GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Thermodynamics, PG_00055054		
Field of study	Management and Production Engineering		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2023/2024
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study 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	2	Language of instruction	Polish
Semester of study	3	ECTS credits	3.0
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	dr hab. inż. Jan Wajs	
	Teachers	dr inż. Marcin Jewartowski dr hab. inż. Michał Klugmann dr inż. Waldemar Targański dr hab. inż. Jan Wajs	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	15.0	0.0	0.0	45
	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	45	2.0	28.0	75

Subject objectives

Student acquire basic knowledge of thermodynamics in the dimension of theory and practice.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U02] has the ability of self-learning and expanding knowledge in a specialized field of engineering production	Student broadens his knowledge in areas related to the thermodynamics.	[SU2] Assessment of ability to analyse information
[K6_K03] is aware of the social role of a graduate of a technical university, understands the importance of non-technical aspects and effects of engineering activities including their impact on the environment and responsibility for decisions, sees the need to formulate and provide the public with information and opinions on the achievements of technology, correctly identifies and resolves dilemmas associated with thejob of an engineer	Student understands a need to improve the thermodynamic efficiency of gas and steam cycles for the protection of natural environment.	[SK5] Assessment of ability to solve problems that arise in practice
[K6_W04] has basic knowledge in the field of automation, robotics and control of production processes, has elementary knowledge of electrical and electronic applications in the production system, has basic knowledge of thermodynamics and fluid mechanics as well as the selection and design of hydraulic and pneumatic systems	Student uses the concepts of thermodynamics and the first and second law of thermodynamics in the analysis of technological and energy processes. Student understands a mechanisms of energy conversion in the engine and pump systems.	[SW1] Assessment of factual knowledge

Subject contents	LECTURE: Basic concepts. The first law of thermodynamics for closed and open systems. Properties of ideal gases and the gas laws. Thermal and caloric equation of state. Thermodynamic processes of ideal gas. Thermodynamics gas cycles. Entropy. The second law of thermodynamics. Fundamentals definitions for steam thermodynamics. EXERCISES: Simple conversion of energy, heat, work. The balances of power of open or closed thermodynamics systems. State and functions of state of ideal and semi-ideal gases and gas mixtures. Characteristic processes of gases. Gas thermodynamic cycles. Characteristic changes of steam. Calculations thermodynamic steam cycles. LABORATORIES: Measurements of thermodynamic parameters: temperature and pressure. Determination of mass flow rate and enthalpy. Energy balance of piston engine. Testing of the refrigerating unit or heat pump.
Prerequisites and co-requisites	Knowledge from course of physics and mathematics.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Laboratory reports	100.0%	20.0%
Written test	56.0%	50.0%
Midterm colloquium	56.0%	30.0%

Recommended reading

Basic literature	Mayhew R.: Engineering thermodynamics/Work & Heat Transfer. Wiley & Sons Inc. 1993, USA.
Supplementary literature	No requirements
eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	Present equations of first law of thermodynamics. Describe Carnot Cycle. Describe Rankine / Otto / Diesel cycle. Present definitions of second law of thermodynamics.
Work placement	Not applicable