SYLLABUS OF AN ACADEMIC DISCIPLINE

Agroecology

Academic degree – Bachelor's
Specialty "H1- Agronomy"
Academic program Agronomy

Year of study 1, semester 2
Form of study Full-time (full-time, part-time**)**
Number of ECTS credits 3
Language(s) of instruction English (Ukrainian, English, German)

Lecturer of the discipline	**PhD, associated professor Kravchenko O.O.**
Lecturer's contact information (e-mail)	**olha_kravchenko@nubip.edu.ua**
URL of the e-learning course on the NULES e-learning portal	

ACADEMIC DISCIPLINE DESCRIPTION

(up to 1000 symbols)

Discipline forms students a holistic view of the phenomena and processes in the agricultural sphere, to master new approaches, principles and methods of conducting ecologically balanced agriculture, to get familiar with the means of reproducing the productivity of modern agricultural landscapes and to ensure the production of ecologically safe products and formation of ecological awareness.

Objectives:

- provision of knowledge about methods and means of increasing the productivity of agroecosystems and reducing the negative impact on the environment;

- study of the main properties, structure and functioning of agrobiogeocenoses as artificial ecosystems.

- understanding the principles of ecologically balanced agriculture;

- mastering methods for assessing the ecological state of agroecosystems and its components

Competences of the discipline:

Integral competence (IC): The ability to solve complex tasks and problems in the field of veterinary medicine, which involves conducting research and/or implementing innovations and is characterized by the uncertainty of conditions and requirements.

General competences (GC):
GC 7. Ability to apply knowledge in practical situations;
GC 8. Skills of performing safe activities;
GC 11. Efforts to preserve the environment

Special (professional) competences (SC): SC 7. Ability to organize and conduct laboratory and special diagnostic studies and analyze their results, SC 9. Ability to manage complex actions or projects, responsibility for decision-making in specific production conditions.

Expected Learning Outcomes (ELO):

ELO 9. To have at the operational level the methods of observation, description, identification, classification, as well as cultivation objects and maintaining the stability of agrocenoses with conservation of

natural diversity;

ELO 10. Analyze and integrate knowledge from general and special professional training to the extent necessary for specialized professional work in the field of agronomy;

ELO 11. To initiate an operational and expedient solution production problems according to zonal conditions;

ELO 13. Design and organize cultivation activities high-quality agricultural products

ACADEMIC DISCIPLINE STRUCTURE

Topic	**Hours** (lectures/laboratory, practical, seminars)	**Learning outcomes**	**Tasks**	**Assessment**
Module №1. **Agroecosystems and their natural-resource potential**				
Topic #1. Scientific bases of agroecology. The purpose and tasks of discipline studying	2/1/8	To know: the place of agroecology among the main natural sciences, the main purpose and tasks of agroecology To form ecological awareness To understand: the importance of studying agroecology in the system of training future bachelors in agronomy	To do "Practical training 1.1 The basic concepts and laws of agroecology, and their practical implementation" To do "Independent. Study 1.1 Assessing the ecological state of your area of residence"	**10** **5**
Topic #2. "Agroecosystems: Structural and Functional Organization and the Role of Abiotic Factors in Their Functioning"	2/3/10	To know: the main problem of Ukrainian agricultural sector To analyze biogeochemical cycles of elements and their most important compounds To be able to give the agroecological characteristics of crops	To do **Practical training 1.2** "Ecological bases of Crop rotation" To do **Practical training 1.3** "The influence of abiotic factors on the growth and development of plants. Agroecological characteristics of agricultural crops" To do **Independent study 1.2** for "Biogeochemistry of trace elements and agrochemicals (Academic search)"	**10** **5** 15
Topic #3-4. "Biotic Components and Their Interactions in Agroecosystem"	3/3/12	To understand the influence of various biotic factor on the stability of agroecosystems.	To do **Practical Training 1.4** "Response and adaptation of crops to Air pollution" To do **Practical Training** 1.5 "Modeling of agroecosystems contamination by radionuclides"	**20** **15**
Total hours **(module 1)**	**7/7/28**			
			Total points of lab work for the first module	**80**
			Module test	**20**
			Total points for module 1	**100**

Module №2. **Theoretical and methodological principles of agroecological monitoring**				
Topic #5. Ecological Aspects of Pesticide and Agrochemical Use	2/1/10	To analyze the safety of products based on the indicator of nitrate content To be able to calculate and assess toxicity of pesticides	**To do Independent study 2.1** "Assessment of the effectiveness and ecological safety of pesticides"	**10**
Topic #6. The Biological Approach to Environmental Assessment. Biomonitoring and bioindication	1/2/6	To be able to give the ecological assessment of soil	To do **Practical tratining 2.1** Determination of total water hardness, concentration of Calcium and Magnesium in irrigation water To do **Practical training 2.2** "Determination of water mineralization (TDS) in irrigation water"	**12** **8**
Topic #7. Bioassay: an important tool for evaluating ecological safety	4/4/8	To know: the importance the water quality in agriculture	To do **Practical training 2.3** "Assessment of Water Quality for Irrigation" To do **Practical training 2.4** "Assessment of Pesticides Toxicity Using the Allium-Test "	**20** **20**
Topic #8. Ecological certification and labeling of agricultural production	2/1/8	Be able to evaluate the toxicity of environmental to biota using biological methods determine and manage the processes that occur during complex formation	To do **Independent study 2.2 "**Determination of the cumulative properties of pesticides"	**10**
Total hours (module 2)	**8/8/32**			
			Total points of lab work for the second module	**80**
			Module test	**20**
			Total points for module 2	**100**
Total hours of whole course	**15/15/60**			
Total amount of point				
Total of educational course				**70**
Examination				**30**
Total for the course				**100**

ASSESSMENT POLICY

Deadlines and exam retaking policy:	Works that are submitted late without valid reasons will be assessed with a lower grade. Module tests may be retaken with the permission of the lecturer if there are valid reasons (e.g. a sick leave).
Academic integrity policy:	Cheating during tests and exams is prohibited (including using mobile devices). Term papers and essays must have correct references to the literature used
Attendance policy:	Attendance is compulsory. For good reasons (e.g. illness, international internship), training can take place individually (online by the faculty dean's consent)

SCALE FOR ASSESSING STUDENTS 'KNOWLEDGE AND SKILLS

Student's rating, points	**National grading of exams and credits**	
	exams	**credits**
90-100	excellent	pass
74-89	good	
60-73	satisfactorily	
0-59	unsatisfactorily	fail

RECOMMENDED SOURCES OF INFORMATION

Technology and methodological requirements

1. Methodological guidelines "Inorganic and analytical chemistry for bachelor students specialty 201 – "Agronomy". Voitenko L.V., Kopilevich V.A., Prokopchuk N.M. Savchenko D.A., Kravchenko O.O. – Kyiv: Експо-Друк., 2022. - 219 p..

Required and recommended literature

1. Gliessman, S. R. (2021). Package price agroecology: The ecology of sustainable food systems. CRC press
2. Voitenko L. Chemistry with the foundations of biogeochemistry: manual. Kyiv: Naukova stolytsa, 2019. 400 p. (In Ukrainian).
3. Gliessman, S. R., Méndez, V. E., Izzo, V. M., & Engles, E. W. (2022). Agroecology: Leading the transformation to a just and sustainable food system. CRC Press.

Supplemental

1. McCune, N., & Rosset, P. (2021). 48. Agroecology. Handbook of Critical Agrarian Studies, 438.

IT resources

1. Ecology of agrosphere (handbook): https://www.agroeco.org.ua/wp-content/uploads/Publications/ecology_agrosphere.pdf
2. SEGAE: a serious game to learn agroecology https://www.segae.org/game/
3. Global Fertilizer impact monitor http://bit.ly/3Z50lDS