



## Subject card

Subject name and code	Hydraulics and Hydrology , PG_00044017						
Field of study	Civil Engineering						
Date of commencement of studies	October 2021		Academic year of realisation of subject		2023/2024		
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	3		Language of instruction		Polish		
Semester of study	5		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		assessment		
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. Michał Szydłowski				
	Teachers		dr inż. Wioletta Gorczewska-Langner				
			dr inż. Witold Sterpejkowicz-Wersocki				
			dr inż. Patrycja Mikos-Studnicka				
			dr hab. inż. Michał Szydłowski				
			mgr inż. Paweł Wielgat				
			prof. dr hab. inż. Adam Szymkiewicz				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	15.0	0.0	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	Acquisition of knowledge and skills related to the description of the liquid state and hydrological processes.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W07] has basic knowlede on natural processes (hydrological, hydraulical or geological) and its influence on building subsoil; understands specific aspects of surface and underground water, which constraints the design and exploitation of buildings and engineering objects		Student defines and analyzes elements of the water balance of the river basin. Student names and explains the physical processes that determine water circulation on the surface and in the ground. The student defines the concepts and explains the principles of water movement in the natural environment. It determines the nature of water flow in closed conduits and open channels. Analyzes simplified flow models.		[SW1] Assessment of factual knowledge		
	[K6_U07] Can design and properly dimension basic elements of construction or basic foundations of general, hydrotechnical and bridge constructions		The student calculates the basic parameters of the flow in pipelines, channels and hydraulic devices. He studies hydraulic phenomena in the laboratory. It measures and determines the parameters of water movement. He draws conclusions about the movement of water.		[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		

Subject contents	LECTURE Fluid properties. The forces acting on the fluid. Basic equations of fluid flow. Classification of flows. Elements of hydrostatics. Kinematics of fluids. Simplify the equations of water flow. Conservation equations for one-dimensional flow. The fluid flow in closed pipes. The fluid flow in open channels. Flow of liquid through the wires. Filtration of water in the soil. Velocity and flow measurements. Hydrological cycle, hydrological characteristics of catchments. The parameters of the river basin. Water balance of the catchment. Flood, flow characteristics in rivers. CLASSES Hydraulics and hydrology computations: hydrostatics, pipelines, open channels, water filtration LABORATORY EXERCISES Analysis of flow in pipelines. Analysis of flow in open channel.		
Prerequisites and co-requisites	No requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	50.0%	25.0%
	Final test	60.0%	50.0%
	Laboratory experiments reports	100.0%	25.0%
Recommended reading	Basic literature	1. Czetwertyński E., Utrysko B. Hydraulika i hydromechanika, PWN 1986 2. Kubrak J., Hydraulika techniczna, SGGW Warszawa 1998 3. Mitosek M., Mechanika płynów w inżynierii i ochronie środowiska, PWN 2001 4. Byczkowski A., Hydrologia, SGGW 1996 5. Ojha C.S.P. et al., Engineering Hydrology, Oxford 2008	
	Supplementary literature	1. Sawicki J., Przepływy ze swobodna powierzchnia, PWN Warszawa 1998. 2. Van Te Chow, Open-Channel Hydraulics, McGRAW-HILL, 1957 (first ed.) 3. Van Te Chow et al., Applied Hydrology, McGRAW-HILL, 1988	
	eResources addresses	Adresy na platformie eNauczanie: Hydraulika i hydrologia - wykład 2023/2024 - Moodle ID: 28907 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28907">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28907</a> Hydraulika i hydrologia - wykład 2023/2024 - Moodle ID: 28907 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28907">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28907</a>	
Example issues/ example questions/ tasks being completed	1. Computations of hydrostatic pressure and pressure forces. 2. Computations of pressure flow in pipelines. 3. Computations of open channel hydraulics. 4. Hydrological computations of river catchment outflow. 5. Measurements of water flow in open channels.		
Work placement	Not applicable		