



Course lecturer
Lecturer contact
information (e-mail)
Course page in eLearn

Syllabus of discipline «Agroecology»

Degree of higher education - Bachelor

Specialty 101 "Ecology"

Educational program "Ecology"

Year of study 3 semester 6

Form of study full-time education

Amount of credit ECTS 5

Language of instruction: english

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DESCRIPTION OF THE DISCIPLINE

Agroecology, similar to sustainable farming, is a scientific framework that integrates ecological concepts and human's socio-economic system into agricultural productions. It **aims** to increase the interaction between plants, animals, and the environment for food security and nutrition.

Learning objectives are aspects are studying belongs acquaintance with the harmful action of pesticides, contamination of environment, as result of mineral fertilizers application, and agricultural produce – by nitrates. The special attention is devoted the degradation processes of soils: humus damages, wind and water erosion, updepressed. Topics are also consider in relation to the alternative ways of support of agriculture, bringing of organic| fertilizers and biological| protection of plants, soil protection cultivation till and general ecological situation, in agrolandscapes and main tasks of Agroecology studies.

Learning outcome of course is the student's ability as a specialist:

- Gain a wider understanding of agroecological and environmental issues ranging from biodiversity to climate resilience and appreciate potential approaches for cities to deal with ecological and environmental challenges and threats of climate change.
- Enhance abilities and skills relating to evaluation of environmental and social impacts of urban development.

Upon completion of this course, students should be known:

- criteria for selection and formation of research topics;
- basic principles of organization and conduct of scientific research;
- methods of mathematical processing of research results;
- methodology of ecological research;
- organization and conduct of expeditionary research;
- methods of laboratory, field, vegetation and lysimetric research;
- technique of work with experimental objects;
- methods of plant and soil diagnostics, environmental monitoring, land certification;
- basic principles of analysis, generalization and interpretation of results scientific research;
- requirements for writing, design and defense of diploma, master's degree works;
- requirements for the preparation of publications, reports.

should be able:

- formulate basic environmental laws, rules and principles of environmental protection

and balanced nature management.

- understand basic concepts, theoretical and practical problems in the field of natural sciences that are necessary for analysis and decision-making in the field of ecology, protection environment and sustainable use of nature.
- apply management principles on which based environmental safety system.
- know the conceptual foundations of monitoring and normalization of anthropogenic load on the environment.
- identify the factors that determine the formation landscape and biological diversity.

Acquisition of competencies:

Integral competence (IC): The ability to generate new ideas, solve complex problems in the field of ecology, environmental protection and sustainable use of natural resources in the implementation of research and innovation activities.

General competencies (GC):

GC1 Knowledge and understanding of the subject area and professional activities.

Special (professional) competencies (SC)

SC1. Knowledge and understanding of the theoretical foundations of ecology, environmental protection and sustainable use of natural resources.

SC2. Ability to critically comprehend the basic theories, methods and principles of the natural sciences.

SC4. Knowledge of current achievements of national and international environmental legislation.

SC10. Ability to use modern information resources and technologies for environmental research.

SC12. Ability to master international and domestic experience in solving regional and transboundary environmental problems.

SC15. Ability to develop an algorithm for achieving the indicators of the goals of the Water Strategy of Ukraine, taking into account the peculiarities of the territory

SC18. Ability to assess the impact of military operations on environmental components and justify measures to restore them.

Program learning outcomes (PLO)

PLO2. Formulate the basic environmental laws, rules and principles of environmental protection and sustainable use of natural resources.

PLO3. Understand the basic concepts, theoretical and practical problems in the field of natural sciences necessary for analysis and decision-making in the field of ecology, environmental protection and sustainable use of natural resources.

PLO5. To know the conceptual foundations of environmental monitoring and regulation of anthropogenic pressure on the environment.

PLO7. Solve problems in the field of environmental protection using innovative approaches, national and international experience.

PLO10. To be able to apply software and hardware, GIS technologies and Internet resources for information support of environmental research, in particular, in radioactively contaminated areas.

PLO11. To be able to predict the impact of technological processes and production on the environment.

PLO13. To be able to formulate effective communication strategies to convey ideas, problems, solutions and own experience in the field of environmental, biological and radiation safety.

OOI22. Participate in the development of projects and practical recommendations for

environmental protection with the involvement of the public.

PLO24. Understand and exercise their rights and responsibilities as a member of society, the rule of law, human and civil rights and freedoms in Ukraine, use different types and forms of physical activity to lead a healthy lifestyle.

PLO25. To preserve and enhance the achievements and values of society based on an understanding of the place of the subject area in the general system of knowledge.

PLO26. To be able to develop technologies that guarantee the protection, balanced use of natural resources of the agrosphere and the quality of agricultural products.

COURSE STRUCTURE

Topic	Hours (lectures / laboratory, practical, seminar)	Learning outcomes	Task	Assessment
Module 1. Bases of ecology and agroecology				
Delivery of all practical works and performance of independent works takes place including in the elearn platform				
Lecture 1. Introduction. A subject of agroecology, its modes, functions and tasks	2/2	<i>Practical work 1. Analysis of features of historical stages of the interaction of society and nature</i>		
		To find out the peculiarities of the influence of human society on the biosphere at various stages of interaction between man and nature.	Develop the ability to establish causal relationships.	Submit as a table and send as an attached file in the format Microsoft Word 10
Lecture 2. Ecosystem and agroecosystem	2/2	<i>Practical work №2. Types of nutrition and types of relationships in agrobiocenosis</i>		
		Characterize nutrition as a factor of the environment in agrobiocenosis.	Identify the types and ways of feeding and the types of relationships that affect the process of formation and development of various types of agrobiocenoses.	Submit as a table and send as an attached file in the format Microsoft Word 10
Lecture 3. Progress and Effects of Agriculture	4/4	<i>Practical work №3. Ecological factors and their interaction in agrobiocenosis</i>		
		Characterize the habitat of organisms.	Determine environmental factors that influence the process of formation and development of various types of agrobiocenoses..	Submit as a table and send as an attached file in the format Microsoft Word 10
Lecture 4. Patterns and processes in ecosystems	4/4	<i>Practical work №4. Analysis of schemes of circulation of basic substances in nature for the change of their links by anthropogenic activity</i>		
		Get acquainted with the factors that negatively affect the circulation of biosphere substances and cause changes in their links; consider the consequences of variability in the cycle of matter and energy.	Develop the ability to establish cause-and-effect relationships, cooperate and draw conclusions; to form value orientations on nature conservation.	Submit as a table and send as an attached file in the format Microsoft Word 10

Lecture 5. Agroecology and pest management	3/3	Practical work № 5. The existing and optimal structure of nature management in Ukraine		
		To form an idea of the balance between biological productivity and consumption of biological products, to conclude that the need for balanced development as a guarantor of inexhaustible use of nature.	Develop the ability to express one's opinion, to form skills and abilities to work with handouts, schemes; to form ecological culture.	Submit as a table and send as an attached file in the format Microsoft Word 10
		Individual work №1. Comparison of volumes and structure of pollution of the cities of Ukraine		
		To form the concept of resistance of natural ecosystems, geosystems to anthropogenic pollution of the regions of Ukraine.	Get acquainted with the map "Emissions of harmful substances into the atmosphere". Determine the level of pollution in your region and compare with neighboring ones.	Submit as a table and send as an attached file in the format Microsoft Word 20
Modular work 1	15/15	Evaluation of the result of mastering knowledge and skills according to the topics included in the module №1		Execution of the test 30
RESULT FOR THE MODULE 1				100
Module 2. Anthropogenic impact on agroecosystems				
Delivery of all practical works and performance of independent works takes place including in the elearn platform				
Lecture 1. Biodiversity	2/2	Practical work № 1. Analysis of the peculiarities of the development of the protected area network of Ukraine		
		To form the concept of the ecological network as a holistic environmental system, to consider the main structural elements of the ecological network, to clarify the role of international and national programs in biodiversity saving.	Develop the ability to establish causal relationships, generalize, draw conclusions; to form value orientations on nature saving.	Submit as a table and send as an attached file in the format Microsoft Word 10
Lecture 2. Crops and Their Environment	2/2	Practical work № 2. Assessment of chemical pollution of soils in settlements		
		To provide insight into the assessment of chemical contamination of soils of settlements	Perform calculations and estimate the chemical contamination of soils in settlements	Submit as a table and send as an attached file in the format Microsoft Word 10
Lecture 3. Management of unwanted organisms	4/4	Practical work № 3. Assessment of the state of aquatic environments		
		To provide insight into the assessment of the state of aquatic environments	Perform calculations and give an idea of the assessment of the aquatic environment	Submit as a table and send as an attached file in the format Microsoft Word 10

Lecture 4. Ecological succession	4/4	Practical work № 4. Research of successional changes in the agrobiocenosis			
		To get acquainted with successions, the reasons of successions of changes and classification of successions of phytocenoses	Provide definitions of basic terms and concepts: succession, successional differences, causes of successions, changes in successions, primary and secondary successions.	Submit as a table and send as an attached file in the format Microsoft Word 10	
Lecture 5. Agroecological aspects of global change	3/3	Practical work №5. Determination of the level of food pollution by nitrates			
		Get acquainted with the degree of contamination of food production with nitrates	Learn how to determine the degree of contamination of food products with nitrates	Submit as a table and send as an attached file in the format Microsoft Word 10	
		Individual work №2. Estimation of the noise load on industrial facilities			
		Learn how to estimate the degree of noise on industrial facilities	Get acquainted with the principles of noise estimation of industrial facilities	Submit as a table and send as an attached file in the format Microsoft Word 20	
Modular work 2	15/15	Evaluation of the result of mastering knowledge and skills according to the topics included in the module №2		Execution of the test (30 test questions) 30	
RESULT FOR THE MODULE 2					100
Total of educational work	30/15	Calculated as the sum of all modules in terms of 70% of the total score for the course			70
Exam		The exam includes 30% of the total grade for the course	10 test questions of varying difficulty, 2 questions ECE	30	
TOTAL FOR THE COURSE					100

EVALUATION POLICY

<i>Policy on deadlines and rearrangements:</i>	Works that are submitted in violation of the deadlines without good reason are evaluated at a lower grade. Rearrangement of modules takes place with the permission of the lecturer if there are good reasons (for example, hospital).
<i>Policy on academic integrity:</i>	Write-offs (duplication of work with another student) during tests and exams are prohibited (including the use of mobile devices). Course papers, abstracts must have correct textual references to the literature used.
<i>Policy on visiting:</i>	Attendance is mandatory. For objective reasons (for example, illness, international internship) training can take place individually (in online form in consultation with the dean of the faculty)

ASSESSMENT OF STUDENTS

Applicant rating higher education, points	National assessment for the results of examinations	
	exams	test
90-100	perfectly	credited
74-89	good	
60-73	satisfactorily	
0-59	unsatisfactorily	not credited

11. Reference

Basic

1. Vagaliuk L. Lecture notes for the "Bachelor" students in the discipline "Agroecology" Lecture notes.- K.: Компрінт, 2021.- 117 с.
2. M FAO (2018b) The state of world fisheries and aquaculture 2018. Fisheries and Aquaculture Department of the Food and Agriculture Organization of the United Nations, Rome, <http://www.fao.org/docrep/016/i2727e/i2727e.pdf>
3. Eickhout B, Bouwman AF, van Zeijts H (2016) The role of nitrogen in world food production and environmental sustainability – agriculture. *Ecosyst Environ* 116:4–14
4. Evenson RE, Gollin D (2018) Assessing the impact of the green revolution, 1960 to 2000. *Science* 300:758–762
5. Vagaliuk L. Guidelines to conduct practicals in the discipline: "Agroecology".- K.: Компрінт, 2021.- 66 с.
6. FAO (2018) World agriculture: towards 2015/2030 – An FAO perspective. Food and Agriculture Organization of the United Nations, Rome. Earthscan Publications, London/www.fao.org/fileadmin/user_upload/esag/docs/Interim_report_AT2050web.pdf

ADDITIONAL RESOURCES

1. FAOSTAT. The statistical database of the Food and Agriculture Organization (FAO), Rome. <http://www.faostat.fao.org/>
2. Foley JA, Ramankutty N, Brauman KA, Cassidy ES, Gerber JS (2011) Solutions for a cultivated planet. *Nature* 478:337–342
3. Godfray HCJ, Beddington JR, Crute IR, Haddad L (2010) Food security: the challenge of feeding billion people. *Science* 327:812–818
4. Grenz JH, Sauerborn J (2017) Mechanisms limiting the geographical range of the parasitic weed *Orobanche crenata*. *Agric, Ecosyst Environ* 122:275–281
5. Hibberd JM, Sheehy JE, Langdale JA (2008) Using C4 photosynthesis to increase the yield of rice– rationale and feasibility. *Curr Opin Plant Biol* 11:228–231
6. IPCC (2017) Climate change 2001: synthesis report. Cambridge University Press, Cambridge, http://www.grida.no/publications/other/ipcc_tar/
7. ISWA (2012) Ermittlung der Mengen weggeworfener Lebensmittel und Hauptursachen für die Entstehung von Lebensmittelabfällen in Deutschland. Zusammenfassung einer Studie der Universität Stuttgart, Institut für Siedlungswasserbau, Wassergüte und Abfallwirtschaft (ISWA). http://www.iswa.unistuttgart.de/afw/aktuelles/tagungen/tagungen_download/03-12-Studie_Lebensmittel_Factsheet.pdf
8. Met Office Hadley Centre for Climate Prediction and Research (2015) <http://www.metoffice.gov.uk/climate-change/resources/hadley>

INTERNET RESOURCES

1. <http://www.ngo.org.ua>
2. <http://proeko.visit.net/>
3. <http://www.dossier.Kiev.ua>
4. <http://www.rek-Kiev.org.ua>
5. <http://wjwwerm.com/>