



Nr. \_\_\_\_\_ din \_\_\_\_\_

Formular USAMV 0107030214 (discipline code)

**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	Plant culture
1.4. Field of study	Agronomy
1.5. Cycle of study <sup>1</sup>	Bachelor
1.6. Specialization/ Study programme	Environmental Engineering
1.7. Form of education	Full time

**2. Information on the discipline**

2.1. Discipline name	Investigation of environmental factors							
2.2. Course coordinator	Lecturer Florin Păcurar PhD							
2.3. Seminar/ laboratory/ project coordinator	Lecturer Florin Păcurar PhD							
2.4. Year of study	III	2.5. Semester	II	2.6. Evaluation type	Continuous	2.7. Discipline status	Content <sup>2</sup>	DD
							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	56	out of which: 3.5. lecture	28	3.6. seminar/laboratory	28
Distribution of the time allotted					hours
3.4.1. Study based on books, textbooks, bibliography and notes					22
3.4.2. Additional documentation in the library, electronic platforms and field experiences					15
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					15
3.4.4. Tutorials					15
3.4.5. Examinations					4
3.4.6. Other activities					10
3.7. Total hours of individual study	64				
3.8. Total hours per semester	120				
3.9. Number of credits <sup>4</sup>	4				

**4. Prerequisites (if applicable)**

4.1. curriculum-related	Ecology - Environmental protection; Botany, Soil Science, Meteorology and Climatology, Statistics
4.2. skills-related	The student must have knowledge regarding the functioning of ecosystems and agroecosystems; recognition of plant species, etc.

**5. . Conditions (if applicable)**

5.1. for the course	The course takes place in plenary and is interactive. Students may intervene during the teaching of the topic with questions or examples on the topic of discussion. The
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	time allotted to the course is strictly adhered to, the students being prohibited any other activities that are not related to the subject of the course (eg the use of mobile phones). The course begins with questions and discussions from the previously taught topic and ends with a brief recap of the topic presented in the current course. For a good accumulation of knowledge in the field of investigating environmental factors, during the course the information will be repeated in such a way that the students can structure the information received.
5.2. for the seminar/ laboratory/ project	In practical work it is mandatory to consult the practical tutor, each student will carry out an individual activity with the laboratory materials provided and described in the practical work tutor. Academic discipline is required for the entire duration of the work. Laboratory work is carried out in groups.

## 6. Cumulated specific competences

Professional skills	<p>Recognition of the origin of semi-natural grassland habitats and their mode of use.</p> <p>Recognition of the intensity of habitat use.</p> <p>Recognition of landscape types and landscape elements within habitats.</p> <p>Recognition of habitat types and component species.</p> <p>Recognition of species with high indicator value for ecological and anthropogenic conditions of habitats.</p> <p>Recognition of the application of care and use in habitats.</p>
Transversal competences	<p>The ability to interpret the functioning of a semi-natural grassland (habitat) system and identify its management.</p> <p>The ability to identify the intensity of management applied in a given habitat according to the indicator species.</p> <p>The ability to develop a management plan for certain habitats in different categories of protected natural areas.</p> <p>Ability to initiate and perform research activities.</p> <p>The ability to recognize the evolutionary direction of habitats (fluctuations and sequences).</p>

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

7.1. General objective	Investigation of environmental factors in grassland habitats, both with the help of species with an indicator value for ecological and anthropic conditions (agronomic and natural) and through landfill elements and categories of use.
7.2. Specific objectives	During the course of <i>Investigation of the environmental factors</i> the students of the specialization Environmental Engineering receive information regarding the importance of the grassland habitats in the existence of the cultural landscape, the classification of the habitats according to the intensity of the anthropogenic influence, the organization, structure and functioning of the prato-ecosystems (habitats), the principles of habitat monitoring, the indicator value of plant species for ecological conditions and anthropogenic impact, conventional and ecological measures for the conservation and sustainable use of habitats. In these conditions, the future specialist must be able to monitor the habitats of meadows in order to make an agroecological diagnosis of habitats based on the knowledge of some bio-indicator plants. It will also have the capacity to elaborate management plans, which will include sustainable measures for the restoration of habitats affected by certain ecological imbalances or their sustainable use (conservation).

## 8. Content

8.1. COURSE Number of hours – 28	Teaching methods	Observation
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<p>Getting started. Habitat. Meadow habitats. The importance of habitats. Protection of grassland habitats. Multifunctionality of habitats. Classification of habitats according to the intensity of use (degree of intensification), hemerobia, mode of use, floristic composition, resort, etc.</p>	Lecture	2 Lecture
<p>Habitat ecology - structure, energy flow, substance circuit and information flow. The biogeochemical cycle of some macroelements in nature and their impact on grassland habitats. Abiotic factors that influence habitat vegetation - definition, classification, presentation. Biotic and anthropic factors that influence habitat vegetation - definition, classification, presentation. Dynamics of grassland habitats. Changes that occur in the grassy vegetation of habitats - allogenic, autogenous fluctuations. Succession. Ecological conditions of habitats: terrain orography, water supply, soil reaction, soil trophicity, etc.</p>	Lecture	3 Lecture
<p>Habitat types. Concepts, habitat classification systems. Basic typological units of habitats. Ecological zoning of habitats. Floristic composition of habitats. The conservative value of habitats.</p>	Lecture	1 Lecture
<p>Habitat monitoring principles. Species of plants with indicative value for ecological conditions (light, temperature, humidity, soil reaction, soil trophicity), agronomic (tolerance to mowing, grazing) and natural (hemerobia, urbanophilia). Analysis of floristic composition and biodiversity. Ecological, agronomic and natural spectra.</p>	Lecture	2 Lecture
<p>Investigation of environmental factors with the help of landscape elements. Landscape. Definition of Landscape, types of Landscape: Natural Landscape, Cultural Landscape, Agricultural Landscape and Pastoral Landscape. Defining the elements of the landscape and their formation.</p>	Lecture	2 Lecture
<p>Monitoring of the maintenance and conservation measures of the habitats. Surface works applied in habitats. Improvement of the aero-water regime. The trophic regime of habitats. Assortment of materials, quantities, application, etc. Regeneration of the vegetable carpet. Over seeding, conditions, technologies, etc.</p>	Lecture	2 Lecture
<p>Monitoring the use of habitats. Use by mowing: establishing the harvesting season, the harvesting height, the frequency of the harvesting, the methods of harvesting, the methods of preparing the hay, etc. Use of habitats through grazing: grazing technique, determining grassland production, pasture use systems.</p>	Lecture	2 Lecture



8.2. PRACTICAL WORKS Number of hours – 28	Teaching methods	Observation
Agroecological diagnosis of grasslands. The biogeographic regions of Europe and Romania. Zoning and planting of vegetation in our country. The ecological requirements of the plants.		1 lab work
Classification of species according to their behavior towards temperature and light. Defining the temperature and light index. Temperature and light scale.		1 lab work
Classification of species according to their behavior towards water supply.		1 lab work
Defining the water supply index. Water supply ladder.		
Classification of species according to their behavior towards trophicity. Definition of trophicity index. The trophic scale.	The knowledge that the students must acquire is based on heuristic methods,	1 lab work
Classification of species according to their behavior towards soil reaction.	according to the previous knowledge acquired,	1 lab work
Defining the soil reaction index. Scale for soil reaction.	ecopratology being a synthetic discipline. The	1 lab work
Classification of species according to their tolerance to mowing.	material basis of the faculty is the practical support for	1 lab work
Classification of species according to their tolerance to crushing.	understanding the study methodology. Conversation,	1 lab work
Classification of species according to their grazing tolerance.	oral presentation, video and video projector presentation,	1 lab work
Classification of species by feed value, species consumed by animals, species not consumed.	sheets, slides, fresh or pressed materials, field visits, etc. it is the basis of	1 lab work
Species harmful to animal products, harmful species to grassland vegetation, invasive species	active teaching and learning methodology	1 lab work
Toxic species for animals.		1 lab work
The study of grassland vegetation by geobotanical (phytosocial), metric (planimetric), double meter and gravimetric methods.		1 lab work
Statistical processing and interpretation of floristic surveys.		lab work
Verification of knowledge.		
1. <i>Compulsory bibliography</i> :Păcurar F. și Rotar I. (2015). Curs de ecoprategie. Manual didactic. Editura AcademicPres.		
2. Păcurar F. și Rotar I. (2015). Îndrumător de lucrări practice de ecoprategie. Manual didactic. Editura AcademicPres.		
3. Păcurar F. și Rotar I. (2014). Metode de studio și interpretare a vegetației pajiștilor. Editura Risoprint.		
4. Rotar I. și Carlier L. (2010): <i>Cultura pajiștilor</i> , Editura Risoprint, Cluj Napoca		
5. Puia I. si colab. (2001): <i>Agroecologie și ecodezvoltare</i> . Editura AcademicPres, Cluj Napoca		
1. Optional bibliography:Stoic A., Vârban R. (2012): <i>Morfologia și anatomia plantelor</i> , Editura AcademicPres Cluj Napoca.		
2. Vârban R., Stoic A., Stana D. (2009): <i>Botanică sistematică</i> , Editura AcademicPres.		



**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**

In order to identify ways of modernizing and continuously improving the teaching and the content of the courses, with the most current topics and practical problems, the teachers participate in the annual meeting of the Romanian Society of Meadows, European Grassland Federation, etc., where they meet with specialists. and researchers in the field, with farmers and debates are taking place on current and prospective aspects of grassland habitat conservation and cultural landscape in Romania and Europe.

**10. Evaluation**

Type of activity	10.1. Evaluation criteria	10.2. Evaluation type	10.3. Percentage of the final grade
<b>10.4. Course</b>	Operation of semi-natural and natural grassland habitats. Knowledge of habitat classification criteria. Knowledge of the theoretical aspects regarding the principles of habitat monitoring. Knowledge of habitat monitoring based on the indicator value of plant species. Knowledge of habitat monitoring using landscape elements.	Exam Written	60%
	Knowledge of measures for the maintenance and conservation of habitats. Knowledge of the use of grassland habitats.  Attendance at the course.		5%
<b>10.5. Seminar/Laboratory</b>	Recognition of indicator species for certain ecological factors. Recognition of indicator species for certain agronomic factors. Recognition of species consumed by animals, non-consuming, toxic, harmful to grassland vegetation, harmful to animal production, invasive species. Knowledge of methods of research of grass carpet and biodiversity. Assessment of the anthropogenic influence on the systems. Presence and participation in practical works. Projects, reports, participation in other scientific activities. Participation in didactic activities specific to the subject.	They feature two seminars	20%  5% 5% 5%

**10.6. Minimum performance standards**

The future specialist must be able to appreciate the state of grassland habitats and be able to apply the knowledge acquired for their preservation and rehabilitation, in close correlation with their productivity and the flux of the



substance, while preserving the biodiversity at the same time.

- 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

Approved by the  
department on  
05.09.2019

Course coordinator  
Lecturer Florin Păcurar PhD

Laboratory work/seminar coordinator  
Lecturer Florin Păcurar PhD Lecturer  
Florin Păcurar PhD

Head of the Department  
Prof. Duda-Mareel PhD