



Subject card

Subject name and code	Power plants with internal combustion engines design, PG_00059385						
Field of study	Mechanical Engineering						
Date of commencement of studies	February 2024		Academic year of realisation of subject		2024/2025		
Education level	second-cycle studies		Subject group		Optional subject group 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	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		3.0		
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. Jacek Kropiwnicki				
	Teachers		dr hab. inż. Zbigniew Kneba				
			dr hab. inż. Jacek Kropiwnicki				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	18.0	0.0	0.0	9.0	0.0	27
	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	27		6.0		42.0	75
Subject objectives	Improving knowledge of the designing of the stationary and marine power plants with internal combustion engines						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W05] possesses profound knowledge on the operation of complex systems and mechanical devices, including process equipment		can analyse and evaluate the methods of functioning of the power plants, understands the specificity of propulsion systems with internal combustion engines		[SW1] Assessment of factual knowledge		
	[K7_U07] is able to perform a preliminary economic analysis of the undertaken engineering actions within the range of design, production and operation of machines and technical devices		can assess the energy efficiency of designed solutions and determine their impact on the operating costs		[SU1] Assessment of task fulfilment		
	[K7_W10] possesses knowledge on the methods of technical and economic analysis of industrial systems and optimization of manufacturing systems; is familiar with the general principles of initiating and developing forms of individual entrepreneurship, particularly for innovative projects using the knowledge		understands the consequences of the selected solutions in terms of achieved energetics parameters of the system		[SW1] Assessment of factual knowledge		
Subject contents	Tasks and elements (graphic symbols) of land and ship power plants with reciprocating internal combustion engines. Construction of medium and high power engines used in power plants. Design parameters and engine characteristics, thermal balance of the power plant. Cooperation of reciprocating engine with receiver, selection of engine, types of propulsion systems, cooperation of several engines. Main installations of the power plant: cooling, fuel, lubrication, compressed air, steam generation, fresh water production, exhaust gas after treatment, fire protection. Dynamics of drive systems and reduction of vibration and noise from piston engines.						
Prerequisites and co-requisites							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Tests	50.0%	60.0%
	Project	50.0%	40.0%
Recommended reading	Basic literature	<ol style="list-style-type: none">1. Balcerski A.: Siłownie okrętowe: podstawy termodynamiki, silniki i napędy główne, urządzenia pomocnicze, instalacje. Wydaw. PG, 1986.2. Górski Z., Giernalczyk M.: Basics of ship propulsion. Wydaw. Akademii Morskiej w Gdyni, 2014.3. Skorek J., Kalina J.: Gazowe układy kogeneracyjne. Wydawnictwa Naukowo-Techniczne, 2005.4. Babicz J.: Wärtsilä Encyclopedia of Marine Technology. WÄRTSILÄ CORPORATION, 2015.5. Klimstra J., Hotakainen M.: Smart Power Generation: The Future of Electricity Production. Avain Publishers, 2011.	
	Supplementary literature	http://marine.man.eu https://www.wingd.com	
	eResources addresses	Adresy na platformie eNauczanie: Projektowanie siłowni z silnikami spalinowymi - Moodle ID: 41870 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=41870	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none">1. Prepare specification of fluid parameters in selected point of installation2. Design passenger ship energetic system		
Work placement	Not applicable		

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