



Subject card

Subject name and code	, PG_00059967						
Field of study	Environmental Engineering						
Date of commencement of studies	February 2026		Academic year of realisation of subject		2026/2027		
Education level	second-cycle studies		Subject group		Obligatory subject group 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		6.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		mgr inż. Joanna Marzec				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	30.0	0.0	75
	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	75		5.0		70.0	150
Subject objectives	The aim of the course is to familiarize students with the basic theoretical issues and practical problems related to fire ventilation of buildings, including smoke extraction and smoke prevention systems, current legal regulations and standards related to the topic.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K7_W04		The student uses concepts and specialized language in the field of thermodynamics, ventilation and air conditioning, and uses knowledge in the field of fire ventilation and smoke removal from buildings.		[SW1] Assessment of factual knowledge		
	K7_U10		The student is able to prepare design documentation for fire ventilation and smoke removal installations.		[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		
	K7_U02		The student is able to work in a multidisciplinary design team and individually.		[SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task		
	K7_U11		The student is able to describe in an analytical and synthetic way the issues related to fire ventilation. He is able to analyze topics from an economic or legal perspective, not only in the construction context.		[SU2] Assessment of ability to analyse information		
	K7_W06		The student is able to describe in an analytical and synthetic way the issues related to fire ventilation.		[SW1] Assessment of factual knowledge		

Subject contents	Course content – lecture Lectures: Smoke properties, characteristic parameters and their calculation methods. The impact of smoke on evacuation. Smoke hazard. Smoke flow in buildings. Protection system for escape routes in multi-story buildings. Smoke removal systems for large-volume rooms. Smoke removal from garages. Tunnels. Devices and elements of fire ventilation installations. Legal regulations, standards, technical requirements, construction and fire protection rules. Exercises: Fire-specific parameters, fire power, fire curve, required evacuation time for an underground garage, calculation methods. Smoke prevention systems, calculation of the required system performance while maintaining the boundary conditions in accordance with the PN-EN 12101-13 standard. Selection of the size of fans and other devices, including fire dampers. Guidelines for the preparation of design documentation. Design: As part of the project, a conceptual design of the fire ventilation system for the underground garage should be prepared.		
Prerequisites and co-requisites	Knowledge of the basics of thermodynamics, fluid mechanics, mechanical ventilation. Drawing skills in CAD software. Knowledge of the subject: Heating, ventilation and air conditioning and Residential ventilation and air conditioning systems.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	lecture exam	60.0%	40.0%
	exercises	60.0%	20.0%
	project	60.0%	40.0%
Recommended reading	Basic literature	Mizieliński, B., Kubicki, G. Wentylacja pożarowa i oddymianie. Wydawnictwo WNT, 2017. Wojciech Węgrzyński, Krajewski G., Węgrzyński W. Systemy wentylacji pożarowej garaży. Projektowanie, ocena, odbiór. Instrukcje, Wytyczne, Poradniki nr 493/2015. Instytut techniki Budowlanej. Kaiser, K. Wentylacja pożarowa. Projektowanie i instalacja. Dom Wydawniczy Medium, 2012.	
	Supplementary literature	Svensson, Stefan. Fire ventilation. Swedish Civil Contingencies Agency (MSB), Maj 2020. ISBN: 978-91-7927-036-0	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Given the given boundary conditions, calculate the required time needed to evacuate from the underground garage. Calculate the amount of air needed for ducted smoke extraction in the garage according to BS. Calculate the necessary fan capacity for mechanical compensation of gravity smoke extraction according to CNBOP guidelines.		
Practical activities within the subject	Not applicable		

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