



## Subject card

Subject name and code	Technology and Energy Conversion Machines, PG_00042073						
Field of study	Power Engineering, Power Engineering, Power Engineering, Power Engineering, Power Engineering						
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		English		
Semester of study	5		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. Zbigniew Kneba				
	Teachers		dr hab. inż. Zbigniew Kneba				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	0.0	45
	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	45		7.0		23.0	75
Subject objectives	The aim is to familiarize students with modern machines in the production and use of electricity, heat and compressed gas energy.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W06		He knows the constructions of reciprocating machines converting energy in the power industry. He can examine the basic parameters of machines' operation. He knows the methods of monitoring the work of reciprocating machines.		[SW1] Assessment of factual knowledge		
	K6_W04		Can calculate loads - forces and moments acting in reciprocating machines.		[SW1] Assessment of factual knowledge		
Subject contents	Construction of high-power engines. Power plants with reciprocating engines. Gym installations. Monitoring of engine operating parameters in the power industry. Fuel systems of SI engines. Spark ignition systems. Diesel fuel storage injection. Unit injectors. Accumulative injection systems for high-power engines. Gas supply to engines. Energy recovery from exhaust heat. Ship power plants. Distributed energy sysstems. Hybrid drive systems.						
Prerequisites and co-requisites	Thermodynamic changes, fuels, friction processes, heat exchange processes, theoretical mechanics.						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	written exam		50.0%		100.0%		
Recommended reading	Basic literature		Combustion engines development Springer Verlag				
	Supplementary literature		Klimstra J., Hotakainen M.: Smart power generation				
	eResources addresses		Adresy na platformie eNauczanie:				
Example issues/ example questions/ tasks being completed	Draw a diagram of the utilization of thermal energy in a power plant with reciprocating engines.Outline a diagram of a dual-fuel diesel engine fueling with methane and natural gas.						
Work placement	Not applicable						