



Subject card

Subject name and code	Modern technologies in refrigeration, PG_00057391						
Field of study	Mechanical Engineering						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Optional 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			assessment		
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	0.0	15.0	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		6.0		24.0	75
Subject objectives	Deepening the knowledge of refrigeration technology, especially in the aspect of modern solutions						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W09] possesses profound knowledge on the directions of development of construction of machines, devices, calculating methods and systems aiding the design, materials and their properties, manufacturing methods and diagnostics, control-measurement equipment		The student has in-depth knowledge of the directions of development of the construction of machines and devices, methods and computational systems supporting design, materials and their properties, methods of manufacturing and diagnostics, control and measurement equipment.		[SW1] Assessment of factual knowledge		
	[K7_W05] possesses profound knowledge on the operation of complex systems and mechanical devices, including process equipment		The student has in-depth knowledge of the operation of complex systems and mechanical devices, including process equipment.		[SW1] Assessment of factual knowledge		
	[K7_U08] is able to design a procedural equipment or device compliant with the specifications using a design aid system in the form of a design documentation, selecting the appropriate model, performing critical analysis with the proper selection of tools and technologies		The student is able to design process equipment or a device in accordance with the specification using a design support system in the form of project documentation, with the selection of the right model, making a critical analysis, with the right good tools and techniques.		[SU4] Assessment of ability to use methods and tools		

Subject contents	<p>Current regulations and trends in the use of various refrigerants.</p> <p>Carbon dioxide as a refrigerant.</p> <p>Construction and principle of operation of refrigeration adsorption and absorption systems.</p> <p>Construction and principle of operation of refrigeration thermoelectric units.</p> <p>Construction and principle of operation of refrigeration gas systems.</p> <p>Heat recovery from refrigeration systems.</p> <p>Modern elements and systems of refrigeration automation.</p> <p>Modern designs of refrigeration compressors.</p> <p>Modern constructions of refrigeration heat exchangers.</p>								
Prerequisites and co-requisites	Refrigeration technology, heat transfer								
Assessment methods and criteria	<table border="1" data-bbox="448 860 1490 931"> <thead> <tr> <th data-bbox="448 860 794 898">Subject passing criteria</th> <th data-bbox="794 860 1141 898">Passing threshold</th> <th data-bbox="1141 860 1490 898">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 898 794 931">Colloquium</td> <td data-bbox="794 898 1141 931">60.0%</td> <td data-bbox="1141 898 1490 931">100.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Colloquium	60.0%	100.0%
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Colloquium	60.0%	100.0%							
Recommended reading	<p>Basic literature</p> <p>Supplementary literature</p> <p>eResources addresses</p>	<p>1. Bonca Z.: Chłodnictwo okrętowe. Wyd. Akademii Morskiej w Gdyni, 2006.</p> <p>2. Bonca Z. i in.: Nowe czynniki chłodnicze i nośniki ciepła. Właściwości cieplne, chemiczne i eksploatacyjne. Poradnik. Wyd. MASTA, Gdańsk 2004.</p> <p>3. Ullrich H.J.: Technika chłodnicza. Poradnik. Tom I, Wyd. MASTA, Gdańsk 1998.</p> <p>4. Ullrich H.J.: Technika chłodnicza. Poradnik. Tom II. Wyd. MASTA, Gdańsk 1999.</p> <p>5. Staniszewski D., Targański W.: Odzysk ciepła w instalacjach chłodniczych i klimatyzacyjnych. IPPU MASTA. Gdańsk 2007.</p> <p>Papers in journals.</p> <p>Papers in journals.</p>	<p>Adresy na platformie eNauczanie:</p>						
Example issues/ example questions/ tasks being completed	<p>Current regulations and trends in the use of various refrigerants.</p> <p>Carbon dioxide as a refrigerant.</p> <p>Construction and principle of operation of refrigeration adsorption and absorption systems.</p> <p>Construction and principle of operation of refrigeration thermoelectric units.</p> <p>Construction and principle of operation of refrigeration gas systems.</p> <p>Heat recovery from refrigeration systems.</p>								

Work placement	Not applicable
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