



Subject card

Subject name and code	Fundamentals of Refrigeration and Air Conditioning, PG_00040106						
Field of study	Mechanical Engineering, Mechanical 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	Part-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			Polish		
Semester of study	5	ECTS credits			5.0		
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						
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	22.0	0.0	15.0	0.0	0.0	37
	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	37		11.0		77.0	125
Subject objectives	Basic knowledge on design and working principles of refrigerating and ventilating systems..						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U07] is able to design a typical construction of a mechanical device, component or a testing station using appropriate methods and tools, adhering to the set usage criteria		The student is able to design a typical structure, mechanical device, subassembly or test bench using appropriate methods and tools taking into account the given functional criteria.		[SU4] Assessment of ability to use methods and tools		
	[K6_U06] is able to use mathematical and physical models for analysing the processes and phenomena occurring in mechanical devices within the range of material strength, thermodynamics and fluid mechanics		The student is able to use mathematical and physical models to analyze processes and phenomena occurring in mechanical devices in the field of material strength, thermodynamics and fluid mechanics.		[SU4] Assessment of ability to use methods and tools		
	[K6_W09] possesses basic knowledge within the range of thermodynamics and fluid mechanics, construction and operation of heat generating devices, process equipment, including renewable energy sources, cooling and air conditioning		The student has basic knowledge in the field of thermodynamics and fluid mechanics, construction and operation of thermal energy equipment, process equipment, including renewable energy sources and refrigeration and air conditioning.		[SW1] Assessment of factual knowledge		
Subject contents	The use of refrigeration and heat pumps. Construction and operation of compressor and thermoelectric refrigerating unit. Direct and indirect cooling systems. Refrigerants and heat carriers: The selected properties. Interaction of basic machinery and apparatus cooling systems. Some operational problems: ice on evaporators, oil in the cooling system. Meaning and purpose of air conditioning. Parameters of thermal comfort of air. Air conditioners: one-and two-lines. Use of Mollier chart for the presentation of processes of thermal-humidity air in air conditioning. Construction and operation of the air conditioning unit. Examples of ventilation and air conditioning systems. Selected problems of operating an air conditioner.						
Prerequisites and co-requisites	Thermodynamics, Heat Transfer and Heat Exchangers						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Reports from the laboratory experiments	100.0%	25.0%
	Written exam	50.0%	40.0%
	Midterm colloquium	60.0%	35.0%
Recommended reading	Basic literature	1. Bonca Z.: Chłodnictwo okrętowe. Wyd. Akademii Morskiej w Gdyni, 2006. 2. Bonca Z. i in.: Nowe czynniki chłodnicze i nośniki ciepła. Właściwości cieplne, chemiczne i eksploatacyjne. Poradnik. Wyd. MASTA, Gdańsk 2004. 3. Ullrich H.J.: Technika chłodnicza. Poradnik. Tom I, Wyd. MASTA, Gdańsk 1998. 4. Ullrich H.J.: Technika Klimatyzacyjna. Poradnik. Wyd. MASTA, Gdańsk 2001. 5. Jones W.P.: Klimatyzacja. Wyd. ARKADY, Warszawa 2001.	
	Supplementary literature	No requirements	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<p>Construction and operation of compressor and thermoelectric refrigerating unit.</p> <p>Direct and indirect cooling systems.</p> <p>Refrigerants and heat carriers: selected properties.</p> <p>Construction and operation of the air conditioning unit.</p>		
Work placement	Not applicable		