GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Hydro engineering facilities in the energy sector, PG_00055975		
Field of study	Power Engineering, Power Engineering, Power Engineering		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	Optional subject group 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	3	Language of instruction	Polish
Semester of study	5	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 inż. Witold Sterpejkowicz-Wersocki	
	Teachers		

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	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	2.0	18.0	50

Subject objectives	The aim of the subject is to present the types and basic principles of construction of water engineering structures related to energy.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W16] has an elementary knowledge about energy and environmental construction including building materials, their strength, construction mechanics and building physics, moisture migration in buildings, heat transfer through building partitions, has a basic knowledge of marine and inland hydrotechnical structures; has knowledge of the hydraulic and hydrological conditions of designing facilities and building structures, photogrammetry, remote sensing, hydrography, and spatial analysis.	The student describes the basic types of inland water structures and has knowledge of the hydrological and hydrotechnical conditions of these structures.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
[K6_U11] Can design and properly dimension basic foundations in hydrotechnical construction facilities; can evaluate and list the loads acting on constructions, knows the codes of modern geotechnical investigations and technologies, knows the principles of foundations and safe design of foundations of typical buildings	The student knows the basic principles of selecting and designing damming structures and other facilities related to hydropower. Is able to collect loads acting on selected hydrotechnical objects.	[SU1] Assessment of task fulfilment
[K6_U12] can correctly choose tools (analytical or numerical) to solve engineering problems filtration processes, and data analysis; is able to use photogrammetric and remote sensing tools in engineering tasks in the field of geodetic techniques and metrology	The student is able to assess, based on analytical or numerical methods, the possibility of excessive seepage under dam structures.	[SU4] Assessment of ability to use methods and tools

Subject contents

Course content – lecture
1. Damming structures
2. Hydrotechnical facilities based on the example of a cascade of barrages on the Radunia and Gwda rivers
3. Controlled and uncontrolled weirs
4. Seepage and uplift force under damming structures
5. Weir gates
6. Water intakes and inlets
7. Diversional channels (dimensioning, reinforcements, seals)
8. Pipelines and energy tunnels
9. Earth dams - types, seals, reinforcements and drainage
10. Hydroelectric power plants

Course content – project

1. Basics of designing a controlled weir with a water intake.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Design task	60.0%	50.0%
Passing the lectures	60.0%	50.0%

Recommended reading

Basic literature	1. Budownictwo betonowe tom XVII: Budowle wodne śródlądowe, Wydawnictwo Arkady, Warszawa 1969 2. Depczyński W., Szamowski A.,: Budowle i zbiorniki wodne, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 1999 3. Bednarczyk S., Bolt A., Mackiewicz St., : Stateczność oraz bezpieczeństwo jazów i zapór, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2009
Supplementary literature	Rozporządzenie Ministra Środowiska w sprawie warunków jakim powinny odpowiadać budowle hydrotechniczne i ich usytuowanie, Dz..U. z 2007 r. Nr 86 poz. 579
eResources addresses	

Example issues/ example questions/ tasks being completed

1. Selecting the spillway capacity of the weir.
2. Verifying the safe seepage below the weir.
3. Calculating the fill level of the derivation channel.

Practical activites within the subject

Not applicable