

**Evaluation tools
for the course “Pharmaceutical Ecology” for students
admitted in 2024 in the educational program 33.05.01 Pharmacy,
specialization (profile): Pharmacy (Specialist Degree Program),
full-time mode of study for the 2026–2027 Academic Year**

1. Assessment tools for conducting ongoing monitoring in classes (TC), assessing the independent study of students (IS), conducting intermediate assessment (IA), allowing to check the development of students' knowledge (k) / skills (s) / abilities (ZUN) as provided by the discipline program:

UK-8.1.1. Understands the effects of harmful and hazardous factors on the human and animal body and the natural environment; methods and techniques for protecting against harmful and hazardous factors in everyday life and professional activities.

Results of mastering the educational program (competencies)	Indicators of Competency Achievement	Learning outcomes for the discipline
UK-1. Capable of carrying out a critical analysis of problematic situations based on a systems approach and developing an action strategy	UK-1.1 Knows: UK-1.1.1 Knows the historical milestones of society's development; the basic principles and methods of critical analysis and evaluation of modern scientific and practical achievements.	z-1. Knows the basic concepts in the field of modern ecology, the procedure for collecting, storing, searching, processing, transforming, and disseminating information on environmental factors, and the use of information computer systems.

N o.	Section(s), subsection(s) of the discipline (modules, modular units), forming this knowledge, skills and abilities	Task type	Task content	Correct answer	What type of control is it intended for?		
					TC	IS	IA

1.	Module 1. History of ecology, pharmaceutical ecology, and its relationship with environmental sciences. Modular unit 1. History of ecology, pharmaceutical ecology, and its relationship with environmental sciences .	1. Selecting multiple correct answers	Choose three correct answers out of six. What actions are included in the process of processing environmental information? (Select all correct options) 1) storage; 2) retrieval; 3) analysis; 4) deletion.	1) storage; 2) retrieval; 3) analysis;	Yes	No	No
		2. Situational tasks/cases	1. Name the three main stages of working with environmental information.	collection processing distribution.	Yes	No	No

PC – 5.1.1. Knows the principles and methods of personnel management; job responsibilities of the medical personnel at the laboratory's disposal.

Results of mastering the educational program (competencies)	Indicators of Competency Achievement	Learning outcomes for the discipline
UK-1. Capable of carrying out a critical analysis of problematic situations based on a systems approach and developing an action strategy	UK-1.2 Can : UK-1.2.1 Able to collect and summarize data on current issues, including those related to the professional field, search for information and solutions based on actions, experimentation, and experience; analyze a problem situation as a system, identifying its components and the connections between them.	U-1. Able to use educational, scientific, popular science literature, the Internet for professional activities; use laboratory equipment, work with instruments.

N o.	Section(s), subsection(s) of the discipline (modules, modular units), forming this knowledge, skills and abilities	Task type	Task content	Correct answer	What type of control is it intended for?		
					TC	IS	IA
2.	Module 2. General Ecology. Unit 2. Environmental Factors. Basic Ecological Laws. Physical, chemical, biotic, and anthropogenic factors, examples, and patterns of action of the basic ecological laws. Module 3. Habitats. The theory of the biosphere . Terrestrial, aerial, aquatic, soil, and intraorganismal habitats. Key characteristics. The biosphere: structure, fundamental laws, and man's place within it. Module 4. Adaptations of organisms to the environment and habitat conditions. Module 5. The organism as a living, integrated system. Levels of biological organization as objects of study in ecology. Trophic levels:	1. Selecting multiple correct answers	What skills are needed to work in a laboratory? (Select all correct options) 1) working with equipment; 2) analyzing literature; 3) maintaining records; 4) cleaning the premises. 5) restriction of access to information; 6) use of non-discriminatory	1) working with devices; 2) literature analysis; 3) maintaining documentation;	Yes	No	No
		2. Situational tasks/cases	Name two sources of information for professional development.	educational literature.	Yes	No	No

	concept and ecological functions.						
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PC – 5.2.1. Able to organize the activities of medical laboratory personnel; perform internal quality control of the activities of medical laboratory personnel at their disposal.

Results of mastering the educational program (competencies)	Indicators of Competency Achievement	Learning outcomes for the discipline
UK-1. Capable of carrying out a critical analysis of problematic situations based on a systems approach and developing an action strategy	UK-1.3 Owns: UK-1.3.1 Possesses experience in forming value judgments in solving problematic, including professional, situations; the skill of developing a strategy for achieving a set goal as a sequence of steps, anticipating the outcome of each of them and assessing their impact on the external environment of the planned activity and on the relationships of the participants in this activity.	n-1. Possesses skills in making evaluative judgments regarding anthropogenic impacts on the environment and preventative technologies for the prevention of non-communicable diseases, including identifying cause-and-effect relationships in the system "human environmental factors - human health" and the use of non-discriminatory approaches in public information and education work on environmental safety issues.

N o.	Section(s), subsection(s) of the discipline (modules, modular units),	Task type	Task content	Correct answer	What type of control is it intended for?		
					TC	IS	IA

	forming this knowledge, skills and abilities						
3.	Module 3. Human Ecology. Unit 6. Nutritional Ecology. Xenobiotics in Food: Environmental Causes and Health Consequences. Unit 7. Nutrition ecology. Characteristics of dietary supplements (DS), analysis of individual ingredients, safety assessment and use; public health implications.	1. Selecting multiple correct answers	What measures are related to the prevention of non-communicable diseases? (Select all correct options) 1) informing the population; 2) identifying cause-and-effect relationships; 3) restricting access to information; 4) using non-discriminatory approaches. 5) cleaning the premises. 6) documentation maintenance;	1) informing the population; 2) identifying cause-and-effect relationships; 4) using non-discriminatory approaches.	Yes	No	No
		2. Situational tasks/cases	Name the key factor in human health.	environment.	Yes	No	No

Results of mastering the educational program (competencies)	Indicators of Competency Achievement	Learning outcomes for the discipline
UK-1. Capable of carrying out a critical analysis of problematic situations based on a	UK-5.3 Owns: UK-5.3.1 Possesses the skills of selecting value guidelines and a civic position;	N-1. Proficient in preventative technologies for developing environmental awareness among various population groups, including identifying cause-and-

systems approach and developing an action strategy	reasoned discussion and resolution of problems of an ideological, social, and personal nature; creation of a non-discriminatory environment for productive interaction in a professional environment, taking into account national, ethnocultural, and religious characteristics; skills in overcoming communicative, educational, ethnic, religious, and other barriers in the process of intercultural interaction.	effect relationships in the "human environmental factors - human health" system and using non-discriminatory approaches in public outreach on environmental safety issues.
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N o.	Section(s), subsection(s) of the discipline (modules, modular units), forming this knowledge, skills and abilities	Task type	Task content	Correct answer	What type of control is it intended for?		
					TC	IS	IA
4.	Module 3. Human Ecology. Unit 6. Nutritional Ecology. Xenobiotics in Food – Environmental Causes and Health Consequences. Unit 7. Nutritional Ecology. Characteristics of Dietary Supplements (DS), analysis of individual DS	1. Selecting multiple correct answers	What methods are used to generate environmental knowledge? (Select all correct options) 1) identifying cause-and-effect relationships; 2) non-discriminatory approaches; 3) limiting information; 4) informing the public. 5) architectural; 6) economic.	1) identification of cause-and-effect relationships; 2) non-discriminatory approaches; 4) informing the population.	Yes	No	No

	Ingredients, safety assessment and use; public health implications.	2. Situational tasks/cases	What is the main goal of educational work?	environmental safety.	Yes	No	No
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Results of mastering the educational program (competencies)	Indicators of Competency Achievement	Learning outcomes for the discipline
UK-8. Capable of creating and maintaining safe living conditions in everyday life and professional activities to preserve the natural environment and ensure sustainable development of society, including during the threat and occurrence of emergency situations and military conflicts.	UK-8.1 Knows: UK-8.1.1 Knowledge of the consequences of exposure to harmful and hazardous factors on the human and animal body and the natural environment; methods and means of protection against harmful and hazardous factors in everyday life and in professional activities.	Z-1. Knowledge of basic concepts of environmental factors, modern requirements for planning and development, ecological, hygienic, and anti-epidemic regimes of pharmacies, methods for assessing environmental and industrial factors, and the consequences of exposure to harmful and hazardous factors on the human and animal body and the natural environment.

No.	Section(s), subsection(s) of the discipline (modules, modular units), forming this knowledge, skills and abilities	Task type	Task content	Correct answer	What type of control is it intended for?		
					TC	IS	IA
5.	Module 5. Nature Management and Environmental Protection. Module 15. Environmental Monitoring. Environmental Risk, Assessment, and	1. Selecting multiple correct answers	What requirements are important for pharmacies? (Select all correct options) 1) ecological and hygienic; 2) anti-epidemic;	1) ecological and hygienic; 2) anti-epidemic; 3) architectural	Yes	No	No

	Management. Module 16. Industrial Environmental Monitoring Program, Procedure and Deadlines for Submitting a Report on the Organization and Results of Industrial Environmental Monitoring. Module 17. Excursion "Diversity of Spore and Gymnosperm Plants of the Volgograd State Agricultural Pedagogical University Botanical Garden, Methods of Plant Introduction and Protection." Module 18. Environmental problems of the Volgograd region, solutions – round table.		3) architectural; 4) economic. 5) non-discriminatory approaches; 6) limitation of information;				
		2. Situational tasks/cases	Name the main object of assessment in ecology.	environmental factors.	Yes	No	No

Results of mastering the educational program (competencies)	Indicators of Competency Achievement	Learning outcomes for the discipline
UK-8. Capable of creating and maintaining safe living conditions in everyday life and professional activities to preserve the natural environment and ensure sustainable	UK-8.2 Can: UK-8.2.1 Able to make decisions to ensure security in various situations, including during the threat and occurrence of emergency situations and	U-1. Able to make decisions to ensure safety in various situations, including in the event of a threat or emergency caused by the consequences of the

development of society, including during the threat and occurrence of emergency situations and military conflicts.	military conflicts.	influence of anthropogenic factors on the environment (atmospheric air, water bodies, and soil)
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N o.	Section(s), subsection(s) of the discipline (modules, modular units), forming this knowledge, skills and abilities	Task type	Task content	Correct answer	What type of control is it intended for?		
					TC	IS	IA
6.	Module 5. Nature Management and Environmental Protection. Module 15. Environmental Monitoring. Environmental Risk, Assessment, and Management. Module 16. Industrial Environmental Monitoring Program, Procedure and Deadlines for Submitting a Report on the Organization and Results of Industrial Environmental Monitoring. Module 17. Excursion "Diversity of Spore and Gymnosperm Plants of the Volgograd State Agricultural Pedagogical University Botanical Garden, Methods of Plant Introduction and	1. Selecting multiple correct answers	What objects are subject to anthropogenic impact? (Select all correct options) 1) atmospheric air; 2) water bodies; 3) soil; 4) buildings. 5) medical equipment; 6) food waste.	1)atmospheric air; 2)water bodies; 3)soil;	Yes	No	No
		2. Situational tasks/cases	What is the main goal in an emergency?	ensuring security.	Yes	No	No

	Protection." Module 18. Environmental problems of the Volgograd region, solutions – round table.						
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7. Questions to prepare for the intermediate assessment:

1. Pharmaceutical ecology: definition, goals, and objectives. Its place in the system of environmental knowledge.
2. The history of the formation and development of scientific environmental knowledge. The emergence of ecology as a complex interdisciplinary science.
3. The development of V.I. Vernadsky's teaching on the biosphere. Functions of living matter in the biosphere (according to V.I. Vernadsky). The concept of the noosphere.
4. The great circulation of substances in nature.
5. Biological circulation of substances in nature.
6. The minor circulation of substances in nature - what functions in nature does it provide?
7. Biogeochemical cycles of substances are the most vital for the biosphere (O₂, C, S, N).
8. The habitat of modern man (according to N.F. Reims).
9. Physical and chemical methods, methods of applied statistics used in environmental research.
10. Field and laboratory methods of environmental research.
11. Instruments used in environmental research.
12. Levels of biological organization and ecology. The organism as an integral system.
13. The concepts of population, ecotype, biocenosis, biotope and biogeocenosis
14. Concepts of biogeocenosis. Biogeocenosis diagram.
15. Intraspecific and interspecific interactions as the basis for the existence of biocenoses
16. Trophic levels: autotrophic and heterotrophic organisms; producers, consumers, reducers and their role in metabolism and energy
17. Environmental factors. Types of environmental factors. Environmental factors affecting living organisms. Classification.
18. Patterns of influence of environmental factors on the body: the rule of optimum; the rule of minimum; Shelford's tolerance rule.

19. Patterns of influence of environmental factors on the organism: the rule of two levels of adaptation; ambiguity of the influence of a factor on various functions of the organism; the rule of interaction of factors; the law of ecological duplication.
20. Adaptation of the organism to environmental factors. Basic laws and rules of adaptation.
21. The main mechanisms of formation of adaptations at the organism level.
22. Features of adaptation of organisms to different living environments. Adaptation of plants to light and temperature conditions.
23. Anthropogenic factors – definition. Environmental consequences of the influence of anthropogenic factors on the natural environment.
24. Modern environmental problems and ways to overcome them.
25. The impact of chemicals on public health. Routes of chemical entry into the body.
26. Xenobiotics: definition and classification. Routes of xenobiotic entry into food.
27. Food additives. Standardization and quality control system for food additives.
28. Biologically active food supplements (BAFs). Procedure for establishing the safety of dietary supplements.
29. Ecology of nutrition: Basic regulatory documents concerning the production, quality control and use of food additives; general principles for assessing the effectiveness, safety and quality of food additives.
30. Environmental pollution - definition, indicate its types and objects of pollution
31. The main anthropogenic (technogenic) pollutants of the atmosphere, methods of their analysis.
32. The main anthropogenic (technogenic) pollutants of the hydrosphere, methods of their analysis
33. The main anthropogenic (technogenic) pollutants of the lithosphere and medicinal plant materials, methods of their analysis;
34. The main anthropogenic (technogenic) pollutants and pollution associated with the production of pharmaceuticals and chemicals, areas of prevention.
35. The main consequences of air pollution: acid rain, ozone layer depletion, greenhouse effect – characteristics of the cause and conditions of occurrence.
36. Main groups of measures for atmospheric air protection, purpose, characteristics.
37. Wastewater – definition, Mechanical and biological wastewater treatment: concept, main stages and methods, their characteristics.
38. Main types of anthropogenic impact on soils. Main soil pollutants.
39. What is land degradation and what are its causes?
40. "Soil erosion" - give a definition, list the types of erosion processes.
41. "Desertification" - give a definition, indicate the reasons.
42. Chemical and pharmaceutical enterprises and pharmacy organizations as sources of environmental pollution.
43. Environmental safety and technology in pharmaceutical and chemical production: concepts, examples.

44. Environmental protection organizations in industrial, including chemical and pharmaceutical enterprises; the tasks of these organizations; concepts of maximum permissible concentrations of pollutants in the atmosphere, hydrosphere, soil, medicinal plant materials, as well as their hazard classes.
45. Natural conditions and nature management: concepts, types of nature management, examples of nature management in the Volgograd region.
46. Natural resources Classification of natural resources, examples of natural resources of the Volgograd region.
47. Natural resource potential of the region: concept, characteristics.
48. Natural resources, features of resource management on the model of the Volgograd region
49. Rational and irrational use of natural resources: concepts.
50. General principles of rational nature management.
51. Environmental monitoring: concept, types of monitoring, and goals and objectives of environmental monitoring.
52. Environmental risks: concept and types. Public health risk assessment – content and stages.
53. Sanitary and hygienic monitoring: concept, goals and objectives, importance for public health protection.
54. Objectives and general principles of environmental protection.
55. Environmental assessment: concept, purpose, content.
56. Industrial environmental control program – goals and objectives, main content.
57. Industrial environmental monitoring program – procedure and deadlines for submitting a report on the organization and results of industrial environmental monitoring. Specialist duties.
58. Achievements of environmental science and practice, concepts for the development of environmental protection, including the protection of medicinal plants, environmental legislation.
59. Basic principles of environmental protection.
60. Specially protected areas: concept, functions, use.

3. Example of a ticket for intermediate assessment:

Federal State Budgetary Educational Institution of Higher Education

Volgograd State Medical University

Ministry of Health of the Russian Federation

Department of General Hygiene and Ecology, N.P. Grigorenko Institute of Health

Discipline: Pharmaceutical Ecology

Specialist in specialty 33.05.01 Pharmacy, focus (profile) Pharmacy

Academic year: 2026-2027

No. 1

1. Natural resources Classification of natural resources, examples of natural resources of the Volgograd region.
2. General principles of rational nature management.

Head of the Department

N.I. Latyshevskaya

The full fund of assessment tools for the discipline is available in the Electronic Information and Analysis System of the Federal State Budgetary Educational Institution of Higher Education Volgograd State Medical University of the Ministry of Health of the Russian Federation.

Considered at a meeting of the Department of General Hygiene and Ecology of the N.P. Grigorenko Institute of Public Health, Minutes №10 of May 29th, 2026.

Head of the Department

A handwritten signature in blue ink, consisting of stylized cursive letters, positioned above a horizontal line.

N.I. Latyshevskaya