



No. _____ of _____

USAMV form 0124010104 (discipline code)

SUBJECT OUTLINE**1. Information on the programme**

1.1. Higher education institution	University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca
1.2. Faculty	Agriculture
1.3. Department	Environmental and Plant Protection
1.4. Field of study	Environmental Engineering
1.5. Cycle of study ¹	Master
1.6. Specialization/ Study programme	Protection of natural and anthropic systems
1.7. Form of education	Full time

2. Information on the discipline

2.1. Discipline name	Air resource management							
2.2. Course coordinator	Professor PhD Ioan OROIAN							
2.3. Seminar/ laboratory/ project coordinator	Professor PhD Ioan OROIAN							
2.4. Year of study	I	2.5. Semester	I	2.6. Evaluation type	continuous	2.7. Discipline status	Content ²	DF
							Compulsoriness ³	DI

3. Total estimated time (teaching hours per semester)

3.1. Hours per week – full time programme	3	out of which: 3.2. lecture	2	3.3. seminar/ laboratory/ project	1
3.4. Total number of hours in the curriculum	42	out of which: 3.5. lecture	28	3.6. seminar/laboratory	14
Distribution of the time allotted					hours
3.4.1. Study based on books, textbooks, bibliography and notes					40
3.4.2. Additional documentation in the library, electronic platforms and field experiences					20
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					28
3.4.4. Tutorials					10
3.4.5. Examinations					10
3.4.6. Other activities					
3.7. Total hours of individual study	108				
3.8. Total hours per semester	150				
3.9. Number of credits ⁴	5				

4. Prerequisites (if applicable)

4.1. curriculum-related	Community environment policies, institutions and norms
4.2. skills-related	Knowledge of air pollutants and their effects on the environment.

5. Conditions (if applicable)

5.1. for the course	The course is interactive, students can address questions regarding the exposed content. The university discipline impose respecting the beginning and finalizing hours of the course. Are not tolerated other activities during lecture, mobile phones are to be turned off.
5.2. for the seminar/ laboratory/ project	The practical work is mandatory the course note and practical work, each student will develop an individual activity with laboratory materials made on. Academic conduit is required during the works.

6. Cumulated specific competences

Professional competences	Applying legislation and legal norms to prevent and reduce the impact of human activities on environment. Efficient use of norms (standards, legislation, etc.) in establishing appropriate basic methods problem solving.
Transversal competences	Objective self-assessment of the need for continuous training in order to adapt and respond constant demands of economic development; the use of information and communication techniques and at least one languages of international circulation.

7. Discipline objectives (based on the cumulated specific competences)

7.1. General objective	The discipline addresses the issue of the atmospheric environment by presenting the composition of the atmosphere, the atmospheric component of the major biogeochemical cycles, the sources of air pollution, the processes of transport and transformation of the pollutants.
7.2. Specific objectives	Knowledge of the processes and phenomena specific to the atmospheric environment, approached individually in order to identify the determinants of the state and quality of the atmospheric environment.

8. Content

8.1. COURSE Number of hours -28	Teaching methods	Observation
The importance of the atmosphere. Genesis of the atmosphere. The main characteristics of the atmosphere.	Lecture	2 hours
Global climate. Macrometeorological phenomena. Global climate change.	Lecture	2 hours
Pollutants - dispersed systems. Basic aspects of pollutant dispersion processes.	Lecture	2 hours
Atmospheric pollutant factors: their main physico-chemical and toxicological properties. The air pollution. Definitions. Suspended particles, gaseous organic pollutants, gaseous inorganic pollutants, photochemical smog. Their effects.	Lecture	2 hours
Sources of air pollution: natural sources, artificial sources.		
Meteorological factors and their influence. Temperature, instability, stability, density and pressure, humidity, wind, turbulence.	Lecture	2 hours
Processes of transport and transformation of pollutants in the atmospheric environment.	Lecture	2 hours
Urban air quality.	Lecture	2 hours
Overall effects. Anthropogenic changes in the atmosphere		
Greenhouse gases and global warming.	Lecture	2 hours
Acid rain.	Lecture	2 hours
Ozone formation in the atmosphere. Destruction of the ozone layer.	Lecture	2 hours
Photochemical smog.	Lecture	2 hours
Management measures for air quality protection.	Lecture	2 hours
	Lecture	2 hours

8.2. PRACTICAL WORKS Number of hours -	Teaching methods	Observation
Meteorological factors and their influence. Analysis of weather maps.	Theoretical presentation of practical works	1 lab work
Analysis of the meteorological data necessary for the preparation of an air pollutant dispersion study.	Theoretical presentation of practical works	1 lab work
Principles for determining the concentrations of pollutants around a source.	Theoretical presentation of practical works	1 lab work
Realization of the inventory of emission sources.	Theoretical presentation of practical works	1 lab work
Use of mathematical models in the calculation of air pollutant dispersion.	Theoretical presentation of practical works	2 lab work
The use of AP 42 in establishing the emission rate of air pollutants from point sources of pollution.	Theoretical presentation of practical works	2 lab work

Use of AP 42 in establishing the emission rate of air pollutants from linear and surface sources of pollution. Case Study. Air quality in large urban agglomerations.	Theoretical presentation of practical works	2 lab work
Case Study. Cross-border air pollution phenomena.	Theoretical presentation of practical works	2 lab work
Case Study. Global impacts on air quality. Greenhouse gases, ozone layer destruction, acid precipitation.	Theoretical presentation of practical works	1 lab work
	Theoretical presentation of practical works	1 lab work
Compulsory bibliography: 1. Ursu D. Pascu, Dan P. Frosin, Ileana Bergea-Tatu, Dorin R. Popa, Dora Frosin-Rada, 1978, <i>Atmospheric air protection, practical guidance</i> , Ed. Tehnică, București. 2. Mănescu S., Cucu M., 1994, <i>Environmental chemistry</i> Ed. Medicală, București 3. Negulescu M., Ianculescu S., 1995, <i>Environment protection</i> Ed. Tehnică, București 4. Rojanschi, VL., Bran, Florina., 2002, <i>Environmental policies and strategies</i> , Ed. Economică, București. 5. Rusu, T., 2002, <i>Protection of the industrial environment</i> Ed. Mediamira, Cluj-Napoca. Optional bibliography:		

9. Corroborating the discipline content with the expectations of the epistemic community representatives, of the professional associations and of the relevant employers in the corresponding field

The content of the discipline is consistent with what is done in other university centers in the country and abroad. For a better adaptation to the labor market requirements of the content of the discipline, meetings were held with representatives of the business environment.

10. Evaluation

Type of activity	10.1. Evaluation criteria	10.2. Evaluation type	10.3. Percentage of the final grade
10.4. Course	-problematization, experimentation, debate	continuous(VP)	60% 20%
10.5. Seminar/Laboratory	- case studies		20%
10.6. Minimum performance standards			
Mastery of scientific information transmitted through lectures and practical papers at an acceptable level. Obtaining the passing grade for on-the-spot checks is a condition of promotability..			

- 1 Cycle of studies - choose one of the three options: Bachelor/Master/Ph.D.
- 2 according to the educational plan
- 3 Discipline status (compulsoriness) - choose one of the options - DI (compulsory discipline) DO (optional discipline) DFac (facultative discipline).
- 4 One credit is equivalent to 25-30 hours of study (teaching activities and individual study).

Filled in on
04.09.2019

Course coordinator
Professor PhD Ioan OROIAN

Laboratory work/seminar coordinator
Professor PhD Ioan OROIAN

Approved by the
department on
05.09.2019

Head of the Department
Professor PhD Ioan OROIAN