



Subject card

Subject name and code	Design and operation of drive turbines , PG_00055907						
Field of study	Power Engineering, Power Engineering, Power Engineering						
Date of commencement of studies	October 2021	Academic year of realisation of subject				2023/2024	
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				3.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Institute of Ocean Engineering and Ship Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Marek Dzida				
	Teachers						
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		8.0		37.0	75
Subject objectives	Basic knowledge in the construction and operation of rotating machines						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[K6_U06] is able to use the basic knowledge on the operation of energy equipment in the field of thermal power plants, thermal and energy and heating systems, combustion engines, compressors and rotating machines to assess the technical condition of the system		The student is able to indicate the methods of exploitation of the elements of heat turbines with the aim of not exceeding the strength limits in the conditions of high mechanical and thermal loads.			[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information	
	[K6_W13] has basic knowledge of the operation of energy equipment in the field of thermal power plants, thermal and energy and heating systems, internal combustion engines, compressors and rotating machines, has basic knowledge of the regulation of energy equipment and methods of their selection depending on the needs		The student is able to recognize the basic structural nodes of heat turbines. He can indicate the methods of strength calculations of these nodes. He can show how to properly operate turbines and their components.			[SW1] Assessment of factual knowledge	
	[K6_U08] can design the basic parameters of the selected technology related to energy conversion and select auxiliary devices and evaluate the project in terms of technical and economic		The student is able to indicate the methods of exploitation of the elements of heat turbines with the aim of not exceeding the strength limits in the conditions of high mechanical and thermal loads.			[SU3] Assessment of ability to use knowledge gained from the subject	
Subject contents	Rotor design. Stress analysis of drum and disc rotors. Trigger rotation of foldable disc rotors. Rotor balancing. Designing steering discs. Stress analysis of steering discs. Design of rotor blades and their fastenings. Blade vibrations. Fundamentals of rotor dynamics. Turbine bodies and external glands. Designing radial and thrust bearings						
Prerequisites and co-requisites	Knowledge of heat turbines and their cycles						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Colloquium for credit from exercises	50.0%	40.0%
	Colloquium for credit from lecture	50.0%	60.0%
Recommended reading	Basic literature	1. Kosowski K, Introduction to the theory of marine turbines, Wyd. PG Delft University, Gdańsk 2004 2. Leizerovich A. S. "Steam Turbines for Modern Fossil-fuel Power Plants" Inc NetLibrary, 2007; 1. Logan E., Ro R. "Handbook of Turbomachinery" Arizona State University, Marcel Dekker Inc. New York, Basel, 2003;	
	Supplementary literature	1. Boyce M. P. "Gas Turbine Engineering Handbook Gulf Professional Publishing an imprint of Butterworth-Heinemann, Boston, Oxford, Auckland, Johannesburg, Melbourne, New Delhi, 2002; 2. Horlock J. H. "Advanced Gas Turbine Cycles An imprint of Elsevier Science, Amsterdam, Boston, Heidelberg, London, New York, Oxford, Paris, San Diego, San Francisco, Singapore, Sydney, Tokyo, 2003;	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		