



## Subject card

Subject name and code	Thermodynamics, PG_00042641						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2021		Academic year of realisation of subject		2022/2023		
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	Part-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Energy and Industrial Apparatus -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Marcin Dampc				
	Teachers		dr inż. Marcin Dampc				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	5.0	0.0	0.0	0.0	15
	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	15		4.0		35.0	54
Subject objectives	Students acquire basic knowledge of thermodynamics						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W02] has knowledge of physics, including mechanics, thermodynamics, optics, electricity and magnetism, nuclear physics and solid state physics, including knowledge necessary to: 1) understand the basic physical phenomena related to material durability, fluid mechanics and hydraulics, building physics, geodetic measurements ; 2) understanding the principles of operation of basic electrical devices and systems; 3) solving project tasks of the sanitary industry;		Possess knowledge on heat transfer and principles of thermodynamics and can solve thermodynamics problems,				
	[K6_U01] has the ability to self-education, can obtain information from literature, databases and other sources, uses information technology, Internet resources; can integrate the obtained information, make their interpretation, as well as draw conclusions and formulate and justify opinions		Based on the principles of thermodynamics, can explain and analyse the thermodynamical systems.				
Subject contents	LECTURE: Basic concepts. The first law of thermodynamics for closed and open systems. Properties of ideal, semi-ideal and real gases. Gas laws. Thermal and caloric equation of state. Thermodynamic processes of ideal gas. Thermodynamics gas cycles. The second law of thermodynamics. Fundamentals of heat transfer. TUTORIALS: Pressure. Simple conversion of energy. Heat. Work. 1st Law of Thermodynamic. State and functions of state of ideal and semi-ideal gases. Thermodynamic processes. Gas thermodynamic cycles. Basic methods of heat transfer.						
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
	Colloquium	56.0%	100.0%
Recommended reading	Basic literature	1. Pudlik W.: Termodynamika. Wyd. PG, 1998. 2. Wiśniewski S.: Termodynamika techniczna. WNT, 2005 3. Pudlik W. (red.): Termodynamika - zadania i przykłady obliczeniowe. Wyd. PG, 2000. 4. Mayhew R.: Engineering thermodynamics/Work & Heat Transfer. J. Wiley & Sons Inc. 1993. USA.	
	Supplementary literature	No requirements	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Explain how the heat current is dependant on the temperature in radiation phenomena. Temperature of what object is an essential here?		
Work placement	Not applicable		