GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Turbomachines, PG_00055513						
Field of study	Mechanical Engineering						
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	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						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	75.0	15.0	0.0	30.0	0.0	120
	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	120		11.0	94.0		225
Subject objectives	To present the theory of operation and the design principles of different types of turbomachinery equipment.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U03] is able to identify, formulate and develop the documentation of a simple design or technological task, including the description of the results of this task in Polish or in a foreign language and to present the results using computer software or other aiding tools	Students knows the main parameters and the design characteristics of turbomachinery equipment.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
[K6_U07] is able to design a typical construction of a mechanical device, component or a testing station using appropriate methods and tools, adhering to the set usage criteria	Student can carry out the preliminary design of a turbine, compressor and pump.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
[K6_W09] possesses basic knowledge within the range of thermodynamics and fluid mechanics, construction and operation of heat generating devices, process equipment, including renewable energy sources, cooling and air conditioning	Student knows the thermodynamic and fluid dynamics background of turbomachinery	[SW1] Assessment of factual knowledge
[K6_U06] is able to use mathematical and physical models for analysing the processes and phenomena occurring in mechanical devices within the range of material strength, thermodynamics and fluid mechanics	Student can perform the strength calculations of the elements of turbomachinery equipment.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
[K6_W11] possesses knowledge on design, technology and manufacturing of machine parts, metrology, and quality control; knows and understands methods of measuring and calculating basic values describing the operation of mechanical systems, knows basic calculating methods applied to analyse the results of experiments	Student knows the different types of turbomachinery equipment (steam, gas, water, air turbines, pumps and compressors), knows principles of their operation and the main parameters.	[SW1] Assessment of factual knowledge

Subject contents

Steam and gas turbine thermodynamical cycles and their variants. Combined heat and power production.The principle of operation of an axial turbine stage. The main characteristics and parameters of turbine stages and multistage turbines. Examples of steam and gas turbines. The theory of a radial and axial compressor operation. Characteristics of compressors.Types of water turbines, principle of their operation, water turbine characteristics. Types of air turbines, principle of their operation, air turbine characteristics. Pumps, principle of their operation and characteristics.

Prerequisites and co-requisites

Fluid flow dynamics and thermodynamics.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
design task	60.0%	25.0%
lecture + calc. ex.	60.0%	75.0%

Recommended reading

Basic literature	1. Perycz S., Turbiny parowe i gazowe, IMP- Ossolineum. 2. Kosowski K. et al, Steam and Gas Turbines, Alstom 3. Troskolański A. T., Pompy wirowe, WNT
Supplementary literature	Traupel W., Thermische Turbomaschinen, Springer Verlag
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed

Work placement

Not applicable