GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Ventilation and Air Conditioning II, PG_00042514						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2021		Academic year of realisation of subject		2021/2022		
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 Environmental Engineering Technology -> 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		5.0		65.0	100
Subject objectives	The aim of the subject is to acquaint students with basic and detailed knowledge in the range of ventilation and air-conditioning systems, acoustics fundamentals, current regulations and standards related to the subject, materials types and selection criteria, methodology in designing process, methods and technologies of installation, including other than technical conditions.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U03] can elaborate detailed documentation presenting results of an experiment, design or research task; can prepare a paper to discuss the results	Student prepares engineering specification for ventilation system, including technical description, calculations and drawings	[SU1] Assessment of task fulfilment
	[K7_U12] can design: developed water and sewage system, complex heat source, pool water treatment technology, mechanical ventilation installation or underground water intake, drainage of urban water catchment, reservoir control system during flood seizure or water treatment technology, domestic waste water treatment plant	The student designs the installation mechanical ventilation in building.	[SU1] Assessment of task fulfilment
	[K7_W02] has broadened and well-ordered knowledge of the current law on construction, water, environmental protection and planning and spatial planning.	Student identifies standards and regulations in the range of ventilation and air-conditioning. Selects regulations and standards properly to a design task.	[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 lists and defines the suction concepts for optimising the operation of ventilation and air-conditioning systems. Moreover, he knows methods and devices for rational energy and resource management in ventilation and air-conditioning.	[SW1] Assessment of factual knowledge
	[K7_W06] has deepened, structured and theoretical knowledge related to hydraulics used in the construction, operation, operation of networks and plumbing, sewage, heating, ventilation or water treatment plants and wastewater treatment facilities	Student utilizes nomenclature in the range of ventilation and airconditioning. Determines state parameters in the processes of moist air treatment. Calculates heat and moisture balance in a room and volumetric air flow. Characterizes air stream properties. Explains the principles of ventilating air stream distribution in a room. Describes the criteria of supply and exhaust air equipment selection. Classifies and describes ventilation and airconditioning systems. Specifies methods of air recirculation and heat recovery in ventilation systems. Specifies, describes and selects ventilation and airconditioning systems equipment. Identifies modules/sections of ventilation/air-conditioning central units. Explains the principles of airducts, devices and fittings assembling in ventilation and airconditioning systems. Knows the principles of designing mechanical ventilating system. It uses software to support the design of sanitary installations including ventilation and air conditioning.	[SW1] Assessment of factual knowledge
Subject contents	LECTURE: Ventilation air stream and its properties. Ventilation air distribution in rooms. Characteristic of ventilation and air-conditioning systems. Ventilating air conditioning. Recirculation of air and heat recovery. Ventilation and air-conditioning systems equipment: ducts, devices and fittings. Ventilation and airconditioning central units. Dimensioning of mechanical ventilation system. Acoustics fundamentals. Codes, standards, technical and fire protecting requirements. TUTORIALS: Analytical calculations of moist air state parameters and practical application of h-x (Molliers) diagram. Calculations of external and internal gains of heat and moisture. Determination of ventilation air flux volume.Performing a calculation and drawing exercise using the BIM (Building Information Modeling) tool. PROJECT: Technical project of a supplyexhaust mechanical ventilation system for a complex of rooms in a building. Ventilation air balance. Application of ventilation air distribution principles. Selection of supply and exhaust air elements. Air ducts dimensioning. Selection of fittings and devices. Calculation of pressure loss. Guidelines for technical specification content.		
Prerequisites and co-requisites	Basics of ventilation and air-conditioning systems. Drawing skills in AutoCAD. Knowledge from the course: Heating, ventilation and air-conditioning.		

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final colloquium	60.0%	40.0%
	Calculation exercises	60.0%	40.0%
	Project tasks	60.0%	20.0%
Recommended reading	Basic literature	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. Pełech 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. Regulations: http:// isap.sejm.gov.pl/ , standards related to the subject, COBRTI Instal technical requirements	
	Supplementary literature	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. EWFE, Gdańsk, 2008. 4. Żarski K., Termodynamika. Zagadnienia praktyczne w ogrzewnictwie i klimatyzacji. Ośrodek Informacji Technika instalacyjna w budownictwie, Warszawa, 2005. 5. Guidelines, data sheets of fittings and devices	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		