

SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	Babeş-Bolyai University of Cluj-Napoca
1.2 Faculty	Faculty of Geograph
1.3 Department	Department of Physical and Technical Geography
1.4 Field of study	Geography
1.5 Study cycle	Master
1.6 Study programme / Qualification	Climate Change and Sustainable Development/ Master degree

2. Information regarding the discipline

2.1 Name of the discipline	AIR QUALITY MANAGEMENT						
2.2 Course coordinator	Assistant professor PhD Nicolae AJTAI						
2.3 Seminar coordinator	Assistant professor PhD Nicolae AJTAI						
2.4. Year of study	1	2.5 Semester	1	2.6. Type of evaluation	C	2.7 Type of discipline	DO

3. Total estimated time (hours/semester of didactic activities)

3.1 Hours per week	4	Of which: 3.2 course	2	3.3 seminar/laboratory	2
3.4 Total hours in the curriculum	56	Of which: 3.5 course	28	3.6 seminar/laboratory	28
Time allotment:					hours
Learning using manual, course support, bibliography, course notes					20
Additional documentation (in libraries, on electronic platforms, field documentation)					20
Preparation for seminars/labs, homework, papers, portfolios and essays					20
Tutorship					6
Evaluations					4
Other activities:					-
3.7 Total individual study hours	70				
3.8 Total hours per semester	126				
3.9 Number of ECTS credits	5				

4. Prerequisites (if necessary)

4.1. curriculum	-
4.2. competencies	-

5. Conditions (if necessary)

5.1. for the course	Video projector
5.2. for the seminar /lab activities	Laboratory with computers;

6. Specific competencies acquired

Professional competencies	<ul style="list-style-type: none"> • Acquiring knowledge on air pollutants, generation, air transport, effect; • Acquiring knowledge on mathematical modeling of air pollutant dispersion; • Understanding the role of monitoring in air quality management; • Acquiring fundamental notions in the selection and application of air pollution control technologies; • Knowledge, design and application of air quality management strategies
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Transversal competencies	<ul style="list-style-type: none"> • Autonomy and responsibility. • Communication attitudes and work in interdisciplinary teams. • Ability to interpret, analyze and synthesize data available in the analysis of complex situations • Development of an ethical attitude.
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7. Objectives of the discipline (outcome of the acquired competencies)

7.1 General objective of the discipline	<ul style="list-style-type: none"> • Acquisition of basic notions on air quality management • Applying the concepts of design and implementation of air quality management plans
7.2 Specific objective of the discipline	<ul style="list-style-type: none"> • Understanding the processes of generating air pollution • Understanding the role of pollutant transport and transformation processes in the atmospheric environment • Understanding the effects of air pollutants on the environment and human health • Knowledge, design and application of air quality management strategies

8. Content

8.1 Course	Teaching methods	Remarks
1. The main characteristics of the atmosphere. Global problems - global climate change, destruction of the stratospheric ozone layer	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Conversation 	
2. Sources of pollution, classification, air pollutants and their effects	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Conversation 	
3. Dispersion of pollutants in the atmosphere. Meteorological factors and their influence - temperature, atmospheric stability, turbulence, wind	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Conversation 	
4. Processes of transport and transformation of pollutants in the atmosphere	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Conversation 	
5. Emission inventories, organization principles	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Conversation 	
6. Monitoring and evaluation of air quality. Transfer and transformation processes, immissions, effects on the environment and human health. The role of monitoring in environmental management	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Conversation 	
7. Modeling the dispersion of air pollutants	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Conversation 	
8. Atmospheric emission control technologies- stationary sources	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Conversation 	
9. Emission control technologies - mobile sources	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Conversation 	
10. Environmental impact assessment, aspects in the management of atmospheric pollutant emissions.	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Conversation 	

Industrial Emissions Directive. The best available technologies		
11. Air quality management in Europe-general policies. Regional air quality management strategies	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Conversation 	
12. Air quality management in Europe - urban agglomerations - management strategies, measures applied, effects	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Conversation 	
13. Air quality management - sectoral approaches - transport	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Conversation 	
14. Global air quality management strategies. Scenarios for air quality, past, present and future.	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Conversation 	

Bibliography

1. CITEAIR, 2007, Air Quality Management Guide book, <http://citeair.rec.org/downloads/Products/AirQualityManagement.pdf>
2. EEA, 2020, Measures to reduce emissions of air pollutants and greenhouse gases: the potential for synergies, <https://www.eea.europa.eu/publications/measures-to-reduce-emissions-of>
3. EMEP/EEA, 2019, Air pollutant emission inventory guidebook 2019, Technical guidance to prepare national emission inventories, <https://www.eea.europa.eu/publications/emep-eea-guidebook-2019>
4. IPCC, 2014, Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)], IPCC, Geneva, Switzerland, <https://www.ipcc.ch/report/ar5/syr/>
5. NIVA, 2015, Trends in ecosystem and health responses to long-range transported atmospheric pollutants RAPPORT L.NR. 6946-2015 [Heleen A. de Wit, Jean-Paul Hettelingh, Harry Harmens (eds.)], https://unece.org/DAM/env/documents/2016/AIR/Publications/Trends_in_ecosystem_and_health_responses_to_long-range_transported_atmospheric_pollutants.pdf
6. SLOCAT, 2018, Transport and Climate Change Global Status Report 2018, <http://slocat.net/tcc-gsr>
7. UNEP, 2000, Urban quality management toolbox, https://wedocs.unep.org/bitstream/handle/20.500.11822/8728/Urban_quality_management_toolbook.pdf?sequence=3&isAllowed=y

8.2 Seminar / laboratory	Teaching methods	Remarks
1. Sources of air pollution	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Brainstorming 	
2. Emission inventories-use of technical guidance in quantifying industrial emission sources	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Brainstorming 	
3. Emission inventories-use of technical guidance in quantifying emission sources from transport	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Brainstorming 	
4. Emission inventories-use of technical guidance in quantifying emission sources from agriculture	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Brainstorming 	
5. The use of mathematical models to calculate the dispersion of air pollutants - the model SCREEN View Version 4.0.1	<ul style="list-style-type: none"> • Interactive exposure • Explanation • Brainstorming 	

6. Air quality management strategies - urban agglomerations - case studies.	<ul style="list-style-type: none"> • Interactive exposure • Explanation 	
7. Air quality management strategies- transports - case studies	<ul style="list-style-type: none"> • Lab assignment • thematic analysis 	
8. Air quality related imission measurements – SO2	<ul style="list-style-type: none"> • Lab assignment • thematic analysis 	
9. Air quality related imission measurements – NO2	<ul style="list-style-type: none"> • Lab assignment • thematic analysis 	
10. Air quality related imission measurements – VOCs	<ul style="list-style-type: none"> • Lab assignment • thematic analysis 	
11. Air quality related imission measurements – PMs	<ul style="list-style-type: none"> • Lab assignment • thematic analysis 	
12. Air quality related imission measurements – O3	<ul style="list-style-type: none"> • Lab assignment • thematic analysis 	
13. Air quality indexes calculation – EEA and EPA	<ul style="list-style-type: none"> • Lab assignment • thematic analysis 	
14. Project presentation	<ul style="list-style-type: none"> • Presentation • Q&A 	

Bibliography

1. EMEP/EEA, 2019, Air pollutant emission inventory guidebook 2019, Technical guidance to prepare national emission inventories, <https://www.eea.europa.eu/publications/emep-eea-guidebook-2019>
2. Lakes Environmental, 2018, SCREEN View Version 4.0.1 – Freeware Screening Air Dispersion Model, <https://www.weblakes.com/products/screen/index.html>
3. SLOCAT, 2018, Transport and Climate Change Global Status Report 2018, <http://slocat.net/tcc-gsr>
4. UNEP, 2000, Urban quality management toolbox, https://wedocs.unep.org/bitstream/handle/20.500.11822/8728/Urban_quality_management_toolbook.pdf?sequence=3&isAllowed=y
5. EEA, 2022, Air quality index, <https://www.eea.europa.eu/themes/air/air-quality-index>
6. EPA, 2022, Air quality index (AQI) basics, <https://www.airnow.gov/aqi/aqi-basics/>

9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

The content structure of the discipline was structured by studying the recent monographs in the field and by consulting the programs and the available notes from some recognized institutions in the field.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	<ul style="list-style-type: none"> • The correctness and completeness of the accumulated knowledge. 	Oral exam	50%
10.5 Seminar/lab activities	<ul style="list-style-type: none"> • Individual Project 	Evaluation of the project (documentation and demonstration)	50%

10.6 Minimum performance standards

Each student has to prove that (s)he acquired an acceptable level of knowledge and understanding of the:

- the determinants that influence the quality of air resources;
- air pollution control technologies;
- strategies and measures in the field of air quality management.

The student will prepare and sustain a project / essay according to the content of the framework. Obtaining the minimum mark of 5 is an entry condition for the Exam.

Date	Signature of course coordinator	Signature of seminar coordinator
07.06.2022	Assistant professor PhD Nicolae AJTAI	Assistant professor PhD Nicolae AJTAI

Date of approval

12.10.2022

Signature of the head of department