GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Designing ventilation and air conditioning systems, PG_00064933						
Field of study	Mechanical Engineering						
Date of commencement of studies	February 2027		Academic year of realisation of subject	2027/2028			
Education level	second-cycle studies		Subject group	Specialty subject group Subject group related to scientific research 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	Division of Heating Ventilation Air Conditioning and Refrigeration -> Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Małgorzata Sikora				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	18.0	0.0	9.0	9.0	0.0	36
	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	36		5.0	59.0		100
Subject objectives	Getting the skills to solving theoretical and analytical as well as design and operation problems from theselected ventilation and air-conditioning issues and advanced energy conversion technologies.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W03] demonstrates a well-structured and theoretically grounded knowledge of the key issues in Mechanical Engineering to enable the design and diagnosis of mechanical systems, processes and devices	The student can describe methods of diagnostics of ventilation and air-conditioning devices, in particular ventilation units and air-conditioning units, as well as ventilation duct systems (networks). Demonstrates knowledge of the construction of ventilation and air-conditioning network elements. Can perform simple calculations of the necessary amount of ventilation air and calculations regarding the heat and humidity treatment of this air.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K7_W11] interprets social, economic, legal (including industrial and intellectual property laws), and other non-technical aspects of engineering activities, and includes them into engineering practice	The student can interpret the impact of the solutions used in the field of ventilation and air-conditioning installations on the environment. It is also able to describe the basic factors that translate into generating costs, but also the user's perception of the functioning of the installation, in particular resulting from the analysis of comfort indicators (e.g. PMV/PPD)	[SW3] Assessment of knowledge contained in written work and projects
[K7_U11] communicates and justifies opinions on specialized topics in a manner understandable to diverse audiences, including the use of modern techniques, including information technology	Syudent demonstrates the ability to evaluate basic types of technical solutions used in ventilation and air conditioning systems regarding energy efficiency, operation, and comfort conditions.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject
[K7_U04] creatively designs or modifies devices, processes or systems specific to Mechanics and Mechanical Engineering, using computer-aided design systems in the form of technical documentation, taking into account aspects of economic analysis, using appropriate tools and techniques	Student demonstrates the ability to design a simple ventilation and air-conditioning system with additional economic issues and tools for designing engineering calculations and technical specifications.	[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task

Subject contents

Course content – lecture

Ventilation. Ventilation systems of industrial spaces. Protection of the work area against hazards related tothe emission of pollutants. Methods of calculating supply and exhaust streams. Designing a ducts.Equipment selection. The importance and application of air conditioning. Comfort air conditioning. Industrialair conditioning. Moist air. Calculation of the thermal load of objects - heat gains and losses. The necessaryamount of supply air (including fresh air). Examples of air conditioning systems solutions. Energy demand inair conditioning systems, heat recovry and moister recovery. The problem of systems operation.

Prerequisites and co-requisites

Knowledge of Thermodynamics, Fluid Mechanics

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Laboratory reports	56.0%	25.0%
Written exam	56.0%	50.0%
Project	56.0%	25.0%

Recommended reading	Basic literature	1. M. Malicki Wentylacja i klimatyzacja. Warszawa 2. M. Jaskólski, Z. Micewicz - Wentylacja i klimatyzacja hal krytych pływalni. IPPU MASTA, Gdańsk 3. T. Szymański, W. Wasiluk, Systemy wentylacji przemysłowej. SkryptPolitechnika Gdańska
	Supplementary literature	1. H. Recknagel Poradnik Ogrzewanie, klimatyzacja. EWFE, Gdańsk
	eResources addresses	
Example issues/ example questions/ tasks being completed	Classify air conditioning systems. Classify ventilation systems. Describe the design process ventilation andair conditioning systems. Present a method of determining energy consumption in systems ventilation andair conditioning.	
Practical activites within the subject	Not applicable	

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