



Subject card

Subject name and code	Thermodynamics I, PG_00055117						
Field of study	Mechanical 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	3	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			exam		
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 Jewartowski				
	Teachers		dr inż. Marcin Jewartowski mgr inż. Stanisław Głuch mgr inż. Kamil Stasiak dr hab. inż. Michał Klugmann dr inż. Paweł Dąbrowski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	8.0	15.0	0.0	0.0	38
	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	38	10.0		77.0	125	
Subject objectives	Students acquire basic knowledge of thermodynamics in terms of theory and practice						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U06] is able to use mathematical and physical models for analysing the processes and phenomena occurring in mechanical devices within the range of material strength, thermodynamics and fluid mechanics		Student calculates thermodynamic parameters, thermodynamic gas processes and cycles as well as basic heat transfer mechanisms. Student measures basic thermodynamic parameters and analyzes the obtained results.		[SU1] Assessment of task fulfilment		
	[K6_W09] possesses basic knowledge within the range of thermodynamics and fluid mechanics, construction and operation of heat generating devices, process equipment, including renewable energy sources, cooling and air conditioning		The student defines the basic concepts of thermodynamics, the first and second law of thermodynamics and the equations of state of gases. Student describes and analyzes thermodynamic gas processes and thermodynamic gas cycles as well as heat transfer mechanisms.		[SW1] Assessment of factual knowledge		
Subject contents	LECTURE: Basic concepts. The first law of thermodynamics for closed and open systems. Properties of perfect and semi-perfect gases. Ideal gas laws. Thermal and caloric equations of state. Thermodynamic processes of ideal gas. Thermodynamics gas cycles. The second law of thermodynamics. Entropy. Fundamentals of heat transfer. TUTORIALS: Heat. Work. 1st Law of Thermodynamics. State and functions of state of gases. Gas mixtures. Thermodynamic processes. Gas thermodynamic cycles. Fundamentals of heat transfer. LABORATORY: Measurements of thermodynamic parameters: temperature and pressure. Measurements of mass flow rate and enthalpy rate. Measurements of lower heating value of fuels.						
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
	Written exam	56.0%	35.0%
	Reports and oral or written test from laboratories	56.0%	30.0%
	Written calculation test	56.0%	35.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Pudlik W., Termodynamika. Wyd. PG, 1998. 2. Pudlik W. (red.), Termodynamika - zadania i przykłady obliczeniowe. Wyd. PG, 2000. 3. Pudlik W. (red.), Termodynamika - Laboratorium I miernictwa cieplnego. Wyd. PG, 1993. 4. Pudlik W. (red.), Termodynamika - Laboratorium II badania maszyn i urządzeń. Wyd. PG, 1991. 	
	Supplementary literature	<ol style="list-style-type: none"> 1. Wiśniewski S., Termodynamika techniczna. WNT, 2005 	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Present and describe ideal gas law. Describe basic mechanisms of heat transfer. Calculate efficiency of thermodynamic gas cycle.		
Work placement	Not applicable		