GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Thernodynamics, PG_00055384		
Field of study	Mechatronics		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2024/2025
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	1	Language of instruction	Polish
Semester of study	2	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		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	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

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

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W02] has a knowledge in term of physics that includes mechanics, thermodynamics, optics, electricity, magnetism, atomic physics, nuclear physic, solid state physics, including the knowledge necessary to understand basic phenomena occurring in mechatronic elements and systems and its surroundings	Student defines the concepts of thermodynamics, 1st and 2nd Law of Thermodynamics and thermal/ caloric equations of state. Student understands the energy conversion processes in the mechatronic systems.	[SW1] Assessment of factual knowledge
[K6_U03] has self-learning skills	Student broadens his knowledge in areas related to the thermodynamics.	[SU2] Assessment of ability to analyse information
[K6_U01] is able to acquire information from literature, databases and other, properly chosen sources, integrate these information, interpret them, draw conclusions and formulate opinions	Student uses graphs and tables of the physical properties to prepare laboratory reports. Student is able to interpret the results of energy balance of various machines.	[SU1] Assessment of task fulfilment

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 of steam thermodynamics.

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.

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Written test</td><td>56.0%</td><td>70.0%</td></tr>
<tr><td>Laboratory reports</td><td>100.0%</td><td>30.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. Mayhew R.: Engineering thermodynamics/Work & Heat Transfer. Wiley & Sons Inc. 1993, USA.</td></tr>
<tr><td>Supplementary literature</td><td>No requirements</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Present equations of first law of thermodynamics. Describe Carnot Cycle. Describe Otto/Sabathe Cycle. Present definitions of second law of thermodynamics.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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