



Subject card

Subject name and code	, PG_00037315						
Field of study	Technical Physics						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2022/2023		
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	Instytut Fizyki i Informatyki Stosowanej -> 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_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		
	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		
Subject contents	<div>1. History of hydropower plants.</div> <div>2. Types of hydropower plants.</div> <div>3. Functions of hydropower plants in the power system.</div> <div>4. Hydroelectric power plants in Poland and in the world and their share in energy production.</div> <div>5. Construction of hydropower plants.</div> <div>6. Types of turbines used in hydropower plants.</div> <div>7. Energy conversion in a hydropower plant: water stream energy, energy transferred to a turbine, mechanical energy converted into electricity.</div> <div>8. Operating problems of a hydropower plant: cooperation of generators with the power grid, distributed production and energy accumulation.</div> <div>9. Electrical available quantities and their measurement.</div> <div>10. The impact of hydropower plants on the environment.</div>						
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	Uzupełniające Adresy na platformie eNauczenie: Energetyka wodna 2023 - Moodle ID: 30492 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=30492
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 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	