



## Subject card

Subject name and code	Hydrology, PG_00058801						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2023/2024		
Education level	first-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	2	Language of instruction			Polish		
Semester of study	4	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			exam		
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. Dariusz Gąsiorowski					
	Teachers	dr hab. inż. Dariusz Gąsiorowski					
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						
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	7.0		58.0	125	
Subject objectives	Understanding the basic hydrological processes occurring in the land phase of the cycle. Understanding the mechanisms of formation of the outflow from the catchment area, water flow in openchannels and in the ground.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W14] 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.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	[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.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
	[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 mathematical methods to describe and analyze hydrological phenomena.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects
K6_W12	The student knows the basics equations describing surface and subsurface flow. Student is able to apply these equations to solve hydrological problems.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge	
Subject contents	<p>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 lakes, ice phenomena.</p> <p>PROJECT Elaboration of the elements of hydrologic design. Determination of excess rainfall Determination of the instantaneous unit hydrograph. Determining the impact of the roughness of the floodplain on the channel capacity.</p> <p>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.</p>		
Prerequisites and co-requisites	Knowledge of the following subjects: fluid mechanics, hydraulics, mathematics and informatics.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Test - exercises	51.0%	10.0%
	Task reports	60.0%	40.0%
	Exam	51.0%	50.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>Ozga Zielińska M., Brzeziński J.: Hydrologia stosowana, Wyd. Naukowe PWN, 1994.</li> <li>Byczkowski A.: Hydrologia. SGGW, Warszawa, 1996.</li> <li>Gąsiorowski D., Szymkiewicz R.: Podstawy hydrologii dynamicznej. WNT, Warszawa 2010.</li> </ol>	

	Supplementary literature	<p>1. Chow V. T., Maidment D. R., Mays L.W.: <i>Applied hydrology</i>. McGraw-Hill 1988.</p> <p>2. Maidment D.R.: <i>Hydrology. W: Handbook of Hydrology</i>, Maidment D. R. (ed.). McGraw-Hill INC, New York 1993.</p>
Example issues/ example questions/ tasks being completed	eResources addresses	Adresy na platformie eNauczanie:
Work placement	Field exercises	