



Subject card

Subject name and code	, PG_00061956						
Field of study	Environmental Engineering						
Date of commencement of studies	October 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	Part-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			4.0		
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	10.0	10.0	0.0	10.0	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		6.0		70.0	106
Subject objectives	The aim of the course is to introduce the subject of mechanical ventilation and air conditioning. In particular, with the knowledge of ventilation and air conditioning and the shaping of the indoor environment, the basics of acoustics, current legal regulations and standards related to the subject, installation materials and criteria for their selection, design methods and tools supporting design, 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_W06		The student lists and defines the concepts of media flow in sanitary, thermal or energy systems. Characterises methods and equipment for media flow in sanitary, thermal or energy systems, including mechanical ventilation.		[SW1] Assessment of factual knowledge		
	[K7_W11] has knowledge to analyze, evaluate and optimize processes, objects and systems of environmental engineering and knows the principles of rational energy management and resources		The student is able to use concepts and specialist language in the field of ventilation and air-conditioning. The student is able to carry out technical and economic analysis of selected mechanical ventilation solutions. They will be able to determine the rational source of heat and cold.		[SW1] Assessment of factual knowledge		
	K7_U10		The student designs a mechanical ventilation system in a public building.		[SU1] Assessment of task fulfilment		
K7_U03		The student produces design documentation for a mechanical ventilation system, including technical description, calculations and drawings.		[SU1] Assessment of task fulfilment			

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. EXERCISES: Calculations related to ventilation air treatment processes, determination of external and internal heat and moisture gains. Determination of volume flows and ventilation air parameters. Dimensioning and selection of ventilation system components. DESIGN: Design of a mechanical supply and exhaust ventilation system for a set of rooms in a building. Ventilation air balance. Application of the principles of ventilation air distribution and selection of diffusers and extractors. Duct dimensioning. Selection of fittings and equipment. Calculation of pressure drops and control of air volume flows. Design documentation guidelines.</p>														
Prerequisites and co-requisites	<p>Knowledge of the basics of ventilation and air conditioning. Ability to draw in AutoCAD. Knowledge of the subject Ventilation and Air Conditioning in a first degree engineering course. Basic knowledge of hydraulics and fluid mechanics and thermodynamics.</p>														
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 665 794 689">Subject passing criteria</th> <th data-bbox="799 665 1137 689">Passing threshold</th> <th data-bbox="1142 665 1481 689">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 696 794 721">Exercises</td> <td data-bbox="799 696 1137 721">60.0%</td> <td data-bbox="1142 696 1481 721">20.0%</td> </tr> <tr> <td data-bbox="456 728 794 752">Project</td> <td data-bbox="799 728 1137 752">60.0%</td> <td data-bbox="1142 728 1481 752">40.0%</td> </tr> <tr> <td data-bbox="456 759 794 784">Lecture</td> <td data-bbox="799 759 1137 784">60.0%</td> <td data-bbox="1142 759 1481 784">40.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Exercises	60.0%	20.0%	Project	60.0%	40.0%	Lecture	60.0%	40.0%
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Exercises	60.0%	20.0%													
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Lecture	60.0%	40.0%													
Recommended reading	<p>Basic literature</p>	<ol style="list-style-type: none"> Jaskólski M., Micewicz Z., Wentylacja i klimatyzacja hal krytych pływalni. IPPU MASTA, Gdańsk, 2000. Klinke T., Wentylacja. Tablice do obliczeń strat ciśnienia. OWPW, Warszawa, 2007. Malicki M., Wentylacja i klimatyzacja. PWN, Warszawa 1980. Pelech A., Wentylacja i klimatyzacja. Podstawy. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2009. Legal regulations, Polish and European standards related to the subject, technical conditions of COBRTI Instal. 													
	<p>Supplementary literature</p>	<ol style="list-style-type: none"> Gaziński i in., Technika klimatyzacyjna dla praktyków. Systherm Serwis, Poznań, 2005. Gutkowski K.M., Butrymowicz D.J., Chłodnictwo i klimatyzacja. WNT, Warszawa, 2007. Rosiński M., Odzyskiwanie ciepła w wybranych technologiach inżynierii środowiska. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2008. Recknagel, Sprenger i in., Poradnik. Ogrzewanie i klimatyzacja. EWFEE, Gdańsk, 2008. Manufacturers' guidelines, data sheets for fittings and equipment. 													
	<p>eResources addresses</p>	<p>Adresy na platformie eNauczenie: Wentylacja_i_Klimatyzacja_MGR_NST_sem_II - Moodle ID: 20161 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=20161</p>													
Example issues/ example questions/ tasks being completed	<p>Phases of flow discharge from an unshielded diffuser. List the types of air intakes. List the noise control devices in a ventilation system.</p>														
Work placement	<p>Not applicable</p>														