



No. _____ of _____

Form code USAMV 0102020111

COURSE DESCRIPTION

1. General data

1.1. Higher Education Institution	University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca
1.2. Faculty	Agriculture
1.3. Department	Plant culture
1.4. Domain of study	Agronomy
1.5. level of study ¹⁾	Bachelor
1.6. Specialization/ Program of study	Montanology
1.7. Form of teaching	IF

2. Characteristics of the course

2.1. Name of the course		Microbiology						
2.2. Course leader		Prof.dr. Roxana Vidican						
2.3. Coordinator of the laboratory/seminars activity		Lect. dr. Vlad Stoian						
2.4. Year of study	II	2.5. Semester	I	2.6. Type of Evaluation	Continuou s	2.7. Course regime	Content ²	DF
							Level of compulsory ³	DI

3. Total estimated time (hours/semester for the teaching activities)

3.1. Number of hours/week-frequency form	4	of which: 3.2. course	2	3.3. seminar/ laboratory/ project	2
3.4. Total hours in the teaching curricula	56	Of which: 3.5. course	28	3.6. seminar/ laboratory	28
Distribution of time					hours
Distribution of the time allotted					15
3.4.1. Study based on books, textbooks, bibliography and notes					20
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					6
3.4.4. Tutorials					8
3.4.5. Examinations					
3.4.6. Other activities	64				
3.7. Total hours of individual study	120				
3.8. Total hours per semester	4				

4. Prerequisites (if applicable)

4.1. of curriculum	Physiology, Biochemistry, Genetics, Pedology, Agrochemistry
4.2. of competences	The student should have knowledge concerning the metabolic processes, intracellular chemical processes, soil as living environment and changes in soil nutrients.

5. Conditions (if applicable)

5.1. of course development	The course is interactive, students can ask questions regarding the content of the exposure. Academic discipline require compliance Time start and end of the course. Will not be tolerated any other activities during the lecture and mobile phones must be closed.
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5.2. of seminar/laboratory/project development	For practical work is mandatory consultation of practical handbook, each student will develop an individual activity with laboratory materials that are available and described in the handbook. Academic discipline is imposed for the duration of entire works.
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6. Cumulated specific competences

Professional competences	<p>To know the specific language for the discipline of Microbiology.</p> <p>To understand the role of microorganisms in nature</p> <p>To know the main groups of microorganisms</p> <p>To acquire general microbiology techniques and the conduct of work in a laboratory</p> <p>To know the general characteristics of viruses, bacteria, algae, protozoa and fungi</p> <p>To know the microscopic examination techniques</p> <p>To know the elements of microbial genetics and immunology</p> <p>To learn thoroughly the fundamental concepts of microbiology, its interdisciplinary nature and its impact on various areas of human activity.</p>
Transversal competences	<p>To demonstrate ability to assess microbial component of an ecosystem</p> <p>It can develop conservation projects and stimulate microbial activity analyzed according to the specific ecosystem</p> <p>To be able to think scientific activities and decision concerning the extension and activity of microorganisms on ecosystem level / area / region, including installation of experiences</p> <p>To demonstrate concerns about professional development by engaging in investigations technological impacts on the structure and dynamics of microbial component</p> <p>To participate in the research lab and field experiences of the discipline</p>

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

7.1. General objectives	To acquire knowledge about the fundamental concepts of microbiology with knowledge of the anatomy and morphology of the main groups of microorganisms at the current requirements level.
7.2. Specific objectives	<p>To understand the distribution of microorganisms at the level of ecosystems in our country and globally.</p> <p>To identify the microorganisms and to be able to assess their activity and role in nutrients circuit at the ecosystem's level.</p> <p>To know the factors that influence the distribution and activity of microorganisms, and inter-relationships between them.</p>

8. Content

8.1.COURSE Number of hours - 28	Methods of teaching	Observations
SOIL MICROBIOLOGY. General problems of soil microbiology, soil microbiology importance. Soil - habitat for microorganisms. Population of soil. Biochemical activity of soil microorganisms. Organic substances in the soil.	Lecture	2 lectures
Decomposition of organic substances. Humus - the role of microorganisms in humus formation. Factors that condition the humification. The role of microorganisms in humus decomposition. Factors that contribute to the decomposition of humus.	Lecture	1 lecture
Relations between microorganism and plants - elements of rhizosphere, mycorrhizal symbiosis.	Lecture	2 lectures
Carbon cycle. Decomposition of cellulose. Hemicellulose decomposition. Decomposition of glucose. Decomposition of starch. Decomposition of pectins. Decomposition of chitin. Decomposition of lignins.	Lecture	1 lecture
NITROGEN CYCLE IN SOIL. Ammonification.	Lecture	1 lecture

Nitrification. Denitrification.		
Phosphorus cycle in soil.	Lecture	1 lecture
Potassium and sulphus cycle.	Lecture	2 lectures
Symbiotic and non-symbiotic fixation of nitrogen.	Lecture	1 lecture
Procedures for stimulation of biological activity through microbial bioproducts.	Lecture	2 lectures
Fermentations.	Lecture	1 lecture

8.2.LUCRĂRI PRACTICE Număr de ore - 28		
Soil microbiology - isolation of microorganism from ecosystems	Theoretical and practical work	1 laboratory work
Rhizosphere of cultivated plants	Theoretical and practical work	2 laboratory work
Microbial diversity of agroecosystems	Theoretical and practical work	1 laboratory work
Role of microorganism in growth and development of plants	Theoretical and practical work	1 laboratory work
Nitrogen cycle - ammonification, nitrification and denitrification processes	Theoretical and practical work	2 laboratory work
Non-symbiotic fixation of nitrogen	Theoretical and practical work	1 laboratory work
Studies on nitrogen fixing bacteria	Theoretical and practical work	1 laboratory work
Studies on arbuscular mycorrhizas	Theoretical and practical work	2 laboratory work
Use of microbial bioproducts in agriculture	Theoretical and practical work	2 laboratory work
Fermentations	Theoretical and practical work	1 laboratory work

Compulsory bibliography

1. VIDICAN ROXANA, (2005) - *Notite de curs*
2. PAMFIL DORU (1999) - *Microbiologie*
1. PAMFIL DORU, HENEGARIU OCTAVIAN (1998) - *Microbiologie generala*

Facultative bibliography:

1. Dragan - Bularda O. (2000) - *Microbiologie*

9. Corroboration of the subject content with the expectations of the epistemic communities' representatives, of the professional associations and representatives employers in the domain

In order to identify ways of modernization and continuous improvement of teaching and course content with the current issues and practical problems the teachers participate in symposiums organized by University of Agricultural Sciences and Veterinary Medicine in the country, Symposiums in areas of interest organized by universities in the country and abroad, the annual meeting of the Romanian Society of Grassland and other Societies working in areas of interest where they meet with farmers being discussed current and future aspects of the dynamics of Microbiology in Romania and Europe

10. Evaluation

Type of activity	10.1. Evaluation criteria	10.2. Evaluation methods	10.3. Percent of the final grade
10.4. Course	Knowing the elements of soil		

	<p>microbiology, populations and soil microbial activity, the role of microorganisms in decomposition processes.</p> <p>Acquiring knowledge about the role of soil microorganisms in circuit of elements.</p> <p>Knowing the behavior microorganisms under the influence of ecological factors.</p> <p>Appropriation and knowing the interrelationships between microorganisms in the soil.</p> <p>Deepening aspects of interdependence between biological activity and fertilizer and amendment.</p> <p>Mastering knowledge about stimulation of biological activity using bioproducts.</p> <p>Knowing the microbiology of fermentation, the role of microorganisms in silage production and food preservation.</p>	<p>Continous</p> <p>Theoretical exam</p> <p>Activity at course and interest shown</p>	<p>70%</p> <p>10%</p>
10.5. Seminar/Laborator	<p>Mastering techniques for the preparation of culture media, inoculating microorganisms in the medium and determining the number of bacteria in the culture medium.</p> <p>Knowing the morphological characters of bacteria and fungi in the soil, isolating microorganisms of these groups in pure cultures.</p> <p>Demonstration of the bacteria ability to degrade carbohydrates, decomposition of amino acids, the reducing properties.</p> <p>Appropriation of knowledges on ammonifying and nitrifying power of the soil, highlight the rhizosphere effect.</p>	<p>Practical activity and verification results</p>	<p>20%</p>
10.6. Minimal standard of performance			
<p>Knowing of scientific information transmitted through lectures and practical work at an acceptable level. Obtaining the pass mark in continuous assessment is a condition of graduation.</p>			

- ¹ level of study - to be chosen one of the following - Bachelor /Post graduate/Doctoral
- ² Course regime (content)- for bachelor level it will be chosen one of the following - DF (fundamental subject), DD (subject in teh domain), DS (specific subject), DC (complementary subject).
- ³ Course regime (compulsory level)- to be chosen one of the following – DI (compulsory subject) DO (Optional subject) DFac (Facultative subject).
- ⁴ One ECTS is equivalent with 25-30 de hours of study (didactical and individual study).

Filled in on
04.09.2019

Course coordinator
Prof. dr. Roxana Vidican

Leader of the laboratory/seminars
Lect. dr. Vlad Stoian

Approved by the
department on
05.09.2019

Roxana Vidican

Department manager
Prof. dr. Marcel Duda

Marcel Duda

Vlad Stoian