



## Subject card

Subject name and code	Hydrology, PG_00043622						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2021/2022		
Education level	first-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	2	Language of instruction			Polish		
Semester of study	4	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Dariusz Gąsiorowski					
	Teachers	dr inż. Wioletta Górczewska-Langner dr hab. inż. Dariusz Gąsiorowski dr inż. Patrycja Mikos-Studnicka mgr inż. Paweł Wielgat					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	15.0	0.0	60
	E-learning hours included: 0.0 Adresy na platformie eNauczanie:						
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	45.0	110		
Subject objectives	The student describes the hydrological cycle, explains the most important flow processes in catchment, flow in open channels and in porous media. He is capable to carry out some basic analysis dealing with the selected hydrological problema.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W01] has knowledge in the field of mathematics, including: linear algebra, mathematical analysis and elements of mathematical statistics, probability theory, applications of mathematics, including mathematical methods and numerical methods, necessary for: 1) description and analysis of hydrological phenomena; 2) description and analysis of meteorological phenomena; 3) solving project tasks of the sanitary industry;	The student is able to use the knowledge of the basics of statistical and numerical methods to describe and analyze hydrological and meteorological phenomena.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[K6_W15] knows and understands the methods of measuring basic quantities characteristic for fluid mechanics and hydraulics, hydrology; knows the calculation methods and IT tools necessary to analyze the results of laboratory and field work	The student knows the computational methods and has knowledge about the influence of the model selection and their parameters on the calculation results of objects and environmental engineering systems. The student understands the role of hydrology in issues related to water management and flood protection. The student knows the rules for preparing hydrological studies and knows the available computational tools supporting the work of an engineer within the above mentioned fields.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[K6_U08] can use properly selected methods and devices of hydraulics and hydrology, enabling determination of basic quantities characterizing the flow of water in open channels and rivers, pipelines and flow objects of environmental engineering	The student is able to choose the appropriate method and tools to determine the necessary parameters characterizing the surface and subsurface flows.	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
	[K6_W05] knows the theoretical basis of hydromechanics and its practical models, necessary to solve technical problems in the field of environmental engineering (sanitary engineering, water melioration, water management and flood protection, pollution spread)	The student knows the basics of hydromechanics as well as the equations describing surface and subsurface flow. Student is able to apply these equations to solve hydrological problems.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[K6_W12] knows the theoretical basis of the general atmosphere circulation, radiation processes, thermodynamics of the atmosphere, physical properties of atmospheric air and climate-forming processes	The student gains the basic knowledge of meteorology at the level necessary for an environmental engineering specialist. The student understandst a basic concepts of the water and energy cycle in the atmosphere.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
Subject contents	LECTURE Hydrological cycle, the principal processes determining the transport of water. Water in atmosphere, rainfall. Evaporation. Groundwater, infiltration. Runoff from catchment area, surface flow, Instantaneous Unit Hydrograph. River flow, water stage and discharge and rating curve. Frequency analysis of the extreme flood waves. Solid transport in the rivers. Snow melting, transport of the thermal energy in the river and lacks, ice phenomena. PROJECT Definition of the catchment's limits on the maps. Calculation of aeral rainfall. Estimation of the runoff from catchment using the Iszkowski formulae. Elaboration of the elements of hydrologic design. LABORATORY EXERCISES Measurement of selected hydrological parameters and analysis of the obtained results: distribution of flow velocity over an open channel cross-section, discharge rate in an open channel .		
Prerequisites and co-requisites	Knowledge of the subject Fluid mechanics, Hydraulics, Mathematics and Informatics.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	60.0%	25.0%
	Written exam	55.0%	50.0%
		60.0%	25.0%

Recommended reading	Basic literature	1. Ozga Zielinska M., Brzezinski J.: Hydrologia stosowana, Wyd. Naukowe PWN, 1994.  2. Byczkowski A.: Hydrologia. SGGW, Warszawa, 1996.  3. Gąsiorowski D., Szymkiewicz R.: Podstawy hydrologii dynamicznej. WNT, Warszawa 2010.
	Supplementary literature	No requirements
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Field exercises	