SYLLABUS

1. Information regarding the programme

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		**Managementul integrat al deseurilor / Integrated waste management**					
2.2 Course coordinator		Cristina Modoi					
2.3 Seminar coordinator		Cristina Modoi					
2.4. Year of study	**4/4**	2.5 Semester	**7/4**	2.6. Type of evaluation	**E**	2.7 Type of discipline	DD

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					30
Additional documentation (in libraries, on electronic platforms, field documentation)					20
Preparation for seminars/labs, homework, papers, portfolios and essays					10
Tutorship					8
Evaluations					2
Other activities:					

3.7 Total individual study hours	98
3.8 Total hours per semester	154
3.9 Number of ECTS credits	6

4. Prerequisites (if necessary)

4.1. curriculum	Basic knowledge of environmental science and engineering	
4.2. competencies	Technical and design skills	

5. Conditions (if necessary)

5.1. for the course	Digital projector and laptop required	
5.2. for the seminar /lab activities	Digital projector and laptop required	

6. Specific competencies acquired

Professional competencies	• Basic knowledge of waste management • - Basic knowledge of municipal solid waste management and the use of sustainable waste management alternatives • - Basic knowledge of waste management from specific industries, including hazardous waste; • Application of product life cycle concepts in waste management
Transversal competencies	• Connections with specific areas of contaminated sites, environmental impacts and risks, other environmental releases; • Team work..

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

7.1 General objective of the discipline	To provide a solid foundation for future environmental professionals to develop their waste management skills
7.2 Specific objective of the discipline	• Knowledge of the main classes of waste and their sources; • - Establishing theoretical and practical interdependencies between the internal structure, properties, processing and performance in use for each class of waste; • - Providing a quantum of knowledge about waste minimization, recovery, recycling, reuse, reuse, treatment technologies; the use of these modern technologies as alternatives to landfilling; • Methods of final utilization and/or disposal of waste, pollution generated by waste and its improper management; impact of waste on the environment.

8. Content

8.1 Course	Teaching methods	Remarks
Introduction: introduction to waste; generalities	participatory lecture, dialogue, presentation, debate	
National and international institutional, legislative and regulatory framework of waste management: regulations and laws related to the management of different categories of waste	participatory lecture, dialogue, presentation	
Environmentally engineered landfills: general design scheme of environmentally engineered landfills	participatory lecture, dialogue, presentation	
Integrated waste management in the context of the circular economy	participatory lecture, dialogue, presentation	
Household waste management. Aerobic and anaerobic composting of organic waste	participatory lecture, dialogue, presentation	

Management of construction and demolition waste: examples of valorization of construction and demolition waste;	participatory lecture, dialogue, presentation	
Hazardous waste. Types of hazardous waste. Properties of hazardous waste.	participatory lecture, dialogue, presentation	
Incineration of waste: modern incineration techniques, reduction of pollutants from waste incineration	participatory lecture, dialogue, presentation	
Co-incineration of waste in the cement industry: co-incineration furnaces, advantages of using co-incineration; Other methods of waste thermal treatment	participatory lecture, dialogue, presentation	
Mining waste issues: environmental impacts and risks of mining waste;	participatory lecture, dialogue, presentation	
Pollution abatement, acid water treatment, ecological reconstruction of mining waste dumps; long-term monitoring of mining waste.	participatory lecture, dialogue, presentation	
Waste from manufacturing and other industries; implementation of zero waste concept in waste prevention strategy,	participatory lecture, dialogue, presentation	
Review course and general conclusions	participatory lecture, dialogue, presentation	

Bibliography:

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8.2 Seminar / laboratory	Teaching methods	Remarks
Labor protection notions on waste handling and presentation of laboratory work. Use of specific legislation in waste management.	presentation, problematization, discussion	2
The basic components of ecological landfills. Landfill monitoring and landfill costs.	presentation, problematization, discussion	2
Calculation of the quantities of waste generated by the community. Emissions from landfills.	presentation, problematization, discussion ;	2
Aerobic composting / anaerobic digestion, sustainable alternatives to landfilling biodegradable organic waste Monitoring aerobic composting and anaerobic digestion processes.	experiment, conversation, discovery learning	4
Waste codification according to the European Waste Catalogue. Importance of coding and keeping track of waste produced in different sectors (households, industry, agriculture, etc.)	lecture; small group work; discussion; discovery learning;	2
Waste management plans at national, regional, county, county, city level. Their importance and necessity. Correlation of management plans with types and quantities of waste produced by the community	exposure, problematization, exercises, case studies, combined methods	2
Construction and demolition waste management. Case study.	experiment, conversation, discovery learning	4
Hazardous waste. Municipal hazardous waste. Hazardous waste management	lecture, problematization, exercises, case studies	2
Incineration, hazardous and non-hazardous waste.	lecture, problematization, exercises, case studies	2
Waste co-incineration. Other methods of thermal treatment of waste	lecture, problematization, exercises	2
Estimation of incineration emissions. Case study.	lecture, problematization, exercises	2

Environmental impacts and risks from different types of landfills (e.g. mining waste, waste from thermal power plants, other landfills with relevant impacts)	lecture; discovery learning; solving examples in work teams; discussions;	2
Resource recovery from mining waste	lecture, problem-posing, discussion	2
Waste management plan for an industrial company	exposure, problem-posing, discovery learning and connections with subjects already studied.	2

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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 knowledge acquired during the course can be used in the fields of: municipal solid waste management, industrial, hazardous and non-hazardous waste management; academic field;
- - the graduates can prepare specific environmental studies for various waste management activities generated in the domestic environment or in different industrial branches;
- - graduates receive information and acquire skills in environmental consultancy.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	Accuracy of answers to questions. Student activity during the semester lectures	Final exam (written)	60%
10.5 Seminar/lab activities	Preparation of waste management project. Student activity during laboratory classes and solving the required homework	Presentation of the project. Evaluation of the students during seminar classes	40%
10.6 Minimum performance standards			

Date Signature of course coordinator Signature of seminar coordinator

04/12/ 2024

Date of approval Signature of the head of department