



No. _____ of _____

USAMV form 0109010103(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 ¹	Master of Science
1.6. Specialization/ Study programme	Management of natural and agrotouristic resources / 2 years
1.7. Form of education	Full-time

2. Information on the discipline

2.1.Discipline name	Fertilization management of mountain agricultural systems							
2.2.Course coordinator	Prof. PhD Mărghitaș Marilena							
2.3.Seminar/ laboratory/ project coordinator	Prof. PhD Mărghitaș Marilena							
2.4. Year of study	I	2.5. Semester	II	2.6. Evaluation type	Summative (E)	2.7. Discipline status	Content ²	DD
							Compulsoriness ³	DI

3. Total estimated time(teaching hours per semester)

3.1.Hours per week –full time programme	2	out of which: 3.2.lecture	1	3.3. seminar/ laboratory/ project	1
3.4.Total number of hours in the curriculum	28	out of which: 3.5.lecture	14	3.6.seminar/laboratory	14
Distribution of the time allotted					hours
3.4.1.Study based onbooks, textbooks, bibliographyand notes					78
3.4.2. Additional documentation in the library, electronic platforms and field experiences					35
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfoliosand essays					25
3.4.4.Tutorials					4
3.4.5.Examinations					10
3.4.6. Other activities					
3.7. Total hours of individual study	152				
3.8. Total hours per semester	180				
3.9. Number of credits ⁴	6				

4. Prerequisites(if applicable)

4.1. curriculum-related	Mathematics, Computer Science, Chemistry, Pedology, Botany, Biophysics and Agrometeorology, Economics, Biochemistry, Ecology, Plant Physiology, Agrochemistry, Agrotechnics, Phytotechnics, Vegetables, Pomiculture, Viticulture, Floriculture, Fodder Cultures, Phytology, Entomology, Zootechnics.
4.2.skills-related	The student must have theoretical knowledge regarding the agroecosystem, environmental factors and the measures exercised by humans on them, because the bioproductivity of agroecosystems depends on climatic, nutritional, biological and socio-economic factors (management) and about technologies aimed at reducing the anthropic impact on the environment.

5. Conditions(if applicable)

5.1.for the course	The course is interactive, students can ask questions about the content of the lecture. The university subject requires the observance of the starting and finishing time of the lecture. No other activities are tolerated during the lecture, the cell phones must be closed.
5.2.for the seminar/ laboratory/ project	During the practical laboratory work, the presence of the specialized teacher in the agrochemical field and her consultation during the agrochemical analysis is mandatory. Each student will carry out an individual activity with the laboratory materials provided and described in the procedures and laboratory guide. Academic discipline is imperative during the agrochemical laboratories and field work.

Note: In the case of online teaching, the teaching methods are adapted to the online conditions and platforms used.

6. Cumulated specific competences

Professional competences	<p>To know the agronomic and agrochemical language specific to the understanding of Fertilization management of mountain agricultural systems for the development of agriculture in the mountain area;</p> <p>To know the characteristics and the functioning of the bioproductivity of agroecosystems and of the need to evaluate the quality of soil in the agricultural mountain area by specific pedo-agrochemical methods;</p> <p>To understand the theoretical principles and practical measures underlying the knowledge of agrochemical resources and the management of their use in agriculture and horticulture, under the conditions of agrochemical optimization of the soil-plant system and obtaining higher agricultural and horticultural products quantitatively and qualitatively, as well as their profitability;</p> <p>To acquire knowledge regarding the use of natural organic resources, land management and fertilization of agricultural and horticultural systems, good agricultural practices, respect for nature and biodiversity (ecological management, management of animal husbandry and maintenance) according to the proposed EU strategy for rural and urban space development;</p> <p>To understand the impact of anthropic activities on the environment and remedial measures to be taken; To be able to implement the measures of the development of the green spaces in the urban areas, the mountain areas, the strengthening of the specific management of the rural areas, the development of the villages and their evolution towards the modern civilization.</p>
Transversal competences	<p>To demonstrate the ability to characterize the main agrochemical indices underlying the rational fertilization of plants and the main natural and mineral organic resources applied in sustainable agriculture systems;</p> <p>To acquire the students' theoretical knowledge based on the use of fertilizers and amendments to agricultural and horticultural crops as well as the economic and ecological basis of fertilizer consumption in agriculture and horticulture for the sustainable increase of soil fertility and maintaining ecological balance in existing agroecosystems;</p> <p>To be able to monitor the main agrochemical factors of differentiation of nutrient doses for plants in order to achieve rational and efficient fertilization in increasing soil fertility and productivity and higher quality and quantitative plant productions that ensure food safety and security;</p> <p>To be able to determine the economic efficiency of the soil-plant-fertilizer system at different agricultural crops;</p> <p>To participate in the activities of agrochemical monitoring of soils and the research program of the nutrition of plant species and the management of nutrients and fertilizers of Agrochemistry.</p>

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

7.1. General objective	<p>The necessary knowledge about the management of natural and agrotouristical resources in the mountain area;</p> <p>Knowledge of the specificity of technologies of rational use of natural organic resources and of agrochemical measures and methods of fertilizing with ecological protection of mountain agricultural systems, for the conservation and protection of the environment;</p> <p>To train students on the management of mountain agricultural system fertilization in order to maintain and increase the content of organic matter in accordance with the climatic specificity of the mountain area, which will ensure the prevention of soil and agroecosystem degradation and obtaining superior quality vegetable and animal consumables, with the satisfaction of the food safety and security parameters..</p>
7.2. Specific objectives	<p>To know the functions, strategy and management of agricultural farms;</p> <p>To acquire the characteristics of the agricultural systems practiced in the mountain area and the factors underlying the sustainable development;</p> <p>To acquire knowledge on the need to differentiate the fertilization of mountain agricultural systems in accordance with the climatic specific of the area and the adapted plant species. This fertilization system must be permanently accompanied by a rigorous agrochemical control that will ensure a variety of practical solutions in achieving the agrochemical optimum of the soil - plant - fertilizer system and to prevent soil and environmental degradation;</p> <p>To acquire practical and decision-making skills in the field for proper soil management and maintaining the ecological balance.</p>

8. Content

8.1. COURSE Number of hours - 14	Teaching methods	Observation
<p>Chapter 1. Management in agriculture 1.1. Management as science and definition; 1.2. Functions of farm management; 1.3. Functions and strategy of agricultural farms;</p> <p>Chapter 2. Management of the rational use of fertilizers in the mountain area 2.1. Factors that condition the application of fertilizers; 2.2. Correcting the reaction, improving the ionic composition and the fertility of the acidic and saline - alkaline soils; 2.3. Methods for establishing fertilizer doses in plant species; 2.4. Types of fertilization according to the time and method of fertilizer application; 2.5. Management of the application of fertilizers to field crops; 2.6. Fertilization management of natural and sown meadows; 2.7. Management of rational fertilization of vegetables grown in the field; 2.8. Management of the application of fertilizers to vegetables grown in protected spaces; 2.9. Management of rational fertilization of vineyards; 2.10. Management of fertilizer application in fruit plantations.</p>	<p>Lecture</p> <p>Lecture</p>	<p>1 lecture = 2 hours</p> <p>6 lecture = 12 hours</p>

8.2. PRACTICAL WORKS Number of hours - 14	Teaching methods	Observation
<p>1. Agrochemical methods of soil fertility control: Soil analysis; Plant analysis; Agrochemical mapping and interpretation; 2. Identification and quality control of fertilizers - general characteristics and classification; 3. Practical recommendations for rational use of the main chemical fertilizers with nitrogen; 4. Practical recommendations for the rational use of the main chemical fertilizers with phosphorus; 5. Practical recommendations for the rational use of the main chemical fertilizers with potassium; 6. Practical recommendations for the rational use of complex and mixed (compound) fertilizers with 2-3 and more fertilizing elements; 7. Practical recommendations for the rational use of organic fertilizers;</p>	<p>Laboratory</p> <p>Laboratory</p> <p>Laboratory</p> <p>Laboratory</p> <p>Laboratory</p> <p>Laboratory</p> <p>Laboratory</p>	<p>1lab= 2 hours</p> <p>1lab= 2 hours</p> <p>1lab= 2 hours</p> <p>1lab= 2 hours</p> <p>1lab= 2 hours</p> <p>1lab= 2 hours</p> <p>1lab= 2 hours</p>
<p><i>Compulsory bibliography:</i></p> <p>1. Avarvarei I. șicolab., 1997, Agrochimie., Ed Sitech, Craiova ; 2. Rusu M., 1992, 1993, Agrochimie. (vol. I, II), Tipo Agronomia, Cluj-Napoca ; 3. Marilena Mărghitaș, Cătălin Băluțiu, 1996, Agrochimie - Lucrări practice, Tipo Agronomia, Cluj-Napoca ; 4. Marilena Mărghitaș, 2003, Agrochimie, Ed. Academic Pres, Cluj-Napoca ; 5. Rusu Mihai, Marilena Mărghitaș, Tania Mihăiescu, I. Oroian, Adelina Dumitraș, 2005, Tratat de Agrochimie, Ed. Ceres, București ; 6. Marilena Mărghitaș, M. Rusu, Tania Mihăiescu, 2005, Fertilizare a plantelor agricole și horticoale, Ed. Academic Pres, Cluj-Napoca ; 7. Mihai Rusu, Marilena Mărghitaș șicolab., 2010, Cartea agrochimică - Studiu agrochimic al solurilor - Ed. Academic Pres, Cluj-Napoca ; 8. Marilena Mărghitaș șicolab., 2011, Manual de bune practici în tehnologia fertilizării plantelor agricole, Ed. Academic Pres, Cluj-Napoca ;</p>		
<p><i>Optional bibliography:</i></p> <p>1. Hera C., Z. Borlan, 1980, Ghid pentru alcătuirea planurilor de fertilizare, Ed. Ceres, București ; 2. Borlan Z., C. Hera, 1982, Tabele și nomograme agrochimice, Ed. Ceres, București ; 3. Borlan Z. șicolab., 1994, Compendiu de Agrochimie, Ed. Ceres, București ; 4. Velicica Davidescu, D. Davidescu, 2002, Compendiu agrochimic, Ed. Academiei, București ; 5. Marilena Mărghitaș, Mihai Rusu, 2003, Utilizarea îngrășămintelor și amendamentelor în agricultură, Ed. Academic Pres, Cluj-Napoca ;</p>		

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 teacher and students participate in the annual symposium of the USAMV Cluj-Napoca, the Agriculture and Horticulture section and the annual SNRSS Conference where current

issues of Agrochemistry and the management of the use of fertilizers and nutrients in Agriculture are discussed.

10. Evaluation

Type of activity	10.1.Evaluation criteria	10.2.Evaluation type	10.3.Percentage of the final grade
10.4.Course	Overview, definitions, concepts regarding the management of the fertilization of agriculture systems; Agricultural systems in the mountain area; The factors that determine the application of fertilizers; Agrochemical resources used to correct the reaction, improve the ionic composition and the fertility of the acidic and saline - alkaline soils; Methods for establishing fertilizer doses for plants; Types of fertilization according to the time and method of fertilizer application; Management of the rational use of fertilizers for the main adapted plant species in the mountain area.	Summative	70%
10.5.Seminar/Laboratory	Working methodologies used in sampling of soil, plant and fertilizers for the control and evaluation of the state of fertility and soil quality and identification of fertilizers; Determination of the main agrochemical soil indices that underlie the characterization of the regime of humus, nitrogen, phosphorus and potassium in the soil; Determining the specific agrochemical indices of acid and saline - alkaline soils in order to correct the doses of amendments; Qualitative study and identification of the main agrochemical resources (fertilizers and amendments) used in agriculture and practical recommendations of rational use; Solved agrochemical problems and interpretation of the agrochemical mapping work for the correct determination of fertilizer doses in plant species.	A brief check is given at the beginning of each laboratory and the final grade by practical exam at the end of the semester	30%
10.6.Minimum performance standards			
Mastering of scientific information transmitted through lectures and laboratories at an acceptable level. Obtaining a passing grade for practical laboratories and lectures is a condition of passing the exam.			

¹ Cycle of studies- choose one of the three options: Bachelor/Master/Ph.D.

² according to the educational plan

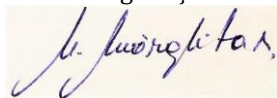
³ Disciplinestatus (compulsoriness)- choose one of the options - **DI** (compulsory discipline) **DO** (optional discipline)

DFac (facultative discipline).

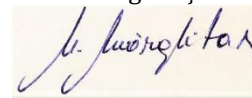
⁴ One credit is equivalent to 25-30 hours of study (teaching activities and individual study).

Filled in on
8.09.2020

Course coordinator
Prof. PhD Mărghitaș Marilena



Laboratory work/seminar coordinator
Prof. PhD Mărghitaș Marilena



Approved
by the
department
on
14.09.2020

Head of the Department
Assoc. prof. eng. PhD. Ovidiu RANTA

