



Subject card

Subject name and code	Residential ventilation and air conditioning systems, PG_00057350						
Field of study	Power Engineering, Power Engineering, Power Engineering						
Date of commencement of studies	February 2022	Academic year of realisation of subject			2022/2023		
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 polish		
Semester of study	2	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Sanitary Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Sylwia Fudala-Książek				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	15.0	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		7.0		8.0	75
Subject objectives	The aim of the course is to familiarize students with the knowledge in the field of ventilation and air conditioning and shaping the internal environment, current legal regulations and standards related to the topic, installation materials and criteria for their selection, design methodology, methods and technologies for the implementation of the installations in question, as well as related non-technical conditions .						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	<p>[K7_W02] has extended and deepened knowledge of physics, chemistry, thermodynamics, fluid mechanics, material science, necessary to understand and describe basic thermal and flow phenomena occurring in and around power equipment and systems, transmission networks and internal installations</p>	<p>The student uses the notions and a specialist language in the field of fluid physics and mechanics, materials science and uses knowledge in the field of fields of ventilation and air conditioning. Designates parameters of the state in air transformation processes wet. Calculates the heat balance and room humidity and air volume flows in general ventilation. Characterizes properties of air streams. Explains the rules of separation ventilation air in room. Classifies and describes the ventilation systems and air conditioning. He lists the ways recirculation and heat recovery in ventilation systems. Lists, describes and selects elements of installation equipment ventilation and air conditioning. Identifies modules / sections of the control panel ventilation / air conditioning. Explains the assembly rules pipes, devices and fittings in ventilation systems and air conditioning. He knows the rules designing the ventilation system mechanical. Uses software assisting design sanitary installations incl ventilation and air conditioning.</p>	<p>[SW1] Assessment of factual knowledge</p>
	<p>[K7_U06] is able to apply basic and advanced knowledge of power equipment and transmission network and internal installations to the preliminary design of a modern power plant or part thereof</p>	<p>The student uses the notions and a specialist language in the field of energy equipment, transmission networks and internal installations in the field of ventilation and air conditioning. The student prepares the documentation design ventilation system mechanical, containing a description technical, calculations and drawings.</p>	<p>[SU1] Assessment of task fulfilment</p>
<p>Subject contents</p>	<p>LECTURES: Ventilation air stream and its properties. Organization of air exchange in room, air distribution in ventilated rooms. Characteristics of the systems ventilation and air conditioning. Air treatment. Air recirculation and heat recovery. Element equipment for mechanical ventilation and air conditioning systems, pipes, fittings and devices. Headquarters ventilation and air conditioning. Dimensioning of the mechanical ventilation duct network. Fundamentals of acoustics. Legal regulations, standards, technical, construction and fire requirements. EXERCISES: Calculations related to the change of parameters of the humid air condition and practical use h-x chart (Mollier). Calculation of external and internal heat and moisture gains. Methods determination of ventilation air volume flows. Performing the computational exercise and drawing using the BIM (Building Information Modeling) tool. PROJECT: Installation design mechanical supply and exhaust ventilation for the complex of rooms in the building. Air balance ventilation. Application of the principles of ventilation air distribution and selection of diffusers and extractors. Cable dimensioning. Selection of fittings and devices. Calculation of pressure drops. Guidelines for the implementation of project documentation.</p>		

Prerequisites and co-requisites	Basic knowledge of thermodynamics, ventilation and air conditioning. Drawing skills in AutoCAD. Knowledge of course: Heating, Ventilation and Air Conditioning.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exercises	60.0%	20.0%
	Project	60.0%	40.0%
	Lecture exam	60.0%	40.0%
Recommended reading	Basic literature	<p>1. Jaskólski M., Micewicz Z.: Wentylacja i klimatyzacja hal krytychpływalni. IPPU MASTA, Gdańsk, 2000.2. Klinke T.: Wentylacja. Tablice do obliczeń strat ciśnienia. OWPW, Warszawa, 2007.3. Pelech A.: Wentylacja i klimatyzacja. Podstawy. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2009.4. Szymański W., Wolańczyk F.: Termodynamika powietrza wilgotnego. Przykłady izadania, OWPRz, Rzeszów, 2008.5. Przepisy prawne: http://isap.sejm.gov.pl/, normy związane z tematem, warunki techniczne COBRTI Instal</p>	
	Supplementary literature	<p>1. Gutkowski K.M., Butrymowicz D.J.: Chłodnictwo i klimatyzacja, WNT, Warszawa, 2007.2. Rosiński M.: Odzyskiwanie ciepła w wybranych technologiach inżynierii środowiska. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2008.3. Recknagel, Sprenger i in., Poradnik. Ogrzewanie i klimatyzacja. EWF, Gdańsk, 2008.4. Żarski K.: Termodynamika. Zagadnienia praktyczne w ogrzewnictwie i klimatyzacji. Ośrodek Informacji Technika instalacyjna w budownictwie, Warszawa, 2005.5. Wytyczne producentów, karty katalogowe armatury i urządzeń.</p>	
	eResources addresses		
Example issues/ example questions/ tasks being completed	<p>1. Calculate the amount of ventilation air from the moisture balance.</p> <p>2. What is the speed of the ventilation stream dieback.</p>		
Work placement	Not applicable		