GDAŃSK UNIVERSITY OF TECHNOLOGY

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 evironmental 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 adiabatyczne. Headers (tanks) - manner isolate, manners of definitions of levels (horizons) gas skroplonych. Basic specialistic endowment (outfit) zbiornikowców LNG and LPG.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Physics, Refrigeration technology, heat exchange</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Presentation/report</td><td>56.0%</td><td>50.0%</td></tr><tr><td>Colloquium</td><td>56.0%</td><td>50.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">R.F. Barron: Cryogenic systems.</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">Papers in journals</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">Design and operation og chosen gas cycle.

Joule-Thomson effect.

Definition of the inversion curve.

Design and operation of chosen liquifier.

Methods for separation of gases.</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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