

MODULE INFORMATION SHEET

Name of Module Unit	Air pollution dispersion modelling
Name in polish language	Modelowanie rozprzestrzeniania się zanieczyszczeń w powietrzu atmosferycznym
Module type	compulsory / elective
Form of studying	full-time day courses
Level of study	undergraduate course (B.Sc. level)
Type of study (for extra-mural courses)	-
Programme	Environmental Engineering
Speciality	Environmental Engineering
Responsible department	Department of Environmental Protection and Management
Responsible person	Dr hab. inż. Maria Markiewicz

Semester	Lectures(E)	Tutorials	Laboratory	Computer Exercises	Projects	ECTS
7	15 (Exam)			30		4

Objectives (summary)

The main purpose of the subject is to introduce students to the theory of air pollution dispersion modelling. Students should acquire the skills in application of air pollution dispersion models. Moreover they will learn to analyze the results from the simulations. After the course the students will be able to solve some basic environmental engineering problems related to air quality evaluation.

Prerequisites

Meteorology, Air pollution control

Rules of integrated grade setting

Exam grade 60% and computer classes grade 40%

Recommended readings

Zanetti P. Air Pollution Modelling, Van Nostrand Reinhold, New York, 1990.

Pielke R. Mesoscale Modelling, Elsevier, Amsterdam, 2001

Markiewicz M. Air Pollution Dispersion Modelling, in: Models and Techniques for Health and Environmental Hazard assessment and Management. Part 2: Air Quality modelling, / Borysiewicz M. (red.), 2006, Institute of Atomic Energy, ISBN 83-914809-7-6, ss. 303-348

Markiewicz M. Mathematical Modelling of the Heavy Gas Dispersion, in: Models and Techniques for Health and Environmental Hazard assessment and Management. Part 2: Air Quality modelling, / Borysiewicz M. (red.), 2006, Institute of Atomic Energy, ISBN 83-914809-7-6, ss. 279-302

Contents of lectures (syllabus)

	Topics	Time (hrs.)	Scope (S / Ex)
1	Introduction.	1	Ex
2	Atmospheric boundary layer meteorology.	2	Ex
3	Sources of air pollution.	1	Ex
4	Theory of air pollution dispersion.	2	Ex
5	Categorization of models using different criteria. Characteristic of different classes of air pollution dispersion models.	1	Ex
6	Application of models.	2	Ex
7	Quality evaluation of mathematical models.	1	Ex
8	Models used in risk assessments for industrial or other sources.	2	Ex
9	Models used for policy assessments to simulate the air quality in a regional scale.	2	Ex
10	Models quality evaluation	1	Ex
Total		15	hours

S – topics listed in the legal study programme standards from 12.07.2007

Ex – extended topics

Lecturers

Dr hab. inż. Maria Markiewicz

Assessment method

Exam

Contents of computer exercises

	Topics	Time (hrs.)	Scope (S / Ex)
1	Preparatory classes.	1	Ex
2	Task 1: Simulations needed for the preparation of an application for a permit concerning the emission of pollution to the atmospheric air - application of the regulatory model (Calculations of basic emission parameters for SO ₂ , NO _x and particulate matter, determination of other input data, simulation of pollution dispersion in the atmosphere, interpretation and presentation of results, analysis of spatial distribution of pollution concentration, statistical interpretation of results, performance of quality assessment air in the selected area, presentation and defense of the task).	15	Ex
3	Task 2: Safety study–application of the heavy gas dispersion model (Calculation of emission parameters for the selected accidental heavy gas releases, determination of other input data, simulation of the diffusion of the heavy gas in the atmosphere, interpretation and presentation of results, analysis of spatial distribution of the heavy gas concentration, determination of hazard zones, presentation and defense of the task).	12	Ex
4	Colloquium	2	Ex
Total		30	hours

S – topics listed in the legal study programme standards from 12.07.2007
Ex – extended topics

Persons responsible for computer exercises

Dr hab. inż. Maria Markiewicz

Assessment method for computer exercises

Assessment of work during exercises. Colloquium during the semester. Realization of two tasks.