



SZKOŁA GŁÓWNA  
GOSPODARSTWA  
WIEJSKIEGO

## Air Pollution and the Protection of the Atmosphere

### Educational subject description sheet

#### Basic information

<b>Field of study</b> Course Offer for exchange students - second cycle studies, including uniform master studies (MA programmes)		<b>Didactic cycle</b> 2024/25	
<b>Speciality</b> -		<b>Subject code</b> PWMPWM2S_D.B100000.06278.24	
<b>Organizational unit</b> Course Offer for exchange students		<b>Lecture languages</b> english	
<b>Study level</b> second cycle studies, including uniform master studies (MA programmes)		<b>Mandatory</b> Elective subjects	
<b>Study form</b> full-time studies		<b>Block</b> Basic subjects	
<b>Education profile</b> General academic		<b>Disciplines</b>	
<b>Coordinator</b>	Tomasz Rozbicki		
<b>Teacher</b>	Tomasz Rozbicki, Małgorzata Kleniewska		
<b>Period</b> Winter semester	<b>Examination</b> Exam	<b>Number of ECTS points</b> 3	
	<b>Activities and hours</b> Lecture: 26 Project exercises: 4		

## Goals

Code	Goal
C1	Acquaint students with dangers and methods of protection of the atmosphere
C2	Acquaint students with basic information about atmospheric pollutants, classification and characteristic of the sources
C3	Acquaint students with effect on human health, animals, plants and materials
C4	Acquaint students with measurement, monitoring and methods of pollutants removal
C5	Acquaint students with the ability to assess the impact of a source of pollution on the environment

## Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
<b>Knowledge - Student knows and understands:</b>			
W1	Basic processes in the atmospheric environment and identification explain a cause-and-effect phenomena occurring in the atmosphere		Written exam
W2	Changes in the atmospheric environment caused by human activities		Written exam
W3	Basic techniques and technologies for removal of air pollution and engineering methods of air pollution control		Written exam
<b>Skills - Student can:</b>			
U1	Use mathematical and statistical methods to describe and analyze the processes occurring in the atmosphere		Written exam, Project
U2	Carry out the analysis of the pollutants dispersion in the air by the use of Gaussian Plume Model (GPM)		Project
<b>Social competences - Student is ready to:</b>			
K1	Be responsible and reliable analysis and evaluation of own obtained results and other ones		Written exam, Project
K2	Have awareness of non-technical aspects and effects of engineering activities, including its impact on the environment		Written exam

## Study content

No.	Course content	Subject's learning outcomes	Activities
1.	The scale of the air pollution problems; legislation and regulations in the field of protection of the air	W1	Lecture
2.	Classifications and characteristics of emission sources as well as gas and PM	W1, W2	Lecture

No.	Course content	Subject's learning outcomes	Activities
3.	<ul style="list-style-type: none"> <li>The effect of air pollution on the health and life of humans and animals, influence on plants and inanimate matter</li> <li>The effect of air pollution on the planet - anthropogenic intensification of the greenhouse effect and depletion of the stratospheric ozone layer</li> </ul>	W1, W2, K2	Lecture
4.	Basic information about the methods of removing air pollution and engineering method of air quality control.	W3	Lecture
5.	Plume model from a single point emission source.	U1, U2, K1	Lecture, Project exercises
6.	<ul style="list-style-type: none"> <li>Data preparation for project calculations: emitter technical parameters, emission schedule, substitute emitter.</li> <li>Maximum and average annual emission.</li> <li>Preliminary calculations: heat emission, gas emission, effective emission height, vertical wind velocity distribution, aerodynamic roughness</li> </ul>	U1, U2	Project exercises
7.	<ul style="list-style-type: none"> <li>Calculation of maximum concentration of pollution on the ground.</li> <li>Calculations of the concentration of pollutants in the vertical profile, on the surface earth and in a three-dimensional coordinate system.</li> </ul>	U1, U2	Project exercises
8.	Assessment of the influence of single point source (stack) on the air quality	U2, K1	Project exercises

### Course advanced

Activities	Methods of conducting classes
Lecture	Lecture, Teamwork
Project exercises	Case study, Individual work

Activities	Examination method	Percentage
Lecture	Written exam	60%
Project exercises	Project	40%

Activities	Credit conditions
Lecture	Test exam (alternatively on-line)
Project exercises	Assessment of individual project

## Literature

### Obligatory

1. Stern A.C., Boubel R.W., Turner D.B., Fox D.L. 1997: Fundamentals of Air Pollution (3rd) edition
2. Presentation provided by lecturer
3. Any university manuals concerning air pollution and quality of the air

### Optional

1. Stull A.R. Meteorology for scientists and engineers
2. Oke T. R. Boundary Layer Climates
3. Regulation of the Minister of the Environment: On references for certain substances in the air - extract prepared in english by tje lecturer
4. Materials and data for project prepared by the lecturers
5. IPCC Reports: <http://www.ipcc.ch>

## Calculation of ECTS points

Activity form	Activity hours*
Lecture	26
Project exercises	4
Preparation for the exam	15
Preparation for exercises	5
Preparing the project	15
Preparation of the report	15
<b>Student workload</b>	<b>Hours</b> 80
<b>Number of ECTS points</b>	<b>ECTS</b> 3

\* hour means 45 minutes