



Subject card

Subject name and code	Cryotechnics, PG_00064774						
Field of study	Power Engineering						
Date of commencement of studies	February 2025	Academic year of realisation of subject				2025/2026	
Education level	second-cycle studies	Subject group				Specialty subject group 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	1	Language of instruction				Polish	
Semester of study	2	ECTS credits				3.0	
Learning profile	general academic profile	Assessment form				exam	
Conducting unit	Zakład Ogrzewnictwa, Wentylacji, Klimatyzacji i Chłodnictwa -> Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Waldemar Targański				
	Teachers						
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	Deepening of acquaintance of question from physics and thermodynamics. Familiarization with specificity of domain and solutions applicable						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W01] explains and describes, based on general knowledge in the field of scientific disciplines forming the theoretical foundations of Power Engineering, the structure, principles of operation and environmental impact of energy systems, machines and devices, transmission grids and internal installations		The student explains the structure, principle of operation and environmental impact of power systems, machinery and equipment, transmission networks and internal installations.		[SW1] Assessment of factual knowledge		
	[K7_U13] evaluates the feasibility and potential for utilizing new technical and technological achievements in accomplishing tasks characteristic for the field of study		The student evaluates the possibility and legitimacy of using new achievements (techniques and technologies) in the implementation of tasks characteristic of the field of study.		[SU2] Assessment of ability to analyse information		
	[K7_W12] identifies and interprets the main developmental trends and significant new achievements in the field of engineering and technical sciences and disciplines relevant to the course of study		The student indicates and comments on the main development trends and the most important new achievements in the field of engineering and technical sciences and scientific disciplines relevant to the field of study.		[SW1] Assessment of factual knowledge		
Subject contents	Area of interest kriotechniki and domains of its (her) utilization. Gas Rozprężanie as method of achievement of low temperature. Gas circulations joule, Ackeret - Kellera, philips () Stirlinga. Cascade fix-up in technique of low temperature. Effect joule - Thomsona; differential effect dławienia. Definition of bandy inversion. Structure and principle of operation skraplarki Lindego - Hampsona, with (from) two-gradual Lindego dławieniem. Claude, Heylandta, la rouge, Kapicy - structure, operation, comparison with circulation Lindego - Hampsona. Contaminating of gas and manners of their deletions. Techniques of divisions gas skraplanych. Fix-ups in technique of low temperature termoelektryczne. Phenomenon () magnetokaloryczne rozmagnesowanie adiabaticzne. Headers (tanks) - manner isolate, manners of definitions of levels (horizons) gas skroplonych. Basic specialistic endowment (outfit) zbiornikowców LNG and LPG.						

Prerequisites and co-requisites	Physics, Refrigeration technology, heat exchange		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Presentation/report	56.0%	50.0%
	Colloquium	56.0%	50.0%
Recommended reading	Basic literature	R.F. Barron: Cryogenic systems.	
	Supplementary literature	Papers in journals	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	<p>Design and operation of chosen gas cycle.</p> <p>Joule-Thomson effect.</p> <p>Definition of the inversion curve.</p> <p>Design and operation of chosen liquifier.</p> <p>Methods for separation of gases.</p>		
Work placement	Not applicable		

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