



Subject card

Subject name and code	, PG_00059987						
Field of study	Environmental Engineering						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2023/2024		
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						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Tomasz Kolerski					
	Teachers	dr hab. inż. Tomasz Kolerski dr inż. Wioletta Gorczewska-Langner					
Lesson types and methods of instruction	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_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		
	[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		

Subject contents	<p>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.</p>		
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	<ol style="list-style-type: none"> 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	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Low head dam calculations		
Work placement	Not applicable		