UNIVERSITATEA DE ŞTIINŢE AGRICOLE ŞI MEDICINĂ VETERINARĂ CLUJ-NAPOCA
Facultatea de Agricultură
Calea Mănăştur 3-5, 400372, Cluj-Napoca, România
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No._____of _____2019 **USAMV form 0107020112**

SUBJECT OUTLINE

1. Information on the programme

1.1. Higher education institution	University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca
1.2. Faculty	Agriculture
1.3. Department	Environmental and Plant Protection
1.4. Field of study	Environmental Engineering
1.5. Cycle of study1	Bachelor
1.6. Specialization/ Study programme	Environmental Engineering
1.7. Form of education	Full time

2. Information on the discipline

2.1. Discipline name	GENERAL ECOLOGY II							
2.2. Course coordinator				Professor Ph.D. Aurel MAXIM				
2.3. Seminar/ laboratory/ project coordinator				Professor Ph.D. Aurel MAXIM				
2.4. Year of study	II	2.5. Semester	II	2.6. Evaluation type	Sumative	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	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					24
3.4.2. Additional documentation in the library, electronic platforms and field experiences					10
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					10
3.4.4. Tutorials					10
3.4.5. Examinations					10
3.4.6. Other activities					
3.7. Total hours of individual study	64				
3.8. Total hours per semester	120				
3.9. Number of credits[4]	4				

4. Prerequisites (if applicable)

4.1. curriculum-related	Botany, Zoology, General Ecology I
4.2. skills-related	The student should have knowledge about environmental factors and ecosystem structure

5. Conditions (if applicable)

5.1. for the course	The course is interactive, students can ask questions regarding the content of the statement. Academic discipline enforces time to start and end of the course. Are not allowed any other activities during the lecture, mobile phones are closed.
5.2. for the seminar/ laboratory/ project	Practical work is compulsory consultation practically mentor, each student will conduct a single laboratory using the materials available and described in the guide for practical work. Academic discipline is imposed throughout the tutorial.

6. Cumulated specific competences

Professional competencies	To know the specific language discipline of Ecology. To understand the energy function of ecosystems. To master the concepts related to the production and productivity of ecosystems. To acquire the main global biogeochemical cycles (carbon, nitrogen, phosphorus, sulfur, water) and the disorders caused by human activities. To know the characteristics and functioning of agroecosystems. To be able to describe the main farming systems. To master aspects of human ecology. To understand the impact of human activities on air, water, and soil and the main remedies.
Transversal competences	Autonomy and assuming responsibility. Application of efficient work techniques in multidisciplinary team. Personal development and management of time and activities to carry out work tasks during courses and practical work.

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

7.1. General objective	Students need to acquire knowledge of the functions of ecosystems, agricultural ecosystems, human ecology and environmental damage
7.2. Specific objectives	Students need to know the functions of ecosystems: energy, of movement and self-regulating. To acquire the characteristics of agroecosystems. To know the characteristics of human ecosystems and natural resources of the planet, including measures for rational use of them. To know the pollution problems of water, air and land and other means of damage to ecosystems, including measures to combat them.

8. Content

8.1. COURSE	**Teaching methods**	**Observation**
Number of hours – 28		
Chapter 5. Ecosystem functions	Lectures	5 lectures
5.1. Energy function of ecosystems		
5.1.1. The laws of thermodynamics in ecology		
5.1.2. Energy flow in biological systems		
5.1.3. The production and productivity of ecosystems		
5.2. The movement function in ecosystems		
5.2.1. Carbon cycle		
5.2.2. Nitrogen cycle		
5.2.3. Phosphorus cycle		
5.2.4 Water cycle		
5.3. Self-regulating function		
Part - II		
AGRICULTURAL ECOLOGY (Agroecology)	Lectures	5 lectures
Chapter 6. General terms of agroecosystems		
6.1. Definition, importance, and historical		
6.2. Origin and evolution of agricultural systems		
6.3. Characteristics of farming systems		
Chapter 7. Classification of power engineering in agroecosystems		
7.1 . Extensive agroecosystems		
7.2. Intensive agroecosystems		
7.3. Industrialized agroecosystems		
Chapter 8. Agroecosystems and the nourishment of mankind		
Chapter 9. Farming system		

9.1. Traditional farming systems 9.2. Modern agriculture systems 9.2.1. Industrialized agriculture systems 9.2.2. Sustainable agriculture systems **Part - III** **ELEMENTS OF HUMAN ECOLOGY** **Chapter 10. Human ecosystems** 10.1. History of anthropogenic activity on the natural environment 10.2. Structure features, and organization of anthropogenic ecosystems 10.3. Population explosion and its consequences 10.4. Earth's natural resources and their rational use measures 10.4.1. Biosphere – the basic resource of mankind 10.4.2. Non-renewable resources 10.4.3. Renewable resources 10.4.4. The international community and environmental issues **PART IV** **DAMAGED ECOSYSTEMS AND ENVIRONMENTAL PROTECTION** **Chapter 11. Damage to ecosystems by pollution** 11.1. Pollutant and pollution 11.2. Classification of pollution 11.3. Air pollution 11.4. Water pollution 11.5. Soil pollution **Chapter 12. Other ways of environmental damages** **Chapter 13. Environmental ethics**	Lectures Lectures Lectures	1 lecture 2 lectures 1 lecture

8.2.PRACTICAL WORK Number of hours – 28 Elements of statistical analysis used in Ecology: the calculation of the average, central deviations, variances and standard deviation of a statistical string The normal distribution and the use of statistical tests for comparing two samples coming from different populations Estimation methods of primary production in ecosystems Estimation methods of secondary production in ecosystems Study of the effect of certain air pollutants on the respiration of plants - activity in the field and laboratory Studying the effects of different agricultural practices on the soil breath - activity in the field and laboratory Methods for estimating the biomass of microorganisms from soil and its importance in the assessment of the health status of soils Nitrogen cycle: determination of ammunition and nitrification power of soil Analysis of the effects of intensive agriculture on the type of aquatic ecosystems using some ecological indices - activity in the field and laboratory Verification of knowledge	Laboratory activity Laboratory activity Laboratory activity Laboratory activity Laboratory activity and fieldwork Laboratory activity and fieldwork Laboratory activity Laboratory activity Laboratory activity Laboratory activity and fieldwork	1 laboratory session 1 laboratory session 1 laboratory session 1 laboratory session 2 laboratory sessions 2 laboratory sessions 1 laboratory session 2 laboratory sessions 2 laboratory sessions 1 laboratory session
Compulsory bibliography:		

1. Botnariuc N., Vădineanu A, Ecologie, Ed. Did. si Ped., Bucuresti, 1982
2. Fiţiu A., Ecologie şi Protecţia Mediului, Ed. Academicpres, 2002
3. Maxim, A., Ecologie generală şi aplicată, Editura Risoprint Cluj-Napoca, 2008
4. Muntean L., Stirban M, Ecologie şi Protecţia Mediului, Editura Dacia, 1995
5. Puia, I., Soran, V., Rotar, I., Agroecologie, ecologism, ecologizare. Editura Genesis, Cluj-Napoca, 1998
6. Şandor, M., Maxim, A., Ecologie. Lucrări practice. Editura AcademicPres, Cluj-Napoca, 2009
7. Şandor M., Ecologie aplicată. Metode şi principii. Editura Digital Data Cluj, 2012

Optional bibliography:
1. Fabian A., Onaca Rodica, Ecologie aplicată, Ed. Sarmis, Cluj Napoca, 1999
2. Jorgensen, S. E., Integration of Ecosystem Theories: A Pattern, Kluwer Academic Publishers, 1992
3. Şchiopu, D., Vântu, V., Ecologie şi protecţia mediului, Ed. „Ion Ionescu de la Brad", Iaşi, 2002
4. Toncea I., Ghid practic de agricultură ecologică, Ed. Academicpres, 2002

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 modernization and continuous improvement of teaching and course content with the current issues and practical problems, teachers and students participate in an annual environmental symposium of University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca in collaboration with the Romanian Waters and Protection Agency Environment Cluj where they debate current environmental issues.

10. Evaluation

Type of activity	10.1. Evaluation criteria	10.2. Evaluation type	10.3. Percentage of the final grade
10.4. Course	Ecosystem functions Agroecology Environmental damage and protection Ecological ethics	oral exam	70%
10.5. Seminar/Laboratory	Statistical calculation in Ecology Estimation methods of primary and secondary production in ecosystems Study on influence of some air pollutants and various agricultural practices on the respiration of plants Determination of ammunition and nitrification power of soil	verification of knowledge (4)	30%
10.6. Minimum standard of performance Mastering scientific information provided during lectures and practical work at an acceptable level. Obtain the pass mark in continuous assessment is a graduation requirement.			

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
4/9/2019

Course coordinator
Professor Ph.D. Aurel MAXIM

Laboratory work/seminar coordinator
Professor Ph.D. Aurel MAXIM

Approved by the department on
5/9/2019

Head of the Department
Professor Ph.D. Ioan OROIAN