



Subject card

Subject name and code	, PG_00056119						
Field of study	Mechatronics						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2025/2026		
Education level	first-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	6		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Division of Heating, Ventilation, Air Conditioning and Refrigeration -> 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	15.0	0.0	15.0	0.0	0.0	30
	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	30		0.0		0.0	30
Subject objectives	Advanced knowledge on refrigerating technology in the scope of automatics.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U05] is able to use properly chosen tools to compare design solutions of elements and mechatronics systems according to given application and economic criteria (e.g. power demand, speed, costs)		The student is able to use properly selected tools to compare design solutions of mechatronic elements and systems, due to the given functional and economic criteria (e.g. power consumption, speed of operation, cost).		[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W10] has knowledge about development trends in the field of engineering and technology sciences and scientific disciplines: Mechanical Engineering, Automation, Electronics, Electrical Engineering and Space Technologies, adequate for Mechatronics course		The student has basic knowledge of development trends in the field of engineering and technical sciences and scientific disciplines: Mechanical Engineering and Automation, Electronics and Electrical Engineering, relevant to the field of study Mechatronics.		[SW1] Assessment of factual knowledge		
	[K6_U06] is able to identify and formulate specification of simple, practical engineering tasks, distinctive for mechatronics		The student is able to identify and formulate a specification of simple engineering tasks of a practical nature, characteristic of mechatronics.		[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W08] knows and understands design and production processes of elements and simple mechatronic devices		The student knows and understands the processes of design and manufacture of elements and simple mechatronic devices.		[SW1] Assessment of factual knowledge		

Subject contents	Features of refrigeration and air conditioning facilities. Tasks, distribution and structure of automatic control systems used in refrigeration and air conditioning. Automation components to supply evaporators - Expansion Valves: automatic, thermostatic, adaptive, and electronics. Regulators liquid level: float (high and low pressure), thermostatic and electronic capacitive probe. Automatic valves, constant pressure: direct action throttle controls and auxiliary power. Regulators of the discontinuous action: pressure switches, thermostats, solenoid valves. Examples of the use of automated controls in the refrigeration and air conditioning. Electronic control systems, control and monitoring systems used in refrigeration and air conditioning. Temperature control in refrigerated facilities. Automating the process of defrosting air coolers. Integrated automatic cooling vents. Adjusting the condensing pressure in air and water condensers. Automation of work of refrigeration compressors. Automation systems of ventilation units and air conditioning. Automatic control system of central air conditioning and ventilation with heat recovery. Design rules for the operation of control systems and air cooling.		
Prerequisites and co-requisites	REFRIGERATION, AIR CONDITIONING, HEAT PUMPS, AUTOMATICS		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Colloquium	60.0%	100.0%
Recommended reading	Basic literature	1. Bielecki A., Chorowski B.: Automatyizacja urządzeń wentylacyjnych i klimatyzacyjnych. Wyd. Politechniki Wrocławskiej, Wrocław 1974./ 2. Wesołowski A., Dworski F.: Automatyizacja urządzeń chłodniczych. Wyd. Naukowo-Techniczne, Warszawa 1984. 3. Bonca Z.: Automatyka chłodnicza i klimatyzacyjna. Wyd. Wyższej Szkoły Morskiej w Gdyni, wyd. V, 2000. 4. Recknagel, Sprenger, Honmann, Schramek: Ogrzewanie + Klimatyzacja. Wyd. EWFE, Gdańsk 1994. 5. Ullrich H.-J.: Technika Chłodnicza Poradnik. IPPU MASTA. Gdańsk 1998 (Tom I). 6. Ullrich H.-J.: Technika Klimatyzacyjna Poradnik. IPPU MASTA. Gdańsk 2001.	
	Supplementary literature	Papers in branch magazines	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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