MODULE INFORMATION SHEET

Name of Module Unit	**Fundamentals of Air Pollution**
Name in polish language	Podstawy ochrony atmosfery
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	Prof. dr hab. inż. Katarzyna Juda-Rezler

Semester	Lectures(E)	Tutorials	Laboratory	Computer Exercises	Projects	ECTS
5	30 (Exam)				15	4

Objectives (summary)

Learning outcomes – skills and competencies: understanding the structure of the atmosphere and how this affects air pollution; understanding the chemical processes that control air pollution; understanding the regulation of air pollution in EU; understanding methods of control of air pollution sources, especially large stationary sources; understanding the significance of regional and international air pollution transport and the impact of air pollution on human populations and environment. Knowledge about systems of air pollution assessment and management and skill to predict air pollutant emissions.

Prerequisites

Environmental Protection, Meteorology

Rules of integrated grade setting

Integrated grade account for 60% of the exam grade and 40% of the guided projects grade.

Recommended readings

1. D.A. Vallero: Fundamentals of Air Pollution, 4th Editions, Academic Press, San Diego 2008.
2. T. Godish: Air Quality, 4th Edition,CRC Press Company. Boca Raton 2005.
3. J.H.Seinfield, S.N.Pandis: Atmospheric Chemistry and Physics: from air pollution to climate change, 2nd edition, Wiley & Sons, Hoboken 2006.
4. Air quality in Europe. Last available Technical Report of the European Environment Agency (EEA).
5. Energy and environment in the European Union, Tracking progress towards integration, EEA report No 8/2006, Copenhagen 2006.
6. Directive of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe (2008/50/EC).
7. Directive of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (2010/75/EC).

Contents of lectures (syllabus)

	Topics	Time (hrs.)	Scope (S / Ex)
1	Introduction. Air Pollution: history of the problem, definition and types of air pollutants, scales of the problem, urban air pollution. Driving forces, sources and emissions of air pollutants. Atmospheric processes and parameters: transport, diffusion, wind, stability; types of inversion; topographical influences; stability and plume behaviour; transport to stratosphere; deposition processes.	6	S/Ex
2	Natural and anthropogenic sources of air pollution. Emission inventories and databases.	4	S
3	Air quality .The effects of air pollution. Effects on Human health and welfare, effect on vegetation, effect on materials. Long-term effect on the planet. Air pollution chemistry. Smog problem, ozone and particulate matter. Impact of air pollution on human health and environment.	6	S/Ex
4	Air pollution assessment and management. The regulatory control of air pollution. EU legislation. Air quality criteria and standards. Emission standards.	4	S/Ex
5	Sustainable methods of preventing air pollution.	4	Ex
6	The engineering control of air pollution. Control devices, technologies and systems. Air pollution control technologies: rules for selection of control method and technology; control options for Large Stationary Sources. Flue gas cleaning technologies: dedusting; methods of separating gaseous pollutants; Flue Gas.	6	S
	Total	**30**	**hours**

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

Lecturers

Prof. dr hab. inż. Katarzyna Juda-Rezler

Assessment method

Exam. Min. 50% of the total score is required.

Contents of guided projects

	Topics	Time (hrs.)	Scope (S / Ex)
1	The guided projects are conducted as an extension and support of the lecture. Students are expected to complete the reading assignments before class, and be ready to question and discuss the material. Three projects are realized: Energy use and its consequences for atmospheric environment; Major air pollutant emissions from large stationary source. Systems of air pollution assessment and management.	15	S
	Total	**15**	**hours**

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

Persons responsible for guided projects

Prof. dr hab. inż. Katarzyna Juda-Rezler

Assessment method for guided projects

Guided projects - 1 test and 3 projects. Min. 50% of the total score is required.