

(faculty stamp)

COURSE DESCRIPTION

Z1-PU7

WYDANIE N1

Strona 1 z 2

1. Course title: GAS PURIFICATION IN VENTILATION		2. Course code		
3. Validity of course description: 2015/2016				
4. Level of studies: 1st cycle of higher education				
5. Mode of studies: intramural studies				
6. Field of study: ENVIRONMENTAL ENGINEERING		(RIE)		
7. Profile of studies: all-academic				
8. Programme: Heating, ventilation and air conditioning				
9. Semester: 6				
10. Faculty teaching the course: Department of Heating, Ventilation and Dust Removal Technology				
11. Course instructor: Dr Przemysław Kateusz				
12. Course classification: specialization course				
13. Course status: compulsory				
14. Language of instruction: English				
15. Pre-requisite qualifications: Ventilation and air conditioning; Air protection; Fluid mechanics; Engineering drawing and descriptive geometry				
16. Course objectives: Training the students so as they have knowledge of processes and devices in flue gas purification in industrial ventilation and indoor ventilation air cleaning as well as are able to: (a) determine particle size distribution and the parameters describing solid particles and particulate matter, (b) determine the basic properties of filtration materials, (c) design a cyclone and a settling chamber, and (d) make various calculations concerning the performance and construction of dust collecting devices used in ventilation.				
17. Description of learning outcomes:				
Nr	Learning outcomes description	Method of assessment	Teaching methods	Learning outcomes reference code
	The student:			
1.	knows the basic quantities characterizing the process of gas purification and cleaning devices.	Written test	Lecture using audiovisual aids	K_W09 K_W26
2.	knows the fundamental concepts concerning the aerosols in ventilation.	Written test	Lecture using audiovisual aids	K_W17
3.	knows the processes of flue gas purification in industrial ventilation and indoor ventilation air cleaning, as well as the construction, application and general designing principles of cleaning devices.	Written test	Lecture using audiovisual aids Demonstration of devices	K_W17 K_W26
4.	is able to make the calculations of basic parameters describing contaminated gas and the cleaning device performance and construction, chiefly including dust collectors.	Written test	Calculation examples	K_U18 K_U23 K_U25
5.	employs the design guidelines to construct simple devices for flue gas purification from particulate pollutants.	Progressive control and acceptance of a home-work exercise project Written test	Examples for the calculation of design solutions	K_U23 K_U25
6.	is able to: (a) carry out the particle size distribution tests using selected methods, (b) determine the properties of a filtration material, (c) calculate the parameters describing a dust particle.	Written report Written test	Demonstration of instruments in operation Performing measurements	K_U14 K_U18
18. Teaching modes and hours				
Lecture – 30 h / BA/MA Seminar – 0 h / Class – 0 h / Project – 15 h / Laboratory – 15 h				

19. Syllabus description:**Lecture:**

Meaning of gas purification in industrial and indoor ventilation. Types of gas pollutants in ventilation. Basic parameters describing the gas purification processes. Fundamental concepts concerning the aerosols used in ventilation. Ventilation flue gas dry cleaning devices (construction, operation principle, parameters, application): (a) mechanical collectors (gravity separators, inertial separators, centrifugal collectors), (b) filters with a dry porous layer, (c) electrostatic precipitators. Wet cleaning devices (construction, operation principle, parameters, application). Overall principles of the design and selection of dust collection devices. Air filters for supply/exhaust and indoor air (construction, operation principle, classification, testing, application). Ventilation flue gas cleaning devices for chosen gaseous pollutants (process, construction, application). Unit collectors.

Laboratory:

Determination of kinetic and aerodynamic parameters of solids free-falling in a continuous medium. Determination of dust particle size distribution with the Bahco separator. Determination of dust particle size distribution – a sieve analysis. Testing the filtration material properties. Construction and operation of a bag filter.

Project:

Calculation of parameters describing the dust collection processes. Calculation of kinetic and aerodynamic parameters of aerosol particles. Calculation of the Barth-Leineweber cyclone dimensions. Carrying out of the project of a cyclone battery. Designing a settling chamber.

20. Examination: no**21. Primary sources:**

- Warych J.: Oczyszczanie przemysłowych gazów odlotowych. Wyd. Nauk.-Tech., Warszawa 1994
- Kabsch P.: Odpylanie i odpylacze, t.1. Mechanika aerozoli i odpylanie suche. Wyd. Nauk.-Tech., Warszawa 1992
- Juda J., Nowicki M.: Urządzenia odpylające. Państw. Wyd. Nauk., Warszawa 1979

22. Secondary sources:

- Koniecznyński J.: Oczyszczanie gazów odlotowych. Politechnika Śl., Gliwice 1993
- Szymański T., Wasiluk W.: Wentylacja użytkowa. Poradnik. IPPU MASTA, Gdańsk 1999
- Warych J.: Procesy oczyszczania gazów. Problemy projektowo-obliczeniowe. Oficyna Wydawnicza Politechniki Warszawskiej, 1999
- Lutyński J.: Elektrostatyczne odpylanie gazów. Wyd. Nauk.-Tech., Warszawa 1965
- Zajączkowski J.: Odpylanie w przemyśle. Arkady, Warszawa 1971
- Porowski M., Szczechowiak E.: Klimatyzacja pomieszczeń czystych. Termedia, Poznań 1999
- Andrzejewski R., Gutowski W.: Fizyczne własności pyłów. Wyd. Śląsk, Katowice 1968

23. Total workload required to achieve learning outcomes

Lp.	Teaching mode	Contact hours / Student workload hours
1	Lecture	30/10
2	Classes	0/0
3	Laboratory	15/15
4	Project	15/20
5	BA/MA Seminar	0/0
6	Other (consultations in: lectures – 5, laboratory – 5, project – 5)	15/0
	Total number of hours	75/45

24. Total hours: 120**25. Number of ECTS credits: 4****26. Number of ECTS credits allocated for contact hours: 3****27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 3****28. Comments:**

Approved:

19.02.2016
 (date, Instructor's signature) P. KATEUR

19.02.2016 Kacuga
 (date, the Director of the Faculty Unit signature)