



## Subject card

Subject name and code	Heating equipment, Refrigeration, Ventillation and Air Conditioning Devices, PG_00045076						
Field of study	Ocean Engineering, Ocean Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2022/2023		
Education level	first-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	3	Language of instruction			Polish		
Semester of study	5	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Faculty of Ocean Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Damian Bocheński					
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	0.0	0.0	60
	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	60		7.5		32.5	100
Subject objectives	To acquaint the student with the issues of heating, refrigeration and air-conditioning of rooms						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W05] has an organized knowledge on design, construction and operation of ocean technology objects and systems		The student knows the construction and operation problems of heating, cooling and air-conditioning systems		[SW1] Assessment of factual knowledge		
	[K6_W06] has an organized knowledge on engineering methods and design tools allowing the conducting of projects within the construction and operation of ocean technology objects and systems		The student knows the basic methods used in the laboratory technique related to heat transfer		[SW3] Assessment of knowledge contained in written work and projects		
	[K6_U05] can formulate a simple engineering task and its specification within the range of design, construction and operation of ocean technology objects and systems		The student is able to carry out an economic analysis of heating, freezing and air-conditioning systems in rooms		[SU1] Assessment of task fulfilment		
Subject contents	Heating installations on ships. Heating factors (steam, thermal oil, electricity). Heating installations on tankers and chemical tankers. Climate - thermal comfort. Humid air parameters, i-X diagram, humid air transformation. Air conditioning on ships - design solutions. Characteristics of loads (hygroscopic and non-hygroscopic). Microclimate in the hold. Cargo hold ventilation - design solutions. Ventilation of the gym. Refrigeration equipment. Cooling circuits. Compressor refrigeration equipment. Refrigerants. Chilled holds. Refrigerated containers. Cold insulation. Fish cooling and freezing. Ice makers.						
Prerequisites and co-requisites	Thermodynamics						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Passing exercises		60.0%		50.0%		
	Colloquium of lectures		60.0%		50.0%		

Recommended reading	Basic literature	1. I. Piotrowski - Okrętowe urządzenia chłodnicze. WM Gdańsk 1977 2. K. Gutkowski, D. Butrymowicz - Chłodnictwo i klimatyzacja, WNT Warszawa 2007 3. P. Urbański - Instalacje spalinowych siłowni okrętowych, Skrypt PG Gdańsk 1991 4. W. Wasiluk - Klimatyzacja pomieszczeń na statkach morskich, Skrypt PG Gdańsk 1975 5. R. Michalski, W. Zeńczak - Okrętowe olejowe systemy grzewcze przysposobione do odzyskiwania energii odpadowej. Zagadnienia Eksploatacji Maszyn 2003
	Supplementary literature	Online catalogs
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	