

SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	Babeş-Bolyai University of Cluj-Napoca
1.2 Faculty	Faculty of Environmental Science and Engineering
1.3 Department	Department of Environmental Analysis and Engineering
1.4 Field of study	Environmental Engineering
1.5 Study cycle	Bachelor
1.6 Study programme / Qualification	Environmental Engineering

2. Information regarding the discipline

2.1 Name of the discipline	Investigation of environmental factors						
2.2 Course coordinator	Prof. dr. ing. Alexandru Ozunu						
2.3 Seminar coordinator	Prof. dr. ing. Alexandru Ozunu						
2.4 Year of study	III	2.5 Semester	V	2.6. Type of evaluation	E	2.7 Type of discipline	Obl.

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 of 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					42
Additional documentation (in libraries, on electronic platforms, field documentation)					12
Preparation for seminars/labs, homework, papers, portfolios and essays					14
Tutorship					0
Evaluations					2
Other activities:					
3.7 Total individual study hours	42				
3.8 Total hours per semester	98				
3.9 Number of credits	4				

4. Prerequisites (if necessary)

4.1 Curriculum	The knowledge acquired by deepening the contents taught within the disciplines Basics of Environmental Science, Soil Science, Meteorology and Climatology, Hydrogeology, Environmental Geomorphology, Introduction to Environmental Engineering - Unit Operations, and Technological Risks, facilitates the understanding and accessibility of the proposed topics, and secondarily, the students will strengthen their operational conceptual base by activating and capitalizing on the pre-existing information fund.
4.2 Competencies	The continuity of the applied valorization of the acquired knowledge allows a gradual reading of the chapters, in close relation to the topic of the previously studied disciplines.

5. Conditions (if necessary)

5.1 Course Conduct	• Room equipped with video projector and writing board.
5.2 Conduct of the seminar/laboratory	• Room equipped with computers, video projector, blackboard and sampling instruments, physico-chemical analysis laboratory.

6. Specific competencies acquired

Professional competences	• Knowledge of the topic of environmental factors and the impact of natural and technological hazards; • Formation of habits and skills of decision-making regarding environmental problems in the current socio-economic context; • Ability to write a scientific paper/technical report in the field of environmental protection; • Learn how to use methods of field investigation of environmental factors.
Transversal competences	• Integrated approach of environmental factors and in-depth investigation of research procedures in terms of analyzing environmental factors from the strategic project phase to the phase of decommissioning, and closure of social and industrial facilities; • Formation of practical skills of interpretation and analysis of extreme conditions; • Knowledge of the working methods used in the elaboration and analysis of environmental studies; • To develop the skills necessary for multidisciplinary cooperation, communication and building of partnership relationships based on the application of acquired knowledge and the development of transdisciplinary scientific reasoning.

7. Objectives of the discipline (outcome of the acquired competencies)

7.1 General objective of the discipline	• Scientific and technical research and investigation, as applied to the environmental field; • Building the skills to grasp important aspects and integrate them into environmental studies and research.
7.2 Specific objectives	• Knowledge of the specific characteristics of each environmental factor; • Acquisition of knowledge regarding the methods of investigation and research; • Knowledge of the places and types of documentation, as well as the sources; • Acquiring the knowledge necessary to obtain useful information for preparing and drafting an environmental research - project report; • Use of standards in the investigation of environmental factors

8. Contents

8.1 Course	Teaching methods	Remarks
The significance of investigating environmental factors. General methodology of environmental research - introductory notions	Lecture, Heuristic Conversation	2 hours
The cycle of chemical elements in the environment	Lecture, Brainstorming	2 hours
Methods of analysis: qualitative and quantitative. Data processing	Lecture, Brainstorming	2 hours
General stages in the investigation of environmental factors: a) the program strategies phase – the environmental permit for the PUZ (structure of the Environmental Report)	Lecture, Heuristic Conversation	2 hours
General stages in the investigation of environmental factors: b) the environmental agreement phase for the implementation of the investment (Report to the impact study)	Lecture, Heuristic Conversation	2 hours
General steps in the investigation of environmental factors: c) the simple or integrated permitting phase (Environmental Assessment Report, Site Report, Initial Reference Conditions Study)	Lecture, Heuristic Conversation	2 hours
Environmental Risk Analysis and Assessment (Risk Analysis according to HG184/1997 and Safety Report according to Law 59/2016.	Lecture, Heuristic Conversation	2 hours
Investigation of the environmental factor water - part I	Lecture Brainstorming	2 hours
Investigation of the environmental factor water - part II	Lecture, Brainstorming	2 hours
Investigation of the environmental factor Soil - Part I	Lecture Brainstorming	2 hours
Investigation of the environmental factor Soil - Part II	Lecture, Brainstorming	2 hours
Investigation of the environmental factor Air	Lecture, Brainstorming	2 hours
Environmental audit	Lecture, Brainstorming	2 hours
Public debate. Recap	Debate	2 hours
Bibliography		
1. Lesnic, M., Ivănescu, V., (2018), Investigarea mediului înconjurător, Editura Matrix Rom, București 2. Mișca, R., Ozunu, A., (2006) Introducere în ingineria mediului – operații unitare, Editura Presa universitară Clujeană, Cluj-Napoca 3. Bica, I., (2014), Remedierea siturilor contaminate, Editura Orizonturi Universitare, Timișoara 4. Simion, G.C., (2012), Monitorizarea și controlul factorilor de mediu, Editura Matrix Rom, București 5. Rusanescu C.O., Rusanescu, M., (2013), Tehnici de achiziție, monitorizare și diagnoză a calității mediului, Editura Matrix Rom, București 6. Dumitrascu, A.E., (2016), Managementul calității mediului. Aplicații, Editura Matrix Rom, București 7. Ozunu, A., Anghel, C., (2007), Evaluarea riscului tehnologic și securitatea mediului, Editura Accent, Cluj-Napoca 8. Teodosiu, C., Managementul integart al mediului, ediția a II-a, (2005), Editura Ecozone, Iași. 9. Jones, A., Duck, R., Reed, R., Weyers, J., (2000), Practical Skills în Environmental Science, Prentice Hall, Harlow. 10. Konklin, A., (2004), <i>Field sampling. Principles and Practices in Environmental Analysis</i>, Marcel Dekker INC, New York, Basel.		

11. Lovelock, J.E., Margulis, L., Fester, R., (editors), (1989), *Global Ecology*, Academic Press Inc., Boston-San Diego-New York-London-Sydney.
12. Markert, B., (1994), *Environmental Sampling for Trace Analysis*, Weinheim, New York, Basel, Cambridge, Tokyo.
13. Muntean, O.L., (2005), *Evaluarea impactului antropic asupra mediului*, Ed. Casa Cărții de Știință, Cluj-Napoca.
14. Rojanschi, VL., Bran, Florina., (1997, 2003), *Protecția și ingineria mediului*, Ed. Economică, București.
15. Rojanschi, VL., Bran, Florina., (2002), *Politici și strategii de mediu*, Ed. Economică, București.

8.2 Seminar / laboratory	Teaching methods	Remarks
Introduction to environmental investigation – recapitulation of units of measurement	- Explanation - Year	2 hours
Environmental certification – debate on a case study	- Explanation - Year	2 hours
Environmental agreement – debate on a case study	- Explanation - Conversation	2 hours
Environmental permit – debate on a case study	- Explanation - Year	2 hours
Natura 2000 certification – debate on a case study	- Explanation - Year	2 hours
Choosing the activity for the preparation of the <i>Presentation and Declaration Sheet/Level 1 Environmental Assessment</i> , to obtain the environmental permit (students will create the specific environmental documentation according to the framework content, which will be worked on during the following seminar hours)	- Group activities - Brainstorming	2 hours
Investigation of the environmental factor <i>water</i> – analysis of data obtained in the laboratory for a case study	- Group activities - Brainstorming	4 hours
Investigation of the air environmental factor – analysis of data obtained in the laboratory for a case study	- Group activities - Brainstorming	2 hours
Investigation of the soil environmental factor – analysis of data obtained in the laboratory for a case study	- Group activities - Brainstorming	4 hours
Investigation of the environmental factor <i>biodiversity</i> (forest fund, ecosystems, landscape)	- PR group activities - Brainstorming	2 hours
Seminar Evaluation – Part I	project materials	2 hours
Seminar Evaluation – Part II	project materials	2 hours

Bibliography

1. Hotărârea Guvernului României nr. 445 din 08/04/2009 privind evaluarea impactului anumitor proiecte publice si private asupra mediului;
2. Hotărârea Guvernului României nr. 1408 din 23/11/2007 privind modalitățile de investigare și evaluare a poluării solului și subsolului;
3. Hotărârea Guvernului României nr. 1403 din 19/11/2007 privind refacerea zonelor în care solul, subsolul si ecosistemele terestre au fost afectate;
4. Hotărârea Guvernului României nr. 1076 din 8 iulie 2004 privind stabilirea procedurii de realizare a evaluării de mediu pentru planuri și programe;
5. Lege nr. 265 din 29 iunie 2006 pentru aprobarea Ordonanței de urgență Guvernului nr. 195/2005 privind protecția mediului;
6. Ordonanța de urgență a Guvernului nr. 57 din 20 iunie 2007 privind regimul ariilor naturale protejate, conservarea habitatelor naturale, a florei și faunei sălbatice;
7. Ordonanța de urgență a Guvernului nr. 195/2005 privind protecția mediului;

8. Ordin nr. 19 din 13 ianuarie 2010 pentru aprobarea Ghidului metodologic privind evaluarea adecvată a efectelor potențiale ale planurilor sau proiectelor asupra ariilor naturale protejate de interes comunitar;
9. Ordin nr. 135/76/84/1284 din 10 februarie 2010 privind aprobarea Metodologiei de aplicare a evaluării impactului asupra mediului pentru proiecte publice și private;
10. Ordin nr. 1798 din 19 noiembrie 2007 pentru aprobarea Procedurii de emitere a autorizației de mediu;
11. Ordin nr. 995 din 21 septembrie 2006 pentru aprobarea listei planurilor și programelor care intră sub incidența Hotărârii Guvernului nr. 1076/2004 privind stabilirea procedurii de realizare a evaluării de mediu pentru planuri și programe;
12. Ordin nr. 818/2003 pentru aprobarea Procedurii de emitere a autorizației integrate de mediu;
13. Ordin nr. 36/2004 privind aprobarea Ghidului tehnic general pentru aplicarea procedurii de emitere a autorizației integrate de mediu;
14. Ordin nr. 863 din 26/09/2002 Publicat în Monitorul Oficial, Partea I nr. 52 din 30/01/2003 privind aprobarea ghidurilor metodologice aplicabile etapelor procedurii-cadru de evaluare a impactului asupra mediului;
15. Ordin nr. 184/1997 - Ordin al ministrului apelor, pădurilor și protecției mediului pentru aprobarea Procedurii de realizarea bilanțurilor de mediu;
16. Ordin nr. 756/1997 - Ordin al ministrului apelor, pădurilor și protecției mediului pentru aprobarea Reglementării privind evaluarea poluării mediului.
17. Legea 278/2013 privind emisiile industriale
18. Legea 59/2016 privind controlul asupra pericolelor de accident major în care sunt implicate substanțe periculoase

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 of the discipline complies with what is studied in other universities in the country and abroad;
- The analysis of the opinions formulated by employers regarding the preferential attributes of the training of specialists resulted in a high degree of appreciation of their professionalism, confirming that the structure and content of the educational curriculum built for this study program are correct, comprehensive, and efficient.

10. Evaluation

Activity Type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Weight of the final grade
10.4 Course	Acquiring new knowledge	Written exam	70%
	Ability to operate with new knowledge		
10.5 Seminar/laboratory	Realization of practical applications	Project presentation	30%
	Decision-making capacity		
10.6 Minimum Performance Standard			
• Definition and classification of environmental factors; • Knowledge of the scientific issues related to the notions of project, audit, and environmental assessment; • Knowledge of the basic methodological and practical aspects of the investigation of environmental factors, in order to understand various environmental problems (pollution, emergency situations, etc.), from the elementary to the most complex.			

Date of completion Signature of the course coordinator Signature of the seminar coordinator

05.12.2024

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Date of approval in the department

Signature of the department director