



Subject card

Subject name and code	Thermodynamics I, PG_00038869						
Field of study	Mechatronics, Mechatronics						
Date of commencement of studies	October 2020	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	Full-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish		
Semester of study	5	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 hab. inż. Jan Wajs					
	Teachers	dr inż. Marcin Jewartowski mgr inż. Piotr Jasiukiewicz mgr inż. Kamil Stasiak dr hab. inż. Michał Klugmann dr inż. Paweł Dąbrowski dr hab. inż. Jan Wajs					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	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	30	5.0		15.0	50	
Subject objectives	The student acquire basic knowledge of thermodynamics in the dimension of theory and practice.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_W02	Student defines the concepts of thermodynamics, 1st and 2nd Law of Thermodynamics and thermal/caloric equations of state. Student understands the energy conversion processes in the mechatronic systems.			[SW1] Assessment of factual knowledge		
	K6_U03	Student broadens his knowledge in areas related to the thermodynamics.			[SU2] Assessment of ability to analyse information		
	K6_U01	Student uses graphs and tables of the physical properties to prepare laboratory reports. Student is able to interpret the results of energy balance of various machines.			[SU1] Assessment of task fulfilment		
Subject contents	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. 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.						
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 test	56.0%	70.0%
	Laboratory reports	100.0%	30.0%
Recommended reading	Basic literature	Mayhew R.: Engineering thermodynamics/Work & Heat Transfer. Wiley & Sons Inc. 1993, USA.	
	Supplementary literature	No requirements	
	eResources addresses	Adresy na platformie eNauczenie:	
Example issues/ example questions/ tasks being completed	Present equations of first law of thermodynamics. Describe Carnot cycle. Describe Otto/Sabathe cycle. Present definitions of second law of thermodynamics.		
Work placement	Not applicable		