



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 2023	Academic year of realisation of subject			2023/2024		
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 language		
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 familiarise the student with basic knowledge of ventilation and air-conditioning and the shaping of the indoor environment, current legal regulations and standards relating to the subject, installation materials and criteria for their selection, design methodologies, methods and technologies for the execution of the installations in question, as well as related non-technical considerations.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[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		The student lists and defines basic concepts in the field of optimising the operation of ventilation and air-conditioning systems. Moreover, he or she is familiar with methods and devices for the rational management of energy and resources in ventilation and air conditioning. The student designs a mechanical ventilation and air-conditioning installation in a selected building both by making manual calculations and in programmes dedicated to the industry.		[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		
	[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		The student is able to make calculations within a set of ventilation and air-conditioning devices using, among others, the knowledge of thermodynamics, basic thermo-humidity phenomena. He/she is able to select equipment correctly on the basis of the acquired knowledge.		[SW1] Assessment of factual knowledge		

Subject contents	<p>LECTURES: Ventilation airflow and its properties. Organisation of room air exchange, air distribution in ventilated rooms. Characteristics of ventilation and air conditioning systems. Air treatment. Air recirculation and heat recovery. Mechanical ventilation and air conditioning system components ducts, fittings and equipment. Ventilation and air conditioning units. Dimensioning of mechanical ventilation duct networks. Basics of acoustics. Legal regulations, standards, technical, construction and fire requirements.</p> <p>EXERCISES: Calculations related to the change of parameters of the humid air condition and practical use of the hx (Mollier) diagram. Calculation of external and internal heat and moisture gains. Methods for the determination of ventilation air volume flows. DESIGN: Design of a mechanical supply and extract ventilation system for a set of rooms in a building. Ventilation air balance. Application of the principles of ventilation air distribution and selection of supply and extract air diffusers. Duct dimensioning. Selection of fittings and equipment. Calculation of pressure drops. Guidelines for preparing project documentation.</p>		
Prerequisites and co-requisites	<p>Knowledge of the basics of ventilation and air conditioning. Ability to draw in AutoCAD. Knowledge of subjects including: physics, thermodynamics, microbiology, chemistry, heating, ventilation and air conditioning.</p>		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	final colloquium	60.0%	40.0%
	calculation exercises	60.0%	20.0%
	project task	60.0%	40.0%
Recommended reading	Basic literature	<p>1. Jaskólski M., Micewicz Z.: Wentylacja i klimatyzacja hal krytych pływalni. 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 i zadania, OWPRZ, Rzeszów, 2008. 5. Przepisy prawne: http://isap.sejm.gov.pl/, normy związane z tematem, warunki techniczne COBRTI Instal. 6. Malicki M.: Wentylacja i klimatyzacja. PWN Warszawa 1980 5. Jones W.P.: Klimatyzacja. ARKADY. Warszawa 2001</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	<ol style="list-style-type: none"> 1. Determination of humid air parameters on a Mollier chart. 2. Determination of air distribution for specific rooms. 		
Work placement	Not applicable		