GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Designing ventilation and air conditioning systems, PG_00064838						
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	Full-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	30.0	0.0	15.0	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		5.0	35.0		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_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	The student is able to design a simple ventilation and air-conditioning system using computer programs and taking into account technical and economic aspects.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
[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	The student is able to analyze and present the line of reasoning regarding humid air treatment processes and the impact of physical parameters on key elements of the ventilation and air-conditioning installation, also using distance learning techniques.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
[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 demonstrates knowledge of legal provisions regarding ventilation and air-conditioning installations, in particular standards related to the design of fire protection installations, requirements regarding air quality and quantity for various types of residential and non-residential buildings. He is also able to characterize the correct stages of designing a ventilation and air-conditioning installation, taking into account economic, environmental and legal aspects.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation
[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 demonstrates knowledge of the construction of key elements of ventilation and air-conditioning installations. In particular, ventilation and air-conditioning devices, compressor refrigeration devices, elements of the ventilation and air-conditioning network such as ducts, section heaters/coolers, filters, noise silencers.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation

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, thermal energy storage.

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 krytychpływalni. IPPU MASTA, Gdańsk 3. T. Szymański, W. Wasiluk, Systemy wentylacji przemysłowej. 4. D. Staniszewski, W.Targański, Odzysk ciepła w instalacjach chłodniczych i klimatyzacyjnych, Masta 2007
	Supplementary literature	1. H. Recknagel Poradnik Ogrzewanie, klimatyzacja. EWFE, Gdańsk 2.. Wolf-Dieter Steinmann, Thermal Energy Storage for Medium and High Temperatures, 2022
	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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