



Subject card

Subject name and code	Thermodynamics II, PG_00039885						
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	Full-time studies	Mode of delivery				at the university	
Year of study	2	Language of instruction				Polish	
Semester of study	4	ECTS credits				3.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Institute of Energy -> 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. Stanisław Głuch mgr inż. Piotr Jasiukiewicz dr hab. inż. Michał Klugmann dr inż. Waldemar Targański 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		40.0		75
Subject objectives	Introduce the thermal engineering field to the students.						
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		Student describes heat transfer mechanisms, uses the theory of moist gases and explains operational principles of refrigeration devices.			[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 performs the measurements on an experimental setup, makes necessary calculations and presents the results in the form of tables and graphs. Student explains the principles of thermal-hydraulic processes and issues related to energy conversion in technical applications.			[SU1] Assessment of task fulfilment	
Subject contents	LECTURE: Fundamentals of heat transfer. Gas mixtures and moist gases. Mollier diagram and the basic moist air processes. Fundamentals of refrigeration. Basics of compressor and sorption heat pumps. Elements of combustion thermodynamics. LABORATORIES: Determination of calorific value of gas fuels. Determination of moist air enthalpy or testing of the fan. Testing of the refrigerating unit. Energy balance of piston engine. Testing of the compressor.						
Prerequisites and co-requisites	Knowledge from course of Applied thermodynamics I, physics and mathematics.						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory reports	100.0%	20.0%
	Written exam	56.0%	80.0%
Recommended reading	Basic literature	Cengel Y.A., Boles M.A.: Thermodynamics. An engineering approach (5th edition), Publisher: McGraw-Hill Science (https://www.academia.edu/38166311/Thermodynamics_an_engineering_approach_5th_edition)	
	Supplementary literature	No requirements	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Mechanisms of heat transfer 2. Operational principle of compressor heat pumps 3. Heating and humidification of air 		
Work placement	Not applicable		