



AGROECOLOGY AND ENVIRONMENTAL PROTECTION

Basic data of the subject	
Academic Unit:	Faculty of Life and Environmental Sciences
Course title:	Agroecology and environmental protection
Study program:	Agribusiness Management
Level:	Master (MSc)
Course status:	Elective (E)
Study year:	1 year / 1 semester
Number of hours per week:	2 + 1
Credit value – ECTS:	5 ECTS
Time / location:	To be announced
Lecturer:	Prof. Asoc. Dr. Albana Milaimi
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Course description:	This course provides students with the main basics of agroecology, agroecosystems and their structural and functional organization. Problems in the sustainable use of the natural resources in agriculture. Plants and environmental factors. The concept of agroecosystems. Introduction to the basic functions of the ecosystem in relation to the organization of biocenosis and metabolism. Population processes in agriculture. Species interactions in crop communities. Agroecosystems, their diversity and stability. Energy in agroecosystems. Elaboration of opportunities and constraints to manage and exploit agroecosystems. Description of relationships and dependencies between different ecosystems in function of land use. Achieving sustainability in agriculture. A special place will be occupied by the basic principles of ecotoxicology.
Course objectives:	Objective of this course is to enable students achieving knowledge and understanding of the principles of regulation within natural and agricultural ecosystems and to demonstrate the complex interconnections between natural landscape and agricultural production; how applying ecological concepts and principles to the design and management of agroecosystems improve long-term reliability in agricultural production. Moreover, course Also, the courses enable students to gain skills in sampling for analysis, measuring of different climatic and soil properties, establishment and management of the sustainable agroecosystems.
Learning outcomes:	After completing the course, students will be able to: ▪ Recognize ecological problems in agriculture, ▪ Design and apply knowledge in the field of agroecology. ▪ Apply new ecological technologies in order to preserve natural resources in agricultural production and create functional agroecosystems. ▪ Criticize, evaluate and synthesize new ideas in the field of agroecology, ▪ Use information technologies in the field of applied ecology in agriculture. ▪ Recognize the contribution that plants and plant products make to human well-being ▪ Critically examine the problems facing the world in relation to food production, trade and consumption, ▪ Know the problems of environmental pollution and measures for environmental protection.



Contribution on student load (must correspond with learning outcomes)			
Activity	Hours	Days/week	Total
Lectures	2	13	26
Exercise theoretical/laboratory	1	13	13
Practice work	/	/	/
Contact with lecturer/consultations	1	15	15
Field exercises	4	2	4
Mid-terms, seminars	3	1	3
Homework	1	11	11
Individual time spent studying (at the library or home)	2	15	30
Final preparation for the exam	2	7	14
Time spent in evaluation (tests, quiz, final exam)	3	2	6
Projects, presentations, etc.	3	1	3
Total			125 hours (5 ECTS)
Teaching methods:	Theoretic lectures, interactive lectures, laboratory exercises, class discussions and work in the groups, project creation and e-learning		
Evaluation methods:	▪ Regular and active attendance: 5%, ▪ Midterm exam (colloquium): 10%, ▪ Course project: 10%, ▪ Exam from laboratory excercise: 15% ▪ Final exam: 60%.		
Literature			
Basic Literature:	▪ Peçuli, V. & Kopali, A. (2012). Agroekologjia. Tiranë. ▪ Altieri, M. A. (2018). Agroecology: The science of sustainable agriculture. CRC Press. ▪ Gliessman, S.R. (2014). Agroecology: The ecology of sustainable food systems. CRC Press, Taylor & Francis. ▪ Newman, M.C. (2015). Fundamentals of ecotoxicology: The science of pollution. CRC Press, Taylor & Francis.		
Additional Literature:	▪ Peirce, J. J., Vesilind, P. A., & Weiner, R. (2013). Environmental pollution and control. Butterworth-Heinemann. ▪ Rozhaja, D. (1983). Ndotja dhe mbrojtja e ambientit jetësor. Prishtinë. ▪ Becker, R., Meyer, D., Wagoner, P., & Saunders, R. M. (1992). Alternative crops for sustainable agricultural systems. Agriculture,		

	Ecosystems & Environment, 40(1-4), 265-274. ▪ Pollinator-Friendly Seeds and Nursery Directory Growing plants to protect managed and wild bees, butterflies, birds and other pollinators — Beyond Pesticides ▪ Buqaj, L., Gashi, B., Zogaj, M., Vataj, R., Sota, V., & Tuna, M. (2023). Stress induced by soil contamination with heavy metals and their effects on some biomarkers and DNA damage in maize plants at the vicinity of Ferronikel smelter in Drenas, Kosovo. Journal of Environmental Science and Health, Part B, 58(10), 617-627.
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Designed study plan:		
Week	Lectures	Exercises
<i>First week:</i>	Overview of basic concepts, subjects of study and protection objectives in ecotoxicology.	Determination of mean lethal / effective dose / concentration, (LD-50, LC-50, EC-50), predicted no effect concentration (PNEC) for ecosystems.
<i>Second week:</i>	Differences between industrial and sustainable agriculture. Ecosystem functions relevant to agriculture.	Determination of hazard Quotient (HQ), toxicity-exposure ratio (TER) and interpretation of the obtained results.
<i>Third week:</i>	Ecosystem Services to agriculture in an overview: Soil fertility and formation, nutrient cycling and retention, Water provision and purification.	Determination of mineral concentration in crop plants
<i>Fourth week:</i>	The crop plant and abiotic factors of the environment, resources and destructors: sun, soil, water, minerals, wind, fire. Biotic factors of the environment.	Light, temperature and humidity - methods for their measurement
<i>Fifth week:</i>	Chemicals in agriculture, advantages, disadvantages and limitations. The alternatives to chemical control in agriculture, and the importance of healthy soil.	Field trip to Agro product company: Organic farming and its challenges.
<i>Sixth week:</i>	Genetic diversity and Climate regulation, pollination and biological pest control.	Genetic manipulation of crop plants
<i>Seventh week:</i>	Ecosystem services provided by birds – international and local examples. Ecosystem services provided by bats – international and local examples.	Field trip: Connecting agriculture and farmers to nature conservation
<i>Eighth week:</i>	Biological pest control: predators and parasitoids in the insect kingdom,	Field trip: Identification of insects and symptoms of phytophagous in

	understanding and helping beneficial insects.	the plants
<i>Ninth week:</i>	Pollination, honeybees and wild pollinators, the use of flowering strips for pollinators and natural enemies.	Insect composition as a key component for pest control and pollination services. – Diversity can be key!
<i>Tenth week:</i>	The importance of ecotoxicology in environmental protection. The most important pollutants from the process of agricultural production and the ways of reaching the populations in the soil and aquatic ecosystems.	Determination of pesticides in the crop plants.
<i>Eleventh week:</i>	Processes of biotransformation.	Field trip to the agricultural farm: Science in small scale experimental farms – opportunities and challenges AND eco/agricultural tourism.
<i>Twelfth week:</i>	Processes of bioaccumulation, biomagnification.	Determination of heavy metal concentration in agricultural food chains.
<i>Thirteenth week:</i>	Legislation in the field of ecotoxicology, laws and bylaws related to plant protection products, biocidal products and industrial chemicals.	Chemical pest control
<i>Fourteenth week:</i>	Direct and indirect effects of pesticides at different levels of biological organization, important for environmental risk assessment.	Soil sampling, evaporation intensity, soil pH and soil CaCO ₃ content.
<i>Fifteenth week:</i>	How can we take scientific results out of the bubble and into the world of agriculture? How applicable is applied research? Involving the farmers in research and its design, towards sustainable agriculture.	Techniques for obtaining, analyzing and interpreting data.
Academic policies and rules of conduct:		
▪ Students should be aware of and respect the institution and Code of ethics. ▪ Students should respect the schedule of lectures, and exercises and be attentive. ▪ It is mandatory to possess and presents a student ID card in the mid-terms and exam, ▪ During the compilation of course projects, students must adhere to the instructions given by the professor. ▪ During the exam is forbidden the use of mobile phones.		