



No. \_\_\_\_\_ of \_\_\_\_\_

USAMV form 0107040109

## 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 <sup>1</sup>	Bachelor / Master
1.6. Specialization/ Study programme	Environmental Engineering
1.7. Form of education	Full time

### 2. Information on the discipline

2.1. Discipline name		<b>Ecological reconstruction 2</b>						
2.2. Course coordinator		Prof.PhD. Laura Paulette						
2.3. Seminar/ laboratory/ project coordinator		Lecturer PhD IOan Brasovean						
2.4. Year of study	IV	2.5. Semester	2	2.6. Evaluation type	Sumative	2.7. Discipline status	Content <sup>2</sup>	DS
							Compulsoriness <sup>3</sup>	DI

### 3. Total estimated time (teaching hours per semester)

3.1. Hours per week - full time programme	4	out of which: 3.2. lecture	2	3.3. seminar/ laboratory/ project	2
3.4. Total number of hours in the curriculum	40	out of which: 3.5. lecture	20	3.6. seminar/laboratory	20
Distribution of the time allotted					hours
3.4.1. Study based on books, textbooks, bibliography and notes					10
3.4.2. Additional documentation in the library, electronic platforms and field experiences					5
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					5
3.4.4. Tutorials					5
3.4.5. Examinations					10
3.4.6. Other activities					
3.7. Total hours of individual study	35				
3.8. Total hours per semester	75				
3.9. Number of credits <sup>4</sup>	3				

### 4. Prerequisites (if applicable)

4.1. curriculum-related	Pedology, Environmental impact of industry, environmental policy and legislation
4.2. skills-related	Knowledge regarding the components and functions of the edaphic system in degraded conditions

### 5. Conditions (if applicable)

5.1. for the course	Teaching is interactive, illustrated with photos and drawings in Power Point. It aims a direct response of the information presented (question and answer) by both, teacher and students. Academic discipline enforce the start time and end of the course. It is not allowing any other activities during the lecture, mobile phones are closed.
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5.2. for the seminar/ laboratory/ project	Under the direct supervision of practical framework, each student will conduct an individual work with laboratory materials provided and described in the guide for practical work. Academic discipline is required throughout the duration of the works.
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## 6. Cumulated specific competences

Professional competences	<p>The rational management and exploitation of edaphic resources.</p> <p>Providing services regarding ecological reconstruction measures according to the causes of agricultural land degradation.</p> <p>Conducting specialized studies and expertise and providing consultancy in ecological reconstruction</p> <p>Taking soil samples, carrying out analyses in laboratories and specialized equipment and interpreting them.</p> <p>Teaching and research activities in the field of ecological reconstruction</p>
Transversal competences	<p>Be familiar with the terms used in soil remediation</p> <p>Understand the concept of ecological restoration in the context of soil pollution by industrial activities</p> <p>To apply the ecological reconstruction measures according to the sources of pollution</p> <p>To be able to analyze and describe the reconstruction methods technically.</p> <p>Demonstrate practical skills in identifying factors / degradation processes</p> <p>Be able to identify methods of controlling and combating physical and chemical degradation</p> <p>Could organize activities specific remediation programs.</p> <p>Demonstrate logic and organization in the evaluation and development of ecological reconstruction programs</p>

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

7.1. General objective	Acquiring knowledge on ecological rehabilitation of agricultural land.
7.2. Specific objectives	<p>Acquiring knowledge about soil pollution sources</p> <p>To be able to analyze the environmental and edaphic components affected by pollution</p> <p>Apply remediation programs specific to the type of pollution.</p> <p>To use the monitoring systems specific to the industrially degraded lands (establishing the monitoring criteria).</p>

## 8. Content

8.1. COURSE Number of hours -20	Teaching methods	Observation
1. Industrial pollution of the soil. Definitions and concepts. Types of pollution. Sources of industrial pollution and pollutants.	Lecture	1 lecture = 2 hours
2. Classification of depollution techniques. Criteria for choosing depollution techniques. Classification of depollution techniques. Glossary of terms specific to the ecological reconstruction of industrially polluted land.	Lecture	1 lecture
3. Rehabilitation of degraded land through the oil extraction and processing industry. Categories of pollutants. Physico-chemical and thermal methods of remediation of hydrocarbon-contaminated land. Bioremediation of lands polluted with oil and other hydrocarbons.	Lecture	2 lectures
4. Ecological reconstruction of the polluted lands through the metallurgical industry. Categories of pollutants and critical areas. Heavy metal pollution. Measures of ecological reconstruction of the lands contaminated with heavy metals.	Lecture	3 lectures
5. Ecological reconstruction of lands degraded by mining activities. Classification of mining waste. Methods of ecological reconstruction of tailings and tailings ponds. Redevelopment of mining gaps.	Lecture	2 lectures
6. Ecological reconstruction of lands degraded by energy activity. Up-to-date coal exploitation. Harnessing the ash. Methods of ecological reconstruction of ash dumps.	Lecture	1 lecture

8.2. PRACTICAL WORKS Number of hours - 20	Teaching methods	Observation
Case study - Heavy metals soil pollution, Zlatna area, Alba county.	Presentation	2 lab work (2hours/work)
Project - Stages of ecological reconstruction by redesigning (recultivating) the waste dumps.	Project editing	2 lab works

Project - implementation of the Nitrates Directive in a town framed in the vulnerable zone	Project editing	2 lab works
Project - anti-erosion arrangement	Project editing	2 lab works
Project - Bioremediation of oil-contaminated soils. Outline of a biological reconstruction plan for an area affected by oil pollution. Case study Albota.	Project editing	2 lab works
<b>Compulsory bibliography:</b>		
1. PAULETTE LAURA, 2016- <i>Reconstrucția ecologică a solurilor 2. Terenurile degradate prin activități industriale</i> . Editura BioFlux, Cluj Napoca, ISBN 978-606-8191-86-7, ISBN 978-606-8887-00-5, 148 p.		
2. *** <i>Legea 137/1995 - Legea protecției mediului</i>		
<b>Optional bibliography:</b>		
1. Florea N. 2003. <i>Degradarea, protecția și ameliorarea solurilor și terenurilor</i> . Editura București.		
2. Bradshaw A. D., 1982 - <i>The Reconstruction of Ecosystems: Presidential Address to the British Ecological Society</i> , December, © 1983.		
3. Dumitru M., Popescu I., Blaga Gh., Elisabeta Dumitru. 1999. <i>Recultivarea terenurilor degradate de exploatarea miniere din bazinul carbonifer Oltenia</i> . Editura Transilvania Press, Cluj Napoca.		
4. Canter, L. W., 1996, <i>Environmental impact assesment</i> , - 2nd ed. McGraw-Hill International Editions		
5. Negulescu., 1995. <i>Protecția mediului înconjurător</i> , Edit. Tehnică, București		
6. Jordan, W. R., Gilpin, M.E., Aber, J.D., Eds. 1986, <i>Restoration ecology. A synthetic approach to ecological research</i> . Cambridge University Press.		
7. Teaci D. (1983), <i>Transformarea peisajului natural al României</i> , Ed. Științifică și Enciclopedică, București.		

**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 similar to that of the disciplines within the faculties with environmental profile of the universities of the country. The content is supplemented annually, based on the new information published in the field and the debates with farmers, practitioners and specialists.

**10. Evaluation**

Type of activity	10.1. Evaluation criteria	10.2. Evaluation type	10.3. Percentage of the final grade
10.4. Course	Answer to the quizzes	continuous(VP)	70%
10.5. Seminar/Laboratory	Project evaluation	test	30%
<b>10.6. Minimum performance standards</b>			
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 for participation in the exam.			

- 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  
Prof. PhD. Laura Paulette

Laboratory work/seminar coordinator  
Lecturer PhD Ioan Brasovean

Approved by the  
department on  
05.09.2019

Head of the Department  
Prof. PhD. Ioan Oroian