater in an urbanized drainage basin. Understands the relationship between hydrological issues and engineer activities. Is able to describe the differences between urban and other drainage basins and explain the resulting consequences for water circulation and computational methodology	
	[K7_U09] can choose tools (analytical or numerical) to solve engineering problems	Is able to choose the appropriate calculation method for the analyzed situation (including determining the time of concentration of the outflow, choosing the precipitation formula, etc.)	
[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	Is able to calculate the amount of rainwater in a catchment for a given design problem, is able to correctly select parameters and calculation coefficients, knows how to discuss them.		
Subject contents	The hydrological cycle in natural and modified environment. 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	knowledge of the basic scope of general hydrology		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	project	80.0%	50.0%
	teoretical test (lecture)	60.0%	50.0%

Recommended reading	Basic literature	<p>Weinerowska-Bords K. : Wpływ uproszczeń na obliczanie spływu deszczowego w zlewni zurbanizowanej. Wydawnictwo Politechniki Gdańskiej,</p> <p>Gdańsk (2010)</p> <p>2. Kotowski A. : Podstawy bezpiecznego wymiarowania odwodnień terenów.</p> <p>Wydawnictwo Seidel-Przywecki, Warszawa (2011)</p> <p>3. Edel R.: Odwodnienie dróg. Wyd. Komunikacji i Łączności, Warszawa (2009)</p>
	Supplementary literature	<p>1. Banasik K. : Wyznaczanie wezbrań powodziowych w małych zlewniach zurbanizowanych, Wydawnictwo SGGW, Warszawa (2009)</p> <p>2. Kotowski A., Kaźmierczak B., Danczewicz A. : Modelowanie opadów do wymiarowania kanalizacji, Monografia PAN, Warszawa (2010)</p> <p>3. Akan, A.O., Houghtalen, R.J.: Urban Hydrology, Hydraulics and Stormwater Quality. Engineering Applications and Computer Modeling.</p> <p>John Wiley and Sons, Inc. (2003)</p> <p>4. McCuen, R. H.: Hydrological Analysis and Design. Practice Hall,</p> <p>Englewood Cliffs, New Jersey (2005)</p> <p>5.. Chow, V.T.: Handbook of Applied Hydrology. McGraw Hill Book Company,</p> <p>New York (1964)</p>
	eResources addresses	
Example issues/ example questions/ tasks being completed	<p>Determine the catchment characteristics</p> <p>Calculate the time of concentration of the outflow from the catchment</p> <p>Calculate the amount of rainwater draining from the catchment area using the chosen method.</p> <p>Explain the difference between global and integrated modeling.</p> <p>Assess the computational usefulness of the Błaszczyk formula in the context of other formulas of a similar nature.</p>	

Work placement	Not applicable
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