



Subject card

Subject name and code	Hydraulic Engineering Structures, PG_00059987									
Field of study	Environmental Engineering									
Date of commencement of studies	February 2026		Academic year of realisation of subject		2026/2027					
Education level	second-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	3		ECTS credits		2.0					
Learning profile	general academic profile		Assessment form		assessment					
Conducting unit	Department of Geotechnical and Hydraulic Engineering -> Faculty of Civil and Environmental Engineering -> Faculties of Gdańsk University of Technology									
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Tomasz Kolarski							
	Teachers									
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM			
	Number of study hours	15.0	15.0	0.0	0.0	0.0	30			
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	30		5.0		19.0	54			
Subject objectives	Studying the principles of construction and operation of hydraulic structures such as weirs, earth and concrete dams, regulatory structures, hydroelectric power plants and others									
Learning outcomes	Course outcome		Subject outcome			Method of verification				
	[K7_U08] is able to assess risks in the implementation of engineering projects and implement appropriate safety rules		The student knows the sources of threats arising during the construction of hydrotechnical facilities, knows the methods of selecting appropriate technical measures to protect against threats			[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information				
	K7_W09		The student describes the processes of selecting computational flows for buildings.			[SW1] Assessment of factual knowledge				
	K7_W05		The student describes the principles of design, implementation and operation of water structures and also makes basic calculations regarding the hydraulics of selected hydrotechnical facilities. The student lists the types of hydrotechnical structures, explains the role and principles of operation.			[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge				
	[K7_W02] has broadened and well-ordered knowledge of the current law on construction, water, environmental protection and planning and spatial planning.		The student is able to use the provisions of the Act in the context of determining the classes of objects and the resulting construction rules			[SW3] Assessment of knowledge contained in written work and projects				

Subject contents	Course content – lecture				
Lecture: Hydrological properties of Polish rivers. Principles of designing and dimensioning a hydraulic structure, selection of a reliable water volume, principles of selecting the damming level, dimensioning of the overflow clearance, dimensioning of the substrate for energy dissipation, anti-filtration protection, stability of the damming structure. Composition of water steps. Main and auxiliary closures of damming structures. Traffic devices. Structures of the body, base plate, pillars and abutments. Earthen and erratic dams, selection of materials for the construction of dams. Sealing elements. Drains and reverse filters. Reinforcements of slopes and crown. Basic calculations and principles of construction. Control and measurement devices for earth dams. Construction of earth and concrete settling tanks. Hydropower structures. Basic types of hydroelectric power plants. River hydropower plant. Pumping stations and their equipment. Rules for protecting the riverbed below the dam. Riverbed regulation: water movement in a natural riverbed, regulation goals. Waterways, technical characteristics of typical hydrotechnical structures on waterways, waterway capacity. Tutorial classes: Design exercise for a low-slope damming structure. Performing basic hydraulic and filtration calculations. List of loads on the structure. Checking the stability of the structure. Determination of stress values and distributions under the structure.					
Prerequisites and co-requisites					
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade		
	final test	60.0%	50.0%		
	reports	60.0%	50.0%		
Recommended reading	Basic literature	1. Budownictwo betonowe t.XVII: Budowle wodne śródlądowe, Arkady 1969.  2. Wolski W. Zapory ziemne, Arkady 1973.  3. Depczyński W., Szamowski A., Budowle i zbiorniki wodne 1999r.			
	Supplementary literature	Bednarczyk S., Bolt A., Mackiewicz. St., Stateczność oraz bezpieczeństwo jazów i zapór, Wyd. Polit. Gdańskiej, Gdańsk 2009			
	eResources addresses				
Example issues/ example questions/ tasks being completed	Low head dam calculations				
Practical activites within the subject	Not applicable				

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