



No. _____ of _____

USAMV form 0102010214 (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	Environment and plant protection
1.4. Field of study	Agronomy
1.5. Cycle of study ¹	Bachelor
1.6. Specialization/ Study programme	Montanology
1.7. Form of education	Full time

2. Information on the discipline

2.1. Discipline name	Soil biology							
2.2. Course coordinator	Associate professor Mignon Sandor							
2.3. Seminar/ laboratory/ project coordinator	Associate professor Mignon Sandor							
2.4. Year of study	1	2.5. Semester	1	2.6. Evaluation type	continuous	2.7. Discipline status	Content ²	DS
							Compulsoriness ³	DO

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					3
3.4.2. Additional documentation in the library, electronic platforms and field experiences					0
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					0
3.4.4. Tutorials					0
3.4.5. Examinations					1
3.4.6. Other activities					
3.7. Total hours of individual study	4				
3.8. Total hours per semester	60				
3.9. Number of credits ⁴	2				

4. Prerequisites (if applicable)

4.1. curriculum-related	
4.2. skills-related	.

5. Conditions (if applicable)

5.1. of course development	The course is interactive, students can ask questions regarding the content of the presentations. Coming to class after the start of the course is disruptive and inconsiderate. We do not allow any other activities during the lecture, mobile phones should be closed.
5.2. of seminar/laboratory/project development	Practical work attendance is compulsory. Students will perform practical work in small groups by using available lab protocols.

6. Cumulated specific competences

Professional competences	<p>Ability to identify the main groups of soil organisms and their adaptation to the environment</p> <p>Understanding of the role of soil living community in pedogenesis</p> <p>Understanding the involvement of soil community in biogeochemical cycles</p> <p>Knowledge of practical methods used to study different groups of edaphic organisms</p> <p>Description and assessment of the effects of anthropogenic activities on soil biodiversity</p> <p>Assessment of soil quality by using biological indicators</p>
Transversal competences	<p>The ability to describe the soil living community and to transmit accurate information about it</p> <p>To understand the role of soil organisms in organic matter decomposition process</p> <p>To achieve teamwork skills in order to develop complex studies related to soil organisms as promoters of ecosystem services</p> <p>To be able to use gained information and concepts in relationship with other subjects that will be studied in the future</p>

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

7.1. Subject general objective	Students are expected to gain knowledge about the soil living community, the importance of this community to ensure soil functions and to understand soil-plant-climate complex interactions in mountain ecosystems
7.2. Specific objective	<p>To be able to identify and classify different soil organisms</p> <p>To know the role of soil organisms in pedogenesis</p> <p>To understand the role of the soil community for soil organic matter decomposition process</p> <p>To know the importance of soil organisms for nutrients cycling</p> <p>To know the relationships between soil management and its living community in mountain agroecosystems</p>

8. Content

8.1. COURSE Number of hours - 28	Methods of teaching	Observations
Introduction to soil biology. History, goals, importance	Lecture	1 lecture
Soil as a habitat in mountain ecosystems Pedogenesis. Physical and chemical soil properties. Soil heterogeneity. Soil taxonomy. Soil quality. Rhizosphere.	Lecture	1 lecture
Soil microflora: soil bacteria Descriptions, importance and study methods	Lecture	1 lecture
Soil microflora: soil fungi Description, importance and study methods	Lecture	1 lecture
Soil protozoa, rotifera and tardigrada Taxonomy, description, importance and study methods	Lecture	1 lecture
Soil nematodes, enchytraeds and earthworms Taxonomy, description, importance and study methods	Lectures	2 lectures
Soil arthropods. Soil vertebrates. Taxonomy, description, importance and study methods	Lecture	1 lecture
Soil organic matter decomposition - the role of soil biota	Lectures	2 lectures
The role of soil biota in nutrient cycles and soil fertility	Lecture	1 lecture

The impact of human activities on soil biodiversity and mitigation possibilities	Lectures	2 lecture
Soil quality assessment: biological indicators	Lecture	1 lecture

8.2.PRACTICAL WORK Number of hours – 28		
Introduction to soil biology practical study. Soil biology lab presentation	Lab presentation	1 lab work
Soil bacteria: most probable number method	Lab activity	2 lab work
Functional diversity of soil bacteria: Microresp method	Lab activity	1 lab work
Soil fungi: study of the soil saprophytic fungi	Lab activity	2 lab work
Study of the soil protozoa	Lab activity	1 lab work
Sampling methods used in the field in order to collect data about soil animals	Field sampling activity	2 lab work
Extraction, identification and description of soil main invertebrates: nematodes, enchytraeids, earthworms and microarthropods	Lab activity	5 lab work

Compulsory bibliography:

- M. Sandor, 2017, *Biologia solului – note de curs*, Ed. AcademicPres, Cluj-Napoca
G. Muller, 1968, *Biologia solului*, Ed. Agro-Silvică, București
D. Dindal, 1990, *Soil Biology Guide*, John Wiley and Sons
M. Drăgan- Bularda, S. Kiss, 1996, *Microbiologia solului, curs pentru studenți*
Șandor și colab., 2012, *Ecologie aplicată: metode și principii*, Ed. Digital Data, Cluj-Napoca

Facultative bibliography:

- P. Lavelle, A.V. Spain, 2005, *Soil Ecology*, Springer, Dordrecht
G. Stefanic, D.I. Săndoiu, 2011, *Biologia solurilor agricole*, Ed. Elisavaras, 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

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10. Evaluation

Type of activity	10.1. Evaluation criteria	10.2. Evaluation type	10.3. Percentage of the final grade
10.4. Course	The students need to know the structure and importance of soil microflora The students need to know the main groups of soil invertebrates and their importance in soil system How the decomposition process occurs and which are the soil organisms involved Assesment of soil quality by using biological indicators	summative(E)	70%
10.5. Seminar/Laboratory	The students need to know to identify main groups of soil organisms They have to know practical methods used to study soil biota	V	30%
10.6. Minimum performance standards			

The students need to obtain at least grade 5 to promote 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
Assoc. prof. Mignon Sandor

Laboratory work/seminar coordinator
Assoc. prof. Mignon Sandor

Approved by the
department on
05.09.2019

Head of the Department
Prof. Ioan Oroian