UNIVERSITY OF PANNONIA

COURSE DATASHEET

Semester:	2016/17/1
Course:	Fundamentals of Air Pollution Control
Code:	VEMKKVB112L
Responsible department:	Department of Environmental Engineering
Department code:	MKKV
Responsible instructor:	Tatjána Juzsakova

Course objectives:

The student become familiar with the most important properties of pollution compounds, their mechanism of formation, sources and impact on air quality. The student earn knowledge about modern active and passive techniques applied in air pollution control; utilize fundamental skill in planning of equipment and calculation of his size

Course content:

1. Clean air and biological, physico-chemical definition of air pollution. Formation of air pollution, definition of emission, transmission and imission. Air pollution spreading: local, continental and global air pollution.
2. Characteristic and sources of the most frequent pollution compounds. Pollution impact on living and non-living environment. The most significant pollution compounds in Hungary, air quality situation in Hungary.
3. Air quality regulation, synchronization of Hungarian and European Union regulations. International conventions. Air resource management, emission and imission limit values. Implementation of sustainable development conception in air pollution control, available best techniques (BAT)
4. Emission and imission measurements and calculation, measuring instruments. Active and passive process in air pollution control. Reduction of pollution by technology modification.
5. Characteristics of solid particles present in atmosphere, their environmental impact. Definition of particle size distribution. Determination of volume flow rate and concentration of tail gases. Basic principles of solid particles separation. Definition and determination of total and fractional separation efficiency.
6. Solid particles separation from combustion gas. Dust separators, dust separation technology based on gravimetry, dust chamber and cyclone dust collector operation, planning and calculation of equipment size.
7. Dust filter cleaning, mechanism of filtration. Wet dust separation, factors affecting the separation, separators. Hydrodynamic resistnace. Electrostatic dust separation, Deutsch-equation.
8. Written test
9. Applying absorption phenomena in air pollution control. Basic principles of absorption of gases by liquid. Absorbers, packed and plate scrubbers, jet bubbling reactor.
10. Appling of adsorption phenomena in purification of tail gas. Adsorbents. Adsorption isotherms. Adsorption equipment. Adsorber design and basic principles of equipment size calculation. Condensation.
11. Field trip
12. Catalytic processes in air pollution control. The most important characteristics of applied catalysts and their determination. Catalytic treatment of auto exhaust gases
13. Thermo-processes in air pollution control, incineration equipments.
14. Biological processes applied in air pollution control. Biosieves, bioscrubbers, bioreactors, membrane bioreaktor

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Course content:

15. Chemical industrial technology of purification of tail gases; air pollution control in nitrogen and in aluminum industry.

Requirements, evaluation and grading:

According to the requirements of fulfillment.

Required and recommended readings:

Sipos Zoltán: Ipari levegőtisztaság védelem. Műszaki Könyvkiadó, Budapest. 1987. Dr. Kovács Béla: Levegőtisztaság-védelem, egyetemi jegyzet, Veszprémi Egyetem, 2004. Woperáné, Serédi Ágnes: SOx és NOx emisszió csökkentése. Debrecen. 1991. Moser M., Pálmai Gy.: A környezetvédelem alapjai. Tankönyvkiadó, Budapest. 1992. Barótfi és tsi.: Környezettechnika, Mezőgazdasági Könyvkiadó. 2000. Ronald M. Heck, Robert J. Farrauto: Catalytic Air Pollution Control, Van Nostrand Reinhold, London, 1995. Seymour Calvert, Herold M. Englund: Handbook of air pollution technology, John Wiley & Sons, New York, 1984