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 2025	Academic year of realisation of subject	2026/2027
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 -> Wydziały Politechniki Gdańskiej		
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	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_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
[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

<table>
<tr><td>Subject contents</td><td>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 and steam cycles.

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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge from course of physics and mathematics.</td></tr>
<tr><td>Assessment methods and criteria</td><td><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>50.0%</td></tr>
<tr><td>Midterm colloquium</td><td>56.0%</td><td>30.0%</td></tr>
<tr><td>Laboratory reports</td><td>100.0%</td><td>20.0%</td></tr>
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<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>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>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>Present equations of first law of thermodynamics. Describe Carnot Cycle. Describe Rankine / Otto / Diesel cycle. Present definitions of second law of thermodynamics.</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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