

Federal State Budgetary Educational Institution of Higher Education
"Privolzhsky Research Medical University"
Ministry of Health of the Russian Federation



APPROVED

Vice-Rector for Academic Affairs

E.S. Bogomolova

31 August 2021

WORKING PROGRAM

Name of the academic discipline: **PHARMACEUTICAL ECOLOGY**

Specialty: **33.05.01 PHARMACY**

Qualification: **PHARMACIST**

Department: **HYGIENE**

Mode of study: **FULL-TIME**

Labor intensity of the academic discipline: **72 academic hours**

Nizhny Novgorod
2021

The working program has been developed in accordance with the Federal State Educational Standard for the specialty 33.05.01 PHARMACY, approved by Order of the Ministry of Science and Higher Education of the Russian Federation No. 219 of March 27, 2018.

Developers of the working program:

Maksimenko E.O., Ph.D. in Medical Sciences, associate professor of the Department of Hygiene

The program was reviewed and approved at the department meeting (protocol No.01 June 2021, date)

Head of the Department,
Doctor of Medical Sciences



(signature)

E. S. Bogomolova

01 June 2021

AGREED

Deputy Head of EMA ph.d. of biology  Lovtsova L.V.

(signature)

01 June 2021

1. The purpose and objectives of mastering the academic discipline Pharmaceutical Ecology (hereinafter – the discipline):

1.1. The purpose of mastering the discipline:

the formation of students' modern ideas about relationships between the biosphere and society, understanding the cause-and-effect relationships between the quality of the environment and man's health, acquiring knowledge and skills of individual and population prevention of environment-born diseases, proposing the environmental protection in the professional activity, introducing the principles of rational nature management, mastering a number of universal competencies (UK-1, UK-8).

1.2. Tasks of the discipline:

1. the formation of students' practical knowledge, skills and abilities to identify cause-and-effect relationships in the system "environmental factors - public health",

2. to formulate, evaluate and test hypotheses explaining the cause of the development of the disease,

3. to assess the risk to public health, identify priority problems and development of management decisions to eliminate (reduce) the negative impact of environmental factors on public health.

1.3. Requirements to the deliverables of mastering the discipline

As a result of completing the discipline, the student should

Know:

- basic concepts and laws of general ecology;
- environmental factors, their impact on the environment;
- types of natural resources, features of resource management,
- protection of the natural environment;
- technogenic pollution of the natural environment (atmosphere, hydrosphere, lithosphere);
- pollution associated with the production of medicinal and chemical substances;
- concepts of maximal allowable concentration for air, hydrosphere, and soil pollutants, as well as their hazard classes.

Be able to:

- analyze water samples from surface water at the point of discharge of industrial wastewater from chemical and pharmaceutical enterprises in accordance with standards;
- to carry out the analysis of pollutants in industrial emissions of chemical and pharmaceutical enterprises into the atmospheric air in accordance with the current standards.

Possess:

- skills in environmental assessment of air in the working area, wastewater, soil of chemical and pharmaceutical enterprises;
- skills in developing measures to prevent contamination of the working area, wastewater, soil at pharmaceutical enterprises.

2. Position of the academic discipline in the structure of the General Educational Program of Higher Education (GEP HE) of the organization.

2.1. The discipline Pharmaceutical Ecology refers to the to the part formed by the participants of educational relations), Block 1 of GEP HE (B1.UOO.4).

The discipline is taught in 7 semester/ IV year of study.

2.2. The following knowledge, skills and abilities formed by previous academic disciplines are required for mastering the discipline:

computer science, general and inorganic chemistry, biological chemistry, physiology with the basics of anatomy, pathology, microbiology, general hygiene.

2.3. Mastering the discipline is required for forming the following knowledge, skills and abilities for subsequent academic disciplines:

pharmacology, pharmaceutical chemistry, toxicological chemistry, pharmacy management and economics.

3. Deliverables of mastering the academic discipline and metrics of competence acquisition

Mastering the discipline aims at acquiring the following universal (UC) or/and general professional (GPC) or/and professional (PC) competencies

№	Competence code	The content of the competence (or its part)	Code and name of the competence acquisition metric	As a result of mastering the discipline, the students should:		
				know	be able to	possess
1.	UC-1	Ability to carry out a critical analysis of problem situations based on a systematic approach, develop an action strategy	<p>CAM-1^{UC-1.1} Analyze the problem situation as a system, identifying its components and relationships between them.</p> <p>CAM-2^{UC-1.2} Identifies gaps in information needed to solve a problem situation and designs processes to address them</p> <p>CAM-3^{UC-1.3} Critically evaluates the reliability of information sources, works with conflicting information from different sources.</p> <p>CAM-4^{UC-1.4} Develops and substantively argues a strategy for solving a problem situation based on systematic and interdisciplinary approaches Proposing a version of the solution to the problem, formulating a</p>	<p>Basic concepts and laws of general ecology, legislation on environmental monitoring. Indicators of the environment and the population health; selection of priority pollutants, risk groups of the population, areas of high risk of disorders development in public health, depending on the environment.</p>	<p>Analyze indicators for assessing the quality of the environment and the population health; calculate and analyze indicators of carcinogenic and non-carcinogenic risk to public health; evaluate the reliability of the relationship between environmental quality and public health.</p>	<p>Methodology for collecting, processing and analyzing data on environmental factors and public health; methodology for assessing the carcinogenic and non-carcinogenic risk of environmental chemicals for public health. The skills of choosing and justifying optimal measures to minimize and eliminate health risks.</p>

			hypothesis, guessing the final result.			
2.	UC-8	Ability to create and maintain safe living conditions in everyday life and in professional activities to preserve the natural environment, ensure the sustainable development of society, including in the event of a threat and emergency situations	<p>CAM-1^{UC-8.1} Analyze the factors of harmful influence on the vital activity of the elements of the environment (technical devices, technological processes, materials, buildings and structures, natural and social factors)</p> <p>CAM-2^{UC-8.2} Identification of hazardous and harmful factors within the framework of the professional activities</p> <p>CAM-3^{UC-8.3} Resolves issues related to safety violations and participates in emergency prevention activities in the workplace</p> <p>CAM-4^{UC-8.4} Observes and explains the rules of conduct in case of emergencies of natural and man-made origin, provides first aid</p>	Goals, objectives, legislative documents that determine the organization of environmental monitoring; environmental legislation. Indicators of the state of the environment and the health of the population; selection of priority pollutants, risk groups of the population, areas of high risk of developing health disorders; methods for establishing cause-and-effect relationships between the level of environmental factors and public health; main provisions of the methodology of risk analysis for human health.	Use legislative and regulatory documents to organize and ensure the work of medical, environmental and socio-hygienic monitoring; Develop, justify medical and preventive measures and make management decisions aimed at maintaining population health	Skills for organizing interaction and data exchange between participants in medical, environmental and socio-hygienic monitoring; The skills to perform the ranking of risk factors for public health, the choice and justification of optimal measures to minimize and eliminate health risks.

4. Sections of the academic discipline and competencies that are formed when mastering them

№	Competence code	Section name of the discipline	The content of the section in teaching units
1.	UC-1 UC-8	Fundamentals of ecology	<p>1. Fundamentals of ecology, nature conservation and environmental problems of nature management. Environmental legislation.</p> <p>2. Fundamentals of regulation of chemicals in environmental objects. Environmental risk. Diseases associated with adverse environmental factors.</p> <p>3. Research methods used in ecology. Bioindication and biotesting of pollutants in environmental objects. Environmental monitoring.</p> <p>4. Prevention of ecologically caused and ecologically dependent violations in the state of public health.</p>
2.	UC-1 UC-8	Medical ecology	<p>1. Atmospheric air as a biosphere factor. Sources of air pollution. Environmental protective measures. Diseases associated with high air</p>

		<p>pollution.</p> <p>2. Soil as a biosphere factor. Sources of soil pollution. Soil protection from pollution by industrial waste. Damaging effects on human health.</p> <p>3. Water as a biosphere factor. Sources of water pollution. Protection of water sources from pollution by industrial wastes. Diverse health effects.</p> <p>4. Hygienic requirements, physical and chemical methods for studying the composition of wastewater from chemical and pharmaceutical enterprises. Waste water treatment methods.</p> <p>5. Environmental safety of food. Food-born diseases.</p>
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5. Volume of the academic discipline and types of academic work

Type of educational work	Labor intensity		Labor intensity (AH) in semesters
	volume in credit units (CU)	volume in academic hours (AH)	
			7
Classroom work, including	1,22	44	44
Lectures (L)	0,28	10	10
Laboratory practicum (LP)*	-	-	-
Practicals (P)	0,94	34	34
Seminars (S)	-	-	-
Student's individual work (SIW)	0,78	28	28
Mid-term assessment			
credit			
TOTAL LABOR INTENSITY	2	72	72

6. Content of the academic discipline

6.1. Sections of the discipline and types of academic work

№	Name of the section of the academic discipline	Types of academic work* (in AH)					
		L	LP	P	S	SIW	total
1.	Fundamentals of ecology	4	-	16	-	12	32
2.	Medical ecology	6	-	18	-	16	40
	TOTAL	10	-	34	-	28	72

* - L – lectures; LP – laboratory practicum; P – practicals; S – seminars; SIW – student's individual work.

6.2. Thematic schedule of educational work types:

6.2.1 Thematic schedule of lectures

№	Name of lecture topics	Volume in AH
		7 semester
1.	Global challenges of our time	2
2.	Public health is the intergrated criterion of the environment.	2
3.	Air is a factor of biosphere, sources of air pollution. Ecological problems of cities.	2
4.	Water is a factor of biosphere. Protection of water sources from pollution by industrial waste.	2
5.	Ecological and hygienic safety of food	2
	TOTAL (total - 10 AH)	10

6.2.2. The thematic plan of laboratory practicums isn't stipulated.

6.2.3. Thematic plan of practicals

№	Name of the topics of practicals	Volume in AH
		7 semester
1.	Outdoor air pollution and human health effects. Bioindication and biotesting	5
2.	Ionizing radiation: human effects and radiation protection	5
3.	Drinking water: risk factors, health effects and preventive measures	5
4.	Sewage water of chemical and pharmaceutical enterprises. Wastewater treatments methods	5
5.	Assessment influence of chemical production factors on the workers' health	5
6.	Hygienic assessment of food quality and safety	5
7.	Risk assessment of environmental chemical exposure to human health	4
	TOTAL (total - 34 AH)	34

6.2.4. Thematic plan of seminars isn't stipulated.

6.2.5. Types and topics of student's individual work (SIW)

№	Types and topics of SIW	Volume in AH
		7 semester
1.	Reading a textbook, additional literature	2
2.	Working with lecture notes	3
3.	Working with dictionaries and reference books	3
4.	Working with regulatory documents	2
5.	Work with electronic educational resources, Internet	2
6.	Answers to questions (MCQ)	3
7.	Analytical text processing (abstracting)	2
8.	Solution of situational tasks	3
9.	Preparation of messages for the speech, abstracts, reports	4
10.	Working with a video recording of a lecture	4
	TOTAL (total – 28 AH)	28

7. Types of assessment formats for ongoing monitoring and mid-term assessment

№	Semester No.	Types of control		Name of section of academic discipline	Competence codes	Assessment formats		
						types	number of test questions	number of test task options
1.	7	Current monitoring	Control of mastering the topic	Fundamentals of ecology	UC-1 UC-8	MCQ Theoretical questions	20 2	not limited 10
			Monitoring the student's individual work			Situational tasks	1	15
2.	7	Current monitoring	Control of mastering the topic	Medical ecology	UC-1 UC-8	MCQ Theoretical questions	20 2	not limited 10

			Monitoring the student's individual work			Situational tasks	1	15
3.	7	Mid-term assessment	Credit	Fundamentals of ecology. Medical ecology	UC-1 UC-8	MCQ Situational tasks	20 1	not limited 15

8. Educational, methodological and informational support for mastering the academic discipline (printed, electronic publications, the Internet and other network resources)

8.1. Key literature references

№	Name according to bibliographic requirements	Number of copies	
		at the department	in the library
1.	Educational and methodological textbook for practical classes on hygiene: tutorial / E.A.Shashina, V.V.Makarova. – M.: Geotar-Media, 2020. – 208 p.: il.	3	197
2.	Pharmaceutical Ecology: textbook/ed. G.V.Ramenskaya. – Moscow: Geotar-Media, 2022. – 312 p.	3	10

8.2. Further reading

№	Name according to bibliographic requirements	Number of copies	
		at the department	in the library
1.	Basic environmental health: textbook / A.Yassi, T.Kjellstrom. – Oxford University Press, 2001. – 440 p.	1	3
2.	Environmental health: tutorial / L.I.Aronova, E.N. Gus'kova, S.V. Plotnova, T.G. Shirokogorova . - NNSMA. - N. Novgorod : Publishing house NNSMA, 2017. - 102 p. - ISBN 9785703211861.	10	97 http://nbk.pimunn.net/ProtectedView/Book/ViewBook/2935
3.	Food Hygiene : tutorial / U.A.Pfarger, V. S. Kaveshnikov, V.N. Serebryakova [et al.]. - Tomsk: Publishing house SSMU, 2018. - 132 p.	-	URL: https://www.books-up.ru/ru/read/food-hygiene-7637970/

8.3. Electronic educational resources for teaching academic subjects

8.3.1. Internal Electronic Library System of the University (IELSU)

№	Name of the electronic resource	Brief description (content)	Access conditions	Number of users
1.	Internal Electronic Library System of the University	Primary prophylaxis in children : A training manual / Bogomolova E.S., Ashina M.V., Badeeva T.V., Kiseleva A.S., Maksimenko E.O., - Nizhny Novgorod : Publishing House of Privolzhsky Research Medical University, 2021. – 88 p. – ISBN 978-5-7032-1390-2. – EDN WQXXEN	Access by individual login and password from any computer and mobile device	Not limited

8.3.2. Electronic educational resources acquired by the University

<i>№</i>	<i>Name of the electronic resource</i>	<i>Brief description (content)</i>	<i>Access conditions</i>	<i>Number of users</i>
1.	Electronic Library "Student Consultant"	Textbooks and training manual for higher medical and pharmaceutical education	Access by individual login and password from any computer and mobile device	Not limited
2.	Database "Electronic Library System "Bookup"	Educational and scientific medical literature	Access by individual login and password. From university computers - access is automatic.	Not limited
3.	«Scientific Electronic Library eLIBRARY»	Electronic medical magazines	Access - from the computers of the university	Not limited

8.3.3 Open access resources

<i>№</i>	<i>Name of the electronic resource</i>	<i>Brief description (content)</i>	<i>Access conditions</i>
1.	BooksMed.com (https://booksmed.com/gigiena)	Medical online library. The site has a collection of educational and practical medical literature. In the online library, it is possible to search for works alphabetically.	http://www.booksmed.com/gigiena/62-obshhaya-gigiena-bolshakov-novikova.html

9. Material and technical support for mastering an academic discipline

9.1. List of premises for classroom activities for the discipline

1. Lecture hall with multimedia equipment
2. Classroom for practical of food, air, soil and water hygiene, occupational (pharmacy) hygiene.
3. Laboratory for assessment of water, soil, food.

9.2. List of equipment for classroom activities for the discipline

Devices: water distiller, gas analyzer, Testo-415 air velocity and temperature meter, IVA-6A temperature and humidity meter, hair hygrometers, psychrometric VIT-2, August psychrometer, Assmann aspiration psychrometer, UG-2 universal gas analyzer, sets of indicator tubes, electric aspirator (model 822), AERA aspirator, liquid rheometers, Zaitsev, Polezhaev, Petri, Richter absorbers, filters, ashless paper, plastic cartridges, rubber tubes, sorption tubes, gas pipettes, sound level meter and vibrometer, cup anemometers, vane anemometers, aneroid barometer, recorders - thermograph, barograph, hygrograph, Argus-01 light meter, light meter - TKA-01 UV-meter, pH meter Ecotest 2000, Krotov's device, Petri dishes, scales, flasks, beakers, funnels, glass capillaries, pipettes, reagent kits, electric stoves, scales and sets of weights, tape measure, measuring tape, rulers.

Drawings of plants-bioindicators, maps - lichenological map of Nizhny Novgorod, map "Organization of monitoring of atmospheric air quality and health status of the children's population of Nizhny Novgorod", map "Assessment of total atmospheric air pollution in Nizhny Novgorod", maps of areas of prevalence of iodine deficiency conditions.

Computers, laptops, multimedia projectors, plasma TVs.

9.3. A set of licensed and freely distributed software, including domestic production

Item no.	Software	number of licenses	Type of software	Manufacturer	Number in the unified register of Russian software	Contract No. and date
1	Wtware	100	Thin Client Operating System	Kovalev Andrey Alexandrovich	1960	2471/05-18 from 28.05.2018
2	MyOffice is Standard. A corporate user license for educational organizations, with no expiration date, with the right to receive updates for 1 year.	220	Office Application	LLC "NEW CLOUD TECHNOLOGIES"	283	without limitation, with the right to receive updates for 1 year.
3	LibreOffice		Office Application	The Document Foundation	Freely distributed software	
4	Windows 10 Education	700	Operating systems	Microsoft	Azure Dev Tools for Teaching Subscription	
5	Yandex. Browser		Browser	«Yandex»	3722	
6	Subscription to MS Office Pro for 170 PCs for FGBOU VO "PIMU" of the Ministry of Health of Russia	170	Office Application	Microsoft		23618/HN10 030 LLC "Softline Trade" from 04.12.2020

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Ministry of Health of the Russian Federation
(FSBEI HE "PRMU" of the Ministry of Health of Russia)

Department of Hygiene

CHANGE REGISTRATION SHEET

working program for the academic discipline
PHARMACEUTICAL ECOLOGY

Field of study / specialty / scientific specialty: **33.05.01 PHARMACY**

Training profile: _____
(name) - for master's degree programs

Mode of study: FULL_TIME

Position	Number and name of the program section	Contents of the changes made	Effective date of the changes	Contributor's signature
1				

Approved at the department meeting
Protocol No. _____ of _____ 20__

Head of the Department,

Doctor of Medical Sciences

E. S. Bogomolova

(signature)

_____ 20__