



University of Miskolc

Faculty of Materials Science and Engineering
Antal Kerpely Doctoral School of Materials Science
& Technology



Transmission processes of air-pollutants

Dr. István SZŰCS

COURSE DESCRIPTION

2017

Transmission processes of air-pollutants

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Lecturer

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<http://combustion.uni-miskolc.hu/>

Target group

Suggested course, especially for students studying Environmental protection, especially air pollution and air quality control

Language

English or Hungarian.

Goal of the course

The aim of this course to provide knowledge about the air pollution sources, and the transport processes of emitted from different sources of the harmful components in the atmosphere

Methodology

Part 1 : classroom presentations, using all possibilities of in-situ internet.

Part 2 : the students receive individual task (home work), which means to prepare a summary of modern literature study of the transport processes of air pollutants.

Part 3: consultation with the students, control of the individual task.

Subjects covered

1. Fundamental conception of air pollution control and air cleaning
2. Vertical structure of the atmosphere, troposphere, phenomenon of the inverse thermal curve of air
3. Formation processes of the harmful gaseous (NO , CO, SO , HCl, Cl₂, unburned radicals) and solid particle
4. Main decrease primary and secondary methods of air pollutants, flue gas cleaning and particle settlement
5. Type of air pollutant sources point (chimney), diffuse (big industrial buildings), territory and line (moving machines) sources
6. Basic characteristics of the emitting point sources
7. Effective stack height calculation for point sources
8. Formulas of coefficients of turbulent dispersion (σ_x , σ_z)
9. Concentration calculation beneath the plume centerline

10. Calculation and diagram of concentration field around of point sources
11. Examples to illustrate the determination of mixing dept
12. General method for estimation the coefficients of turbulent dispersion
13. Determination of stability indicator by Pasquill method based on systematically measured meteorological data
14. Calculation of concentration field of area diffuse sources
15. Calculation of immision concentration around of line sources
16. Immision concentration in urban area sources

Recommended literature

- I Szűcs István - Woperáné Serédi Ágnes: Levegőtisztítás , Miskolci Egyetemi kiadó, 2001.
- Fekete Katalin, Popovics Máris, Szepesi Dezső : Légszennyező anyagok transzmissziójának meghatározása, (Guide to estimate the transmission of air pollutants) OMSZ . kiadvány, Budapest, 1983 .
- Wang Z, Sha W, Ueda H.: Numerical modeling of pollutant transport and chemistry during a high- ozone event in northern Taiwan. Tellus 2000; 52, p. 189- 205 .
- Paolo Zanetti: Air pollution modeling, Theories, Computation Methods and Available Software, Springer Science- Business Media New York, 1990 . ISBN 978 - 1-4757-4467 - 5
- I. Szűcs, T. Szemmelveisz, I. Máté: Calculation method of the air pollutants concentration caused by mineral oil collecting station, CEREC02000 3rd International Conference on Carpathian Euroregion Ecology, Lillafüred, May, 21-24, 2000 ., Proceedings p. 216- 223. ISBN 963 661 4067

Requirements of course completion

Oral exam on the above list of subjects.

List of questions for the complex examination

1. Fundamental conception of air pollution control and air cleaning, vertical structure of the atmosphere, troposphere, phenomenon of the inverse thermal curve of air
2. Type of air pollutant sources - point (chimney), diffuse (big industrial buildings), territory and line (moving machines) sources
3. Basic characteristics of the emitting point sources, effective stack height calculation for point sources
4. Formulas of coefficients of turbulent dispersion (σ_y , σ_z)
5. Calculation and diagram of concentration field around of point sources
6. Calculation of concentration field of area diffuse sources
7. Calculation of immision concentration around of line sources