



Subject card

Subject name and code	Thermodynamics I, PG_00040048						
Field of study	Mechanical Engineering, Mechanical Engineering						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2021/2022		
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. Aleksandra Gołabek				
			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						
	Adresy na platformie eNauczanie: Termodynamika I, W, MiBM niestacjonarne, sem.03, zimowy 21/22, (M:31914W0) - Moodle ID: 18463 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18463 Termodynamika I, W, MiBM niestacjonarne, sem.03, zimowy 21/22, (M:31914W0) - Moodle ID: 18463 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18463						
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_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		
	[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		

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 calculation test	56.0%	35.0%
	Reports and oral or written test from laboratories	56.0%	30.0%
	Written exam	56.0%	35.0%
Recommended reading	Basic literature	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	1. Wiśniewski S., Termodynamika techniczna. WNT, 2005	
	eResources addresses	Termodynamika I, W, MiBM niestacjonarne, sem.03, zimowy 21/22, (M:31914W0) - Moodle ID: 18463 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18463 Termodynamika I, W, MiBM niestacjonarne, sem.03, zimowy 21/22, (M:31914W0) - Moodle ID: 18463 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=18463	
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		