

SYLLABUS

1. Date despre program

1.1 Higher education institution	Babeş-Bolyai University of Cluj-Napoca
1.2 Faculty	Environmental Science and Engineering
1.3 Department	Environmental Analysis and Assessment
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	Contaminated sites						
2.2 Course coordinator	Conf. univ. dr. Ramona Bălc						
2.3 Seminar coordinator	Conf. univ. dr. Ramona Bălc						
2.4 Year of study	3	2.5 Semester	5	2.6. Type of evaluation	E	2.7 Type of discipline	Optional

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					17
Additional documentation (in libraries, on electronic platforms, field documentation)					7
Preparation for seminars/labs, homework, papers, portfolios and essays					15
Tutorship					3
Evaluations					2
Other activities:					-
3.7 Total individual study hours	42				
3.8 Total hours per semester	98				
3.9 Number of ECTS credits	4				

4. Prerequisites (if necessary)

4.1 curriculum	Recommended: environmental chemistry, soil science, geology, sources of air pollution, soil water.
4.2 competencies	Knowledge of specific legislation in the field is required.

5. Conditions (if necessary)

5.1. for the course	- Room equipped with video projector. - Students will come to class with their mobile phones closed. - Lateness is not allowed.
5.2. for the seminar /lab	Room equipped with video projector.

activities	• Students will come to class with their mobile phones closed. • Lateness is not allowed. • Elaboration of presentations/projects and active involvement in the seminar.
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6. Competențele specifice acumulate

Professional competencies	➤ To acquire the basic concepts related to the management of historically contaminated sites. ➤ Acquisition and application of the methodology for the evaluation of historically contaminated sites. ➤ Acquisition and development of remediation methods for historically contaminated sites. ➤ Integration of decontaminated areas into the natural circuit through land use plans. ➤ Operating with legislative notions specific to the field.
Transversal competencies	➤ Development of analytical skills in order to manage environmental problems generated by the existence of historically contaminated sites. ➤ Development of environmental solutions from the perspective of interdisciplinarity involved in this field. ➤ Developing teamwork skills.

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

7.1 General objective of the discipline	➤ Identifying, assessing and managing historically contaminated sites from the perspective of the legislative framework and developing proposals for environmental restoration in areas affected by the existence of historically contaminated sites.
7.2 Specific objective of the discipline	➤ Appropriation of the main terms used in the field of contaminated sites; ➤ Presentation of current policies and legislation in the field, at the level of Romania, the EU and the USA; ➤ Presentation of the main methodologies for the management of contaminated sites; ➤ Analysis of the concept of risk assessment in the context of contaminated sites; ➤ Presentation of decision support systems, which aim to implement appropriate strategies for the restoration of contaminated lands.

8. Content

8.1 Course	Teaching methods	Remarks
1. Introduction: general notions, definitions, classifications.	- Lecture - Explanation - Conversation	2 hours
2. The current political and legislative framework at international level.	- Lecture - Explanation - Conversation	2 hours
3. The current political and legislative framework at national level.	- Lecture - Explanation	2 hours

	- Conversation	
4. Industrial activities and historically contaminated sites	- Lecture - Explanation - Conversation	2 hours
5. The conceptual model of a contaminated site	- Lecture - Explanation - Conversation	2 hours
6. Strategies for investigating a contaminated site	- Lecture - Explanation - Conversation	2 hours
7. Analysis and interpretation of the investigation data	- Lecture - Explanation - Conversation	2 hours
8. Risk assessment for contaminated sites - general	- Lecture - Explanation - Conversation	2 hours
9. Regional assessment of historically contaminated sites	- Lecture - Explanation - Conversation	2 hours
10. Techniques for remediation of polluted soils <i>in situ</i>	- Lecture - Explanation - Conversation	2 hours
11. Techniques for remediation of <i>ex situ</i> polluted soils	- Lecture - Explanation - Conversation	2 hours
12. Actions to restore a historical contaminated site	- Lecture - Explanation - Conversation	2 hours
Seminar Evaluation	- projects presentations	2 hours
Final evaluation	- Written exam	2 hours

Bibliography:

1. Anicăi, L., Bâsceanu, C., Duțu, M., Chineată, S., Anicăi, O., Stăniloae, D., Dumitrache, R., (2010), Managementul integrat al solurilor contaminate, Ed. Printech, București, ISBN 978-606-521-546-7;
2. CLARINET, 2002, Sustainable Management of Contaminated Land: An Overview, A report from the Contaminated Land Rehabilitation Network for Environmental Technologies;
3. Common Forum, 2013. Towards an European Research Agenda for Contaminated Land Management. Paris 18 April 2013
http://www.commonforum.eu/Documents/DOC/PositionPapers/Towards_an_European_Research_Agenda_For_Contaminated_Land_Management.pdf;
4. EC, (European Commission), 2006, Proposal for a Directive of the European Parliament and of the Council establishing a framework for the protection of soil and amending Directive 2004/35/EC, Brussels, 22.9.2006;
5. EC, (European Commission), 2006, European Commission. Thematic Strategy for Soil Protection Communication (COM(2006) 231);
6. Heredea, N., (2011), Îndrumar pentru cunoașterea contaminării mediului geologic, București, ed. MGC TOP S.R.L., ISBN 978-973-0-10124-9;
7. Marcomini A, Suter GW II, Critto A (Eds), 2009, Decision Support Systems for Risk Based Management of Contaminated Sites. New York, Springer Verlag;

8. Micle, V., 2009, Refacerea ecologică a zonelor degradate, U.T. Press, Cluj-Napoca, ISBN 978-973-662-477-3;
9. Suport de curs;
10. US-EPA, United States Environmental Protection Agency, 1989, Risk assessment guidance for superfund Vol 1, Human health evaluation manual, Washington DC: EPA/540//1-89/002. Final Report; 1989;
11. ***MO, (Monitorul Oficial), Partea I nr. 802 din 23/11/2007a, Hotărârea Guvernului României nr. 1408 din 23/11/2007 privind modalitățile de investigare și evaluare a poluării solului și subsolului;
12. ***MO, (Monitorul Oficial), Partea I nr. 804 din 26/11/2007b, Hotărârea Guvernului României nr. 1403 din 19/11/2007 privind refacerea zonelor în care solul, subsolul și ecosistemele terestre au fost afectate.

8.2 Seminar / laboratory	Teaching methods	Remarks
1. Main economic sectors with an impact on soil, subsoil and groundwater/surface water	- presentation, problematization of the exposed material - interactive discussions - case studies	2 hours
2. Institutions, bodies, national programmes in the field of historically contaminated sites	- presentation, problematization of the exposed material - interactive discussions - case studies	2 hours
3. Socio-economic analysis for historically contaminated sites	- presentation, problematization of the exposed material - interactive discussions - case studies	2 hours
4. Land use planning in the context of contaminated sites	- presentation, problematization of the exposed material - interactive discussions - case studies	2 hours
5. Elaboration of a conceptual model of the site in tabular and graphic form	- presentation, problematization of the exposed material - interactive discussions - case studies	2 hours
6. Making a site investigation plan	- presentation, problematization of the exposed material - interactive discussions - case studies	2 hours
7. Physical and chemical analyses: comparison with reference values	- presentation, problematization of the exposed material - interactive discussions - case studies	2 hours
8. Risk characterization – case studies	- presentation, problematization of the exposed material - interactive discussions - case studies	2 hours
9. Identification of contaminated sites	- presentation, problematization of the exposed material - interactive discussions - case studies	2 hours
10. Assessment of contaminated sites	- presentation, problematization of the exposed material - interactive discussions	2 hours

	- case studies	
11. Management of contaminated sites	- presentation, problematization of the exposed material - interactive discussions - case studies	2 hours
12. Restoration techniques and methods	- presentation, problematization of the exposed material - interactive discussions - case studies	2 hours
Seminar Evaluation	- Project presentations	2 hours
Final evaluation	- Written exam	2 hours
Bibliography:		
➤ Bica, I., 2014, Remedierea siturilor contaminate, Orizonturi Universitare Timișoara; ➤ CLARINET, 2002, Sustainable Management of Contaminated Land: An Overview, A report from the Contaminated Land Rehabilitation Network for Environmental Technologies; ➤ Micle, V., 2009, Refacerea ecologică a zonelor degradate, U.T. Press, Cluj-Napoca; ➤ Strategia națională și planul național de acțiune pentru gestionarea siturilor contaminate din România, http://www.mmediu.ro/beta/wp-content/uploads/2013/10/2013-10-29_strategie.pdf; ➤ World Bank, (2010), International experience in policy and regulatory frameworks for brownfield site management, Washington D.C.		

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 structure of the course was developed starting from similar courses that appear in the curriculum of other European universities (such as: Characterization and Reuse of Contaminated Sites, Ca' Foscari University, Department of Molecular Sciences and Nanosystems; Contaminated Land Management, University of Nottingham, England, Prof. Paul Nathanail; Contaminated Land and Remediation, Lancaster University etc.) and adapted to the specifics of Romania. The information and concepts presented were chosen following the feedback from various organizations involved in the development of risk studies for contaminated sites: NGOs, environmental consulting firms, national and local authorities, etc.
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10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	Involvement in interactive discussions: accuracy of answers and correct appropriation of the concepts presented.	Written colloquium	50%
10.5 Seminar/laboratory	Involvement in seminar activities: the ability to explain and interpret; complete and correct resolution of requirements.	Oral – support of projects carried out by students in teams/individually	50%
10.6 Minimum performance standards			
- Attendance at 80% of the seminar hours.			

- Grade 5 (five) both in the defense of the projects and in the written colloquium.

Date

Signature of course coordinator

Signature of seminar coordinator

05.12.2024

Conf. univ. dr. Ramona Bălc

Conf. univ. dr. Ramona Bălc



Date of approval

Signature of the head of department