

## Annex 6

### DISCIPLINE DESCRIPTION

#### 1. Information on the study programme

1.1 Academic institution	<b>UNIVERSITY OF ORADEA</b>
1.2 Faculty	<b>FACULTY OF ENVIRONMENTAL PROTECTION</b>
1.3 Department	<b>Environmental Engineering</b>
1.4 Field of study	<b>Environmental Engineering</b>
1.5 Cycle of study	<b>BACHELOR</b>
1.6 Study programme/Qualification	<b>Engineering of biotechnical and ecological systems / Engineer</b>

#### 2. Information on the discipline

2.1 Name of discipline	Air pollution						
2.2 Course holder	Lecturer Pereş Ana Cornelia						
2.3 Seminar/Laboratory/Project holder	Lecturer Pereş Ana Cornelia						
2.4 Year of study	II	2.5 Semester	IV	2.6 Type of evaluation	Ex	2.7 Regime of discipline	I

(C) Compulsory; (O) Optional; (E) Elective

#### 3. Total estimate time (hours per semester of didactic activities)

3.1 Number of hours per week	3	out of which: 3.2 course	2	out of which 3.3 seminar/laboratory/project	1
3.4 Total hours in the curriculum	48	out of which: 3.5 course	28	out of which 3.6 seminar/laboratory/project	14
Time allotment					hours
Study assisted by manual, course support, bibliography and notes					14
Additional documentation in the library/ on specialised electronic platforms and in the field					8
Preparation of seminars/laboratories/ topics/reports, portfolios and essays					5
Tutorship					2
Examinations					2
Other activities.....					2
<b>3.7 Total hours of individual study</b>	<b>33</b>				
<b>3.9 Total hours per semester</b>	<b>75</b>				
<b>3.10 Number of credits</b>	<b>3</b>				

#### 4. Prerequisites (where appropriate)

4.1 curriculum	(Conditioning) - Physics, Chemistry, Meteorology.
4.2 competences	<ul style="list-style-type: none"> <li>• defining the concept of pollution, presenting the natural and anthropic pollution processes and the main air pollutants;</li> <li>• highlighting the environmental factors that influence the pollution and self-purification of atmospheric air.</li> </ul>

**5. Conditions** (where appropriate)

5.1. related to course	Course with projection system
5.2. related to seminar/laboratory/ project	Apparatus for conducting laboratory hours; Knowledge of the notions contained in the laboratory work to be carried out.

<b>6. Specific competences acquired</b>	
Professional competences	<p>C2.1 Description and application of concepts, theories and practical / technological / engineering methods to determine the quality of the environment</p> <p>C2.3 Application of basic technical and technological knowledge in the definition and explanation of specific concepts of engineering and environmental protection</p> <p>C2.4 Qualitative and quantitative assessment of natural phenomena and anthropogenic activities on the quality of environmental factors</p> <p>C2.5 Identification of the best technical and technological solutions for the implementation of professional engineering and environmental protection projects</p> <p>C3.1 Description of environmental factors and their interaction with natural and anthropogenic phenomena affecting their quality</p> <p>C3.2 Interpretation of the mechanisms by which natural and anthropic factors lead to deterioration of the quality of the environment</p> <p>C3.5 Introducing the best methods of investigation available in environmental engineering projects</p> <p>C4.1 Description of commonly used concepts and theories to assess environmental degradation</p> <p>C4.2 Understand the basic concepts of interdependence between pollutants and direct environmental effects</p> <p>C4.3 Identification of interdependencies between pollutants and environmental effects</p> <p>C4.4 Assessment based on specific documentation of environmental monitoring programs</p>
Transversal competences	<p>CT1. Identifying and observing professional ethics and deontology rules, assuming responsibility for decisions taken and related risks</p>

**7. Objectives of discipline** (coming from the specific competences acquired)

7.1 General objective	<ul style="list-style-type: none"> <li>▪ Undertaking by students of the notions of air pollution;</li> <li>▪ Student knowledge of the main sources of pollution, as well as the most significant air pollutants;</li> <li>▪ Knowledge of the factors that influence the degree of atmospheric pollution.</li> </ul>
7.2 Specific objectives	<p>Acquiring knowledge to enable:</p> <ul style="list-style-type: none"> <li>• identifying sources of pollution and atmospheric pollutants;</li> <li>• identification of polluting substances and knowledge of the effects on air;</li> <li>• detection of industrial operations resulting in the main air pollutants.</li> </ul>

**8. Content\*/**

8.1 Course	Methods of teaching	No. of hours/Remarks
1. General notions about air pollution	Interactive lecture with videoprojection	2
2. Composition of the Earth's atmosphere	Interactive lecture with videoprojection	2
3. Sources of pollution. Sources of natural pollution	Interactive lecture with videoprojection	2
4. Anthropogenic pollution sources	Interactive lecture with videoprojection	2
5. General issues. Carbon compounds	Interactive lecture with videoprojection	2
6. Nitrogen compounds. Sulfur compounds	Interactive lecture with videoprojection	2
7. Pollution by particles	Interactive lecture with videoprojection	2
8. Ozone. Halogen-containing compounds	Interactive lecture with videoprojection	2
9. Heavy metals and their compounds	Interactive lecture with videoprojection	2
10. Emission characteristics	Interactive lecture with videoprojection	2
11. Geographical Factors and Their Impact on Air Pollution	Interactive lecture with videoprojection	2
12. The greenhouse effect	Interactive lecture with videoprojection	2
13. Degradation of the ozone layer	Interactive lecture with videoprojection	2
14. Acid rain	Interactive lecture with videoprojection	2
Bibliography 1. Borota D., Costea Monica, 2000, <i>Poluarea aerului</i> , Editura Universității din Oradea; 2. Cojocaru I., 1995, <i>Surse procese și produse de poluare</i> , Editura Junimea Iași; 3. Domuța C., Brejea R., 2010, <i>Monitoringul mediului</i> , Editura Universității din Oradea; 4. Mănescu S., Cucu M., Diaconescu M.L., 1994, <i>Chimia sanitară a mediului</i> , Editura Medicală, București; 5. Moza (Pereș) Ana Cornelia, 2009, <i>Clima și poluarea aerului în bazinul hidrografic Crișul Repede</i> , Editura Universității din Oradea; 6. Pereș Ana Cornelia, 2011, <i>Poluarea și autopurificarea atmosferei</i> , Editura Universității din Oradea; 7. Rojanschi V., Bran Florina, Diaconu G., 1997, <i>Protecția și ingineria mediului</i> , Editura Economică, București; 8. Tumanov S., 1989, <i>Calitatea aerului</i> , Editura Tehnică, București.		
8.2 Seminar	Methods of teaching	No. of hours/Remarks
8.3 Laboratory		
1. Labor protection measures in the air pollution	Presenting the notions	1

laboratory	of specific labor protection in the air pollution laboratory	
2. Maximum admissible concentrations of the main air pollutants	Exposure, Demonstration, Discussion	1
3. Methods of sampling air	Exposure, Demonstration, Practical Application	1
4. Determination of sulfur dioxide content	Exposure, Demonstration, Practical Application	1
5. Determination of sulfuric acid	Exposure, Demonstration, Practical Application	1
6. Determination of nitrogen dioxide	Exposure, Demonstration, Practical Application	1
7. Determination of ammonia	Exposure, Demonstration, Practical Application	1
8. Determination of carbon dioxide	Exposure, Demonstration, Practical Application	1
9. Determination of chlorine	Exposure, Demonstration, Practical Application	1
10. Determination of hydrochloric acid	Exposure, Demonstration, Practical Application	1
11. Determination of fluorine	Exposure, Demonstration, Practical Application	1
12. Determination of particulate matter	Exposure, Demonstration, Practical Application	1
13. Determination of sedimentary powders	Exposure, Demonstration, Practical Application	1
14. Assessment of knowledge gained during laboratory classes	Teaching laboratories and supporting them	1
8.4 Project		
Bibliography		
1. Kőteles Nandor, 2011, <i>Noțiuni practice și teoretice de poluare și depoluare a aerului atmosferic</i> , Editura Universității din Oradea;		

2. Mănescu S., Cucu M., Diaconescu M.L., 1994, *Chimia sanitară a mediului*, Editura Medicală, București;
3. Pereș Ana Cornelia, 2014, *Poluarea aerului*, Îndrumător de lucrări practice;
4. Ordin MAPPM nr. 462, 1993, *Condiții tehnice privind protecția atmosferei*, București;
5. Ordin MAPM nr. 592, 2002, *Normativ privind stabilirea valorilor limită, a valorilor de prag și a criteriilor și metodelor de evaluare a dioxidului de sulf, dioxidului de azot și oxizilor de azot, pulberilor în suspensie (PM<sub>10</sub> și PM<sub>2,5</sub>), plumbului, benzenului, monoxidului de carbon și ozonului din aerul înconjurător*, București;
6. STAS nr.10331, 1992, *Principii și reguli de supraveghere a calității aerului*.

\* The content, respectively the number of hours allocated to each course / seminar / laboratory / project will be detailed during the 14 weeks of each semester of the academic year.

**9. Corroboration of discipline content with the expectations of the epistemic community, professional associations and representative employers from the field corresponding to the study programme**

- The content of the subject is adapted and satisfies the requirements imposed by the labor market, being agreed by social partners, professional associations and employers in the field of the bachelor's program.
- The content of the discipline can be found in the curriculum of the Environmental Engineering specialization and other academic centers in Romania that have accredited these specializations, thus knowing the basic notions is a stringent requirement of the employers in the environmental field.

**10. Evaluation**

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the final grade
10.4 Course	The degree of acquisition of taught matter	Oral exam	80%
10.5 Seminar	-	-	-
10.6 Laboratory	Teaching laboratories and supporting them	Colloquium in the last hour of practical work	20%
10.7 Project	-	-	-
10.8 Minimum standard of performance			
<ul style="list-style-type: none"> <li>• Undertaking coordinated work to solve specific problems in the field, with the correct assessment of the workload, available resources, the time required to complete and the risks under the conditions of the application of the safety and health rules at work.</li> </ul>			

Date of completion

Signature of course holder\*\*

Signature of seminar  
laboratory/project holder \*\*

mai 2021

Lecturer PEREȘ ANA CORNELIA  
peresana35@yahoo.com

Lecturer PEREȘ ANA CORNELIA  
peresana35@yahoo.com

Date of approval in the department

.....

Signature of the Head of Department  
Assoc. prof. LASLO VASILE

Dean signature  
Prof. CHEREJI IOAN