GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Fire ventilation systems, PG_00057351		
Field of study	Power 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	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	Department of Sanitary Engineering -> Faculty of Civil and Environmental Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	mgr inż. Joanna Marzec	
	Teachers		

Lesson types and methods of instruction	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	8.0	17.0	100

Subject objectives	The aim of the course is to familiarize 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 subject.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_K04] is able to react in emergency situations, health and life threatening when using power equipment	The student knows the health and safety regulations and demonstrates the skills to create security systems and deal with fire situations of power equipment.	[SK5] Assessment of ability to solve problems that arise in practice [SK4] Assessment of communication skills, including language correctness
[K7_W02] has extended and deepened knowledge of physics, chemistry, thermodynamics, fluid mechanics, material science, necessary to understand and describe basic thermal and flow phenomena occurring in and around power equipment and systems, transmission networks and internal installations	The student uses the terms and specialist language in the field of physics, chemistry, thermodynamics, fluid mechanics and material science, and is able to use knowledge in the field of fire ventilation and smoke removal. Student knows the course of the fire and can describe a smoke flow. Student knows the tasks of ventilation, fire, gravitational and mechanical smoke extraction. Student can explain and give examples of solutions for smoke exhaust in large-volume rooms, at risk of explosion, underground storeys of a building, communication routes in high-rise buildings, escape routes in garages and smoke exhaust in lift shafts. Student can systematically present the fire protection requirements that should be met by mechanical ventilation systems.	[SW1] Assessment of factual knowledge
[K7_K03] is able to think and act creatively and entrepreneurially, is aware of the responsibility for his/her own work and takes responsibility for teamwork	The student is able to describe in an analytical and synthetic way the issues related to fire ventilation. Student is aware of the work performed by a multi-discipline design team.	[SK1] Assessment of group work skills [SK4] Assessment of communication skills, including language correctness [SK3] Assessment of ability to organize work
[K7_U06] is able to apply basic and advanced knowledge of power equipment and transmission network and internal installations to the preliminary design of a modern power plant or part thereof	The student uses the terms and specialist language in the field of thermodynamics, ventilation and air conditioning, and uses knowledge in the field of fire ventilation and smoke extraction of buildings. Student is able to prepare design documentation for fire ventilation and smoke removal systems.	[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
[K7_K02] is able to work in a group and take on different roles	The student is able to work in a multidisciplinary project team.	[SK1] Assessment of group work skills

Subject contents

Lectures:Smoke properties, characteristic parameters and their calculation methods. Effect of smoke on evacuation. Smoke hazard. Smoke flow in buildings. Escape route protection system in multi-storey buildings. Smoke exhaust systems for large-volume rooms. Garage smoke ventilation. Tunnels. Devices and elements of fire ventilation installation.Legal regulations, standards, technical and construction requirements and fire protection rules.Tutorials:Fire-specific parameters, fire power, fire curve, required evacuation time for the underground garage calculation methods. Smoke prevention systems calculation of the required system capacity 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 execution of design documentation.Design:As part of the project, a conceptual design of the fire ventilation system should be prepared for the underground garage.

Prerequisites and co-requisites

Knowledge of the basics of thermodynamics, fluid mechanics, mechanical ventilation. Ability to create drawings in CAD software. Knowledge of the subject: Heating, ventilation and air-conditioning and Household ventilation and air-conditioning systems.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
	60.0%	40.0%
	60.0%	40.0%
	60.0%	20.0%

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), May 2020. ISBN: 978-91-7927-036-0
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	1. Given the given boundary conditions, calculate the required time needed to evacuate the underground garage. 2. Calculate the required amount of air in the case of ducted smoke exhaust from the garage according to BS. 3. Calculate the necessary fan capacity for mechanical compensation of gravity smoke extraction according to CNBOP guidelines	
Work placement	Not applicable	