



Subject card

Subject name and code	, PG_00060052						
Field of study	Environmental Engineering						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Obligatory subject group 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			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor	mgr inż. Krzysztof Kaiser					
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	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		5.0		19.0	54
Subject objectives	Expanding knowledge of the theoretical foundations and practical solutions of ventilation and air-conditioning systems for rooms and ventilation devices, as well as the basics of the selection and operation of ventilation and air-conditioning systems for various types of rooms.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_U12	The student designs a mechanical ventilation and technical air conditioning installation in a selected building, both by performing manual calculations and using programs dedicated to the industry. Has the ability to perform calculations within a set of ventilation and air-conditioning devices using knowledge, among others: in the field of thermodynamics, basic thermal and humidity phenomena.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
	K7_W06	The student lists and defines the types of media flows in ventilation systems and in installations cooperating with the air conditioning installation	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	K7_W04	The student lists and defines the basic methods, techniques, tools and automation systems used when designing air-conditioning and ventilation installations	[SW1] Assessment of factual knowledge
	K7_U03	The student develops design documentation for the air conditioning and ventilation installation and prepares an investment cost estimate	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
K7_U10	The student lists and defines basic concepts in the field of optimization of the operation of ventilation and air conditioning systems. In addition, he knows methods and devices for rational management of energy and resources in ventilation and air conditioning and designs air conditioning and ventilation systems.	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment	
Subject contents	<p>Lectures: Humid air parameters and air quality for non-residential rooms-physical and chemical parameters of air,-Mollier's i-x chart,-air heat and humidity treatment processes,-air quality and cleanliness,- concentration of pollutants in the air Determining the amount of ventilation air for non-residential rooms-determining the amount of ventilation air based on the requirements of legal acts, replacement rates, pollutant emissions, thermal load,-ventilation effectiveness. Air distribution systems-air distribution rules,- types of air flows in rooms Determining device parameters using the i-x Mollier chart /3 h/-determining parameters of external and internal air and processes for summer and winter,-calculation of heat exchanger power,-calculating the efficiency of humidifiers Air filtration and noise suppression-air filtration mechanisms,- types and classes of filters,-filtration degrees,-sound propagation and noise sources,-vibration and vibration damping. Ventilation and air conditioning in legal acts Acts and regulations relating to air conditioning and ventilation installations,norms. Installations cooperating with the air conditioning and ventilation system- chilled water unit and water chiller,-technological hot water installation, hydraulic installation,-steam installation for humidification. Design: Concept of air conditioning and aseptic ventilation installation in a hospital operating room determining legal requirements,-calculation of installation efficiency, air exchange rates and exchange time constant,-determining the location of supply and exhaust vents and the distribution of air streams,-determining the location of the air conditioning and ventilation unit in the N and W parts,- determining the necessary modules for air heat and humidity treatment, filtration levels and heat recovery methods,-determining the route of ventilation ducts, calculating the dimensions of the ducts and determining the total flow resistance,-determining fan parameters, heat exchanger power, humidification system efficiency,-determining the value of emitted noise, determining the need to use a noise silencer,-selection of installation elements from catalogs,-planning the use of necessary automation elements.</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		60.0%	50.0%
		60.0%	50.0%

Recommended reading	Basic literature	<p>1. Recknagel H., Sprenger E., Schramek E.R.: Compendium of knowledge: heating, air conditioning, hot water, refrigeration, Omni Scala Publishing House, Wrocław 2008</p> <p>2. Pelech A.: Ventilation and air conditioning - basics. Publishing House of the Wrocław University of Science and Technology. Wrocław 2008</p> <p>3. Malicki M.: Ventilation and air conditioning. PWN Warszawa 1980 5. Jones W.P.: Air conditioning. ARCADES. Warsaw 2001</p> <p>4. Porowski M., Szczechowiak E.: Air conditioning of clean rooms. Ed. TerMedia 1999.</p>
	Supplementary literature	<p>1. Krzysztof Kaiser, 2014. Ventilation and air conditioning of laboratories. Publisher: Medium Group</p> <p>2. Krzysztof Kaiser, Andrzej Wolski, 2007. Air conditioning and ventilation in hospitals. Theory and practice of exploitation. Publisher:MASTAST Publishing House, ISBN:978-83-921555-2-2</p>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>Calculate the installation efficiency, air exchange rate and exchange time constant for the operating room.</p> <p>Designate the location of the air-conditioning and ventilation unit for the operating block room complex.</p>	
Work placement	Not applicable	