GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Designing ventilation and air conditioning systems, PG_00059381		
Field of study	Mechanical Engineering		
Date of commencement of studies	February 2024	Academic year of realisation of subject	2024/2025
Education level	second-cycle studies	Subject group	Optional 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	Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Rafał Andrzejczyk	
	Teachers		

Lesson types and methods of instruction	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	10.0	54.0	100

Subject objectives	Obtaining the ability to solve theoretical and analytical and design issues - operating equipment with selected issues of ventilation and air conditioning and advanced technologies energy conversion.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W03] possesses a profound knowledge on thermodynamic processes and their simulation, knows simulation methods and programs aiding the design and operation of power generating machines and process equipment, including renewable energy sources, air conditioning and cooling renewable energy sources, air conditioning and cooling	The student has an in-depth study knowledge about change thermodynamics of air moist necessary to implementation at the system level ventilation and air conditioning. Can use basic tools supporting the process installation design ventilation and air conditioning in including a chart in particular thermodynamic for air moist (Mollier plot) and thermodynamic charts for refrigeration fluids. The student can use also support software engineering calculations in particular one that allows for quick conversions thermal flow properties of working fluids .	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
	[K7_U07] is able to perform a preliminary economic analysis of the undertaken engineering actions within the range of design, production and operation of machines and technical devices	The student is able to carry out technical and economic analysis ventilation and air-conditioning installation in terms of possible use the use of savings energy. Including in heat recovery in particular and moisture recovery, reduction of energy consumption of the installation refrigeration through use renewable energy and reduction of moisture content for the conditions summer.	[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_U06] when solving engineering problems on design, technology and operation of machines is able to assess and classify typical methods and tools, define systemic and ex-technical aspects using modern calculating methods and design tools or modifying the current ones	The student is able to choose the appropriate methodology of design and technical and economic analysis in the field of machines and ventilation and air conditioning systems	[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_W05] possesses profound knowledge on the operation of complex systems and mechanical devices, including process equipment	The student has knowledge of construction and operation of the headquarters ventilation and air conditioning and its basic components function deciding about proper air treatment wet. Including in in particular it has skills that allow you to analysis of phenomena physical layouts moisturizing, dehumidifying, heating / cooling and filtration air. The student also has knowledge of mechanics air flow through the channels and sections of ventilation and air-conditioning devices including v particular section fan, noise silencers, ventilation ducts.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
Subject contents	Ventilation. Ventilation systems of industrial halls. Protection of the work area against the risks associated with emission of pollution. Methods of calculating supply and exhaust streams. Network design wires. Equipment selection. The importance and application of air conditioning. Comfort air conditioning. Air conditioning industrial. Moist air. Calculation of the thermal load of objects - heat gains and losses. Indispensable amount of supplied air (including fresh air). Examples of air conditioning systems solutions. Energy demand in air-conditioning systems, heat and moisture recovery. The issue of exploitation systems.		
Prerequisites and co-requisites	Knowledge of the subject Thermodynamics, Fluid Mechanics, Heat Transfer		

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Calculation/project task	56.0%	25.0%
	written exam	56.0%	50.0%
	Laboratory reports	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. Skrypt Politechnika Gdańska	
	Supplementary literature	1. H. Recknagel Poradnik Ogrzewanie, klimatyzacja. EWFE, Gdańsk	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Classify air conditioning systems. Classify ventilation systems. Describe the design process ventilation and air conditioning systems. Present a method of determining energy consumption in ventilation and air conditioning systems.		
Work placement	Not applicable		