GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00037315		
Field of study	Technical Physics		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2024/2025
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	6	ECTS credits	1.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Piotr Grygiel	
	Teachers	dr inż. Piotr Grygiel	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

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	15	2.0	8.0	25

Subject objectives

Getting to know the construction and principles of operation of hydropower plants and their impact on the environment

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W01	Understands the civilization importance of physics and its applications in hydropower	[SW1] Assessment of factual knowledge
K6_U01	Can independently learn and obtain information on various aspects of hydropower from literature, databases and other properly selected sources.	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
K6_W02	Has structured knowledge of the basics of physics, including mechanics, thermodynamics, electricity and magnetism to the extent necessary to understand and describe the operation of a hydropower plant.	[SW1] Assessment of factual knowledge

Subject contents

1. History of hydropower plants.
2. Types of hydropower plants.
3. Functions of hydropower plants in the power system.
4. Hydroelectric power plants in Poland and in the world and their share in energy production.
5. Construction of hydropower plants.
6. Types of turbines used in hydropower plants.
7. Energy conversion in a hydropower plant: water stream energy, energy transferred to a turbine, mechanical energy converted into electricity.
8. Operating problems of a hydropower plant: cooperation of generators with the power grid, distributed production and energy accumulation.
9. Electrical available quantities and their measurement.
10. The impact of hydropower plants on the environment.

Prerequisites and co-requisites

Basic, academic physics course in mechanics, thermodynamics, electricity and magnetism.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Oral credit for a term paper on a selected topic	51.0%	100.0%

Recommended reading	Basic literature	1. H.J. Wagner and J. Mathur, Introduction to Hydro Energy Systems, Springer-Verlag GmbH, 2011
	Supplementary literature	1. J. Raabe J, Hydro Power, VDI-Verlag GmbH, Duesseldorf, 1985.
	eResources addresses	Adresy na platformie eNauczanie: Energetyka wodna - Moodle ID: 45594 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=45594
Example issues/ example questions/ tasks being completed	1. Describe the stages of energy conversion in a hydropower plant. 2. Describe the types of turbines used in hydropower plants. 3. Describe the problems of cooperation of the electric generator with the power grid.	
Work placement	Not applicable	

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