GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Construction and design of heat turbines, PG_00055905		
Field of study	Power Engineering		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2023/2024
Education level	first-cycle studies	Subject group	
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	9.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Krzysztof Kosowski	
	Teachers	prof. dr hab. inż. Krzysztof Kosowski dr inż. Wojciech Włodarski dr hab. inż. Marian Piwowarski	

Lesson types and methods of instruction							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	45.0	30.0	0.0	30.0	0.0	105
	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	105	9.0	111.0	225

Subject objectives

Student can apply his knowledge on thermal turbines and their thermal cycles. He can perform preliminary design of a thermal turbine

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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	He can design basic technology parameters concerning energy conversion and choose auxiliary equipment and evaluate design fro technical and economical points of view	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
[K6_W12] has basic knowledge of the life cycle and repairs of energy equipment in the field of thermal power stations, thermal and energy systems and heating systems, internal combustion engines and compressors as well as rotating machines	He can apply basic knowledge from fluid flow machinery field and from methods of design in analytical and numerical way to primary design of energy systems	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[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	He can assess the efficiency and basic parameters of the selected technology related to energy conversion, evaluate auxiliary devices in detail and evaluate the project.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment

Subject contents

Rotor design, strength analysis calculations of drum and disk type rotors. Release rotational speed of disk type rotors. Rotor balancing. Design of nozzle disks, strength analysis calculation of nozzle disks. Rotor blades design and their fixing system on the disks. Strength analysis calculation of rotor blades and their fixing system. Blades vibrations. Basics of turbine rotors dynamics. Turbine casings. Internal and external glands. Design of trust and radial bearings

Prerequisites and co-requisites

Basic knowledge on thermal turbines and their thermal cycles

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	exercise - test	60.0%	30.0%
	project	100.0%	30.0%
	lecture - test	60.0%	40.0%
Recommended reading	Basic literature	Perycz S., Turbiny parowe i gazowe, Politechnika Gdańska, Skrypt, Gdańsk 1988 Perycz S., Turbiny parowe i gazowe, Maszyny Przepływowe T. 10, Wydawnictwo Instytutu Maszyn Przepływowych PAN, Gdańsk 1992.	
	Supplementary literature	Kosowski K, Introduction to the theory of marine turbines, Wyd. PG Delft University, Gdańsk 2004	
	eResources addresses	Adresy na platformie eNauczanie: Konstrukcja i projektowanie turbin cieplnych - Moodle ID: 37913 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37913	
Example issues/ example questions/ tasks being completed	Purpose of disc rotor applicztion.		
Work placement	Not applicable		