GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Thermodynamics, PG_00062723		
Field of study	Technologies for Industry 5.0		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2025/2026
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	5.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Institute Of Nanotechnology And Materials Engineering -> Faculty Of Applied Physics And Mathematics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jakub Karczewski	
	Teachers	Daniel Jaworski Michał Dominów Kinga Kujawska dr hab. inż. Jakub Karczewski	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	15.0	0.0	0.0	60
	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	60	5.0	60.0	125

Subject objectives

Understanding the basic principles of thermodynamics, Enabling students to use theoretical knowledge in the context of industrial applications, including the design and optimization of technological processes. Developing skills in the analysis and evaluation of the performance of energy systems, including thermodynamic cycles, heat machines and heat transfer processes.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U01] applies knowledge of mathematics, physics, chemistry, IT tools and other engineering disciplines to solve theoretical, engineering and technological problems	The student understands the importance of thermodynamic problems in the context of industrial applications.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
[K6_K01] is aware of the need to constantly update and enrich knowledge and practical skills, and improve professional, personal and social competences	The student is aware of the existence of many aspects and problems of thermodynamic nature in technological processes and understands the need to deepen his/her knowledge in the context of specific applications	[SK5] Assessment of ability to solve problems that arise in practice
[K6_W01] demonstrates knowledge and understanding of mathematics, physics, chemistry and IT tools at the level necessary to formulate and solve typical engineering and technological problems	Student has basic knowledge of technical thermodynamics	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects

<table>
<tr><td>Subject contents</td><td>• classical mechanics
• fluid mechanics
• first law of thermodynamics
• ideal and real gases
• second law of thermodynamics
• compressible flows of a thermodynamic medium
• combustion and heat exchange
• compressors, fans and refrigerators
• steam and combustion engines
• steam-gas power plants and combined heat and power plants</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge of physics at the secondary school level</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></td><td>50.0%</td><td>40.0%</td></tr><tr><td></td><td>50.0%</td><td>20.0%</td></tr><tr><td></td><td>50.0%</td><td>40.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>• Jan Szargut "Termodynamika" wydawnictwo naukowe PWN Warszawa 2000
• Andrzej Teodorczyk "Termodynamika Techniczna" Wydawnictwo Szkolne i Pedagogiczne Warszawa 1995</td></tr><tr><td>Supplementary literature</td><td>-</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>• explain the principle of operation of the Carnot engine
• calculate the efficiency of the refrigerator during one cycle
• calculate the change in entropy of gases under the assumed conditions</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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