



## Syllabus of discipline «Hygiene in Pharmacy and Ecology»

<b>1. General information</b>	
<b>Name of the faculty</b>	Department of foreign students
<b>Educational program</b> <i>(branch, specialty, higher education level, form of education)</i>	22 Health Care, 226 Pharmacy Second (Master's) higher education level, full-time
Academic year	2022-2023
<b>Name of the discipline, code</b> <i>(e-mail address at website of Danylo Halytsky Lviv National Medical University)</i>	Hygiene in Pharmacy and Ecology (023)
Department <i>(name, address, telephone, e-mail)</i>	Department of General Hygiene with Ecology 12 Zelena str., Lviv, Ukraine phone: +38(032) 276-28-37; e-mail: <a href="mailto:kaf_genhygiene@meduniv.lviv.ua">kaf_genhygiene@meduniv.lviv.ua</a>
Head of the department <i>(contact e-mail)</i>	Fedorenko Vira Ilarionivna, professor, MD, D.M.Sc. e-mail: <a href="mailto:kaf_genhygiene@meduniv.lviv.ua">kaf_genhygiene@meduniv.lviv.ua</a>
Year of study <i>(year of studying of discipline)</i>	2 <sup>nd</sup>
Semester <i>(semester in which discipline is being implemented)</i>	IV
Type of discipline / module <i>(required / optional)</i>	Required
Teachers <i>(names, degrees and titles of teachers who teach discipline, contact e-mail)</i>	Kozak Liliya Petrivna, PhD, Assoc. Prof., <a href="mailto:kozak.l.p.lnmu@gmail.com">kozak.l.p.lnmu@gmail.com</a> Sybirnyj Andrij Volodymyrovych, PhD, Assoc. Prof., <a href="mailto:sybandrij@dr.com">sybandrij@dr.com</a> Yurchenko Svitlana Teodorivna, PhD, Assist. Prof., <a href="mailto:zubsvitlana@gmail.com">zubsvitlana@gmail.com</a>
Erasmus yes / no <i>(discipline availability for students at within the Erasmus + program)</i>	no
The person responsible for the syllabus <i>(the person to be commented on regarding the syllabus, contact e-mail)</i>	Fedorenko Vira Ilarionivna, professor, MD, D.M.Sc. e-mail: <a href="mailto:kaf_genhygiene@meduniv.lviv.ua">kaf_genhygiene@meduniv.lviv.ua</a>
Number of ECTS credits	3 credits
Number of hours <i>(lectures / practical classes / self-educational work of students)</i>	90 hours <i>(lectures - 10 hours / practical classes - 20 hours / self-educational work of students - 60 hours)</i>
Language of teaching	English
Consultation information	Distant learning MISA platform, website of department, information boards of department
Clinical Base Address, Phone, and Regulations, Bureau... <i>(if needed)</i>	–

## 2. Short summary of the course

The syllabus of hygiene in pharmacy and ecology has composed in accordance with the requirements of the Standard of higher education of the second (Master's degree) level in branch of knowledge 22 "Health Care", specialty 226 "Pharmacy".

"Hygiene in pharmacy and ecology" as a discipline is studied by masters of the specialty "Pharmacy" in the second year. The discipline sets the foundations for understanding the importance of preventive medicine and environmental protection for maintaining and promoting public health. The basics of hygiene and ecology, special issues of hygiene of pharmacies and pharmaceutical companies, environmental problems related, in particular, to the production of medicines, are necessary for future masters of pharmacy to understand the patterns of environmental impact on individual and population health, ensuring appropriate working conditions, organization and observance of sanitary and antiepidemic regime in pharmacies and pharmaceutical enterprises, as well as development, implementation of preventive measures to preserve health and environmental protection. The results of training are required for mastering professional disciplines at the following stages of training: technology of drug preparation, pharmaceutical aspects of nutritionology, ecotoxicology.

## 3. Purpose and goals of the course

**1. The aim** of the discipline "Hygiene in pharmacy and ecology" is to study the theoretical knowledge in hygiene, including hygiene of pharmacies and pharmaceutical companies, and ecology, mastering practical skills aimed at preventive measures on strengthening human health and protecting the environment and applying the acquired knowledge and skills in their practical professional activities.

### 2. Learning objectives:

- to understand of the priority of preventive measures for improving the individual and public health;
- to master the knowledge and skills of sanitary and hygienic assessment of the production environment of pharmacies and pharmaceutical companies, ecological and hygienic assessment of the environment;
- to master the practical skills of organizing effective preventive measures during professional activities.

### Integrative final program learning outcomes, the formation of which is facilitated by the discipline:

- to carry out professional activities in social interaction based on humanistic and ethical principles;
- identify future professional activities as socially significant for human health;
- analyze the state of the environment and the impact of its factors on public health;
- to interpret the general laws of the connection of health with the factors and conditions of the living environment;
- have methods of hygienic assessment of physical, chemical, microbiological factors of the production environment and the environment and their impact on human health;
- to carry out hygienic assessment of modern technological processes in the pharmaceutical industry;
- justify measures to improve working conditions and prevent pollution of the biosphere;
- adhere to the norms of sanitary and hygienic regime in carrying out professional activities;
- to determine the risk factors for major diseases in employees of pharmacies and the pharmaceutical industry, which are related to the conditions of the production environment and technological processes;
- substantiate hygienic measures for the prevention of infectious, ecologically conditioned and ecologically dependent diseases of non-infectious origin;
- plan measures to maintain a healthy lifestyle, personal hygiene and implement them in pharmacies and in the pharmaceutical industry;
- to conduct sanitary and educational work among the population in order to prevent common non-communicable diseases, prevention of infectious and parasitic diseases.

### 3. Competencies and learning results.

The students should acquire below mentioned **competencies** by studying the discipline according with the requirements of the Standard of higher education of the second (Master's degree) level in branch of knowledge 22 "Health Care", specialty 226 "Pharmacy":

- **integrated competencies:** the ability to solve typical and complex specialized tasks in

professional pharmaceutical activity, applying the provisions, theories and methods of fundamental, chemical, technological, biomedical and socioeconomic sciences; to integrate knowledge and solve problem tasks, to formulate judgments under conditions of insufficient information; to communicate and reasonable conclusions to the professional and non-physical audience clearly;

– **general competencies:**

- The ability to be socially responsible and civically aware (**GC 1**).
- The ability to apply knowledge in practical situations (**GC 2**).
- To seek to protect the environment (**GC 3**).
- The ability to abstract thinking, analysis and synthesis; to learn and be modernly trained (**GC 4**).
- To know and understand of the discipline area and professional tasks (**GC 6**).
- The ability to adapt and act in a new situation (**GC 7**).
- To use the information and communication technology skills (**GC 9**).

– **special (professional, subject) competencies:**

- The ability to conduct sanitary and educational work among the population in order to prevent common diseases of internal organs, prevent dangerous infectious and parasitic diseases, as well as to promote timely detection and maintenance of adherence to treatment of these diseases according to their medical and biological characteristics and microbiological peculiarities (**PC 1**).
- The ability to ensure proper storage of medicines and medical devices in accordance with their physicochemical properties and the rules of Good Storage Practices (GSP) in health care facilities (**PC 7**).
- The ability to organize and participate in the production of medicines in the conditions of pharmaceutical enterprises, including the choice of technological process with justification of technological process and selection of appropriate equipment in accordance with the requirements of Good Manufacturing Practice (GMP) (**PC 15**).

**Integrative final program learning results (outcomes):**

- To carry out professional activity in social interaction based on humanistic and ethical principles;
- identify future professional activity as socially significant for human health (**PLR-1**).
- To apply knowledge of general and professional disciplines in practical activities (**PLR-2**).
- To adhere to the norms of sanitary and hygienic regime and safety requirements in carrying out professional activities (**PLR-3**).
- To carry out sanitary and educational work in professional activity in case of outbreaks of infectious, viral and parasitic diseases (**PLR-13**).
- To predict and determine the influence of environmental factors on the quality of medicines and consumer characteristics of other pharmaceutical products during their storage (**PLR-19**).

**4. Prerequisites for the course**

The study of the discipline “Hygiene in pharmacy and ecology” is based on student’s knowledge of human anatomy, physiology, biology with basics of genetics, general and inorganic chemistry, organic chemistry, physical and colloidal chemistry, biological chemistry and microbiology such as:

**Human anatomy:** *to know* anatomic features of organs and systems (visual and auditory analyzers, central nervous system, cardiovascular system, digestive system).

**Physiology:** *to know* the functions of organs and systems, the composition of atmospheric and exhaled air, the ways of heat transfer, mechanisms of thermoregulation, the characteristics of the physiological state of the person in conditions of action of various meteorological factors, physiological importance of water, role of proteins, fats, carbohydrates, vitamins and minerals to ensure normal functioning of the body, the energy coefficients of proteins, fats, carbohydrates, methods of direct and indirect calorimetry to determine basal metabolism, the causes and manifestations of fatigue, fatigue in various types of professional activities, the concept of stress and *to be able* to evaluate the functional parameters of the cardiovascular system, calculate basal metabolism.

**Biology with basics of genetics:** *to know* methods for researching the biological environmental factors, characteristics of pathogens of water- and soil-transmitted worm infections, biological importance of soil.

**General and inorganic chemistry, organic chemistry:** *to know* the basic properties of chemical substances and *to be able* to determine the content of chlorine in the water by iodometric method, the hardness of the water etc.

**Physical and colloidal chemistry:** *to know* the states of matter aggregation, the concept of the aerosol, the methods employed in the manufacture of biological active substances and biological medicinal products for human use: sedimentation, filtration, centrifugation, cooling, crystallization, vacuum.

**Biological chemistry:** *to know* the mechanisms of biotransformation of substances in the body.

**Microbiology:** *to know* the characteristics of microorganisms which can cause water- and soil-transmitted infectious diseases and *to be able* to take swabs for bacteriological analysis.

## 5. Program learning results (PLR)

### List of learning results

Learning result code ( <i>K - Knowledge, Sk - Skills, C - Communication, AR - autonomy and responsibility</i> )	The content of the learning outcome	Reference to the matrix code competencies (code symbol for the higher education standard program results)
<i>K-1</i>	To know social and public rights and responsibilities, the principles of social adaptation and factors of successful adaptation to the new situation	PLR-1
<i>Sk-1</i>	To form one’s civic consciousness and an effective strategy of personal adaptation to new conditions, to be able to act in accordance with them	
<i>C-1</i>	To have ability to convey one’s public and social position	
<i>AR-1</i>	To be responsible for own civic position and activities	

<i>K-2</i>	To know the methods of implementing knowledge in solving practical problems, the structure and features of professional activity, current trends in the industry and in information and communication technologies	PLR-2
<i>Sk-2</i>	To be able to use modern professional knowledge, informational and communication technologies to solve practical tasks in the professional activities	
<i>C-2</i>	To establish contacts with practitioners and use information and communication technologies in professional activities	
<i>AR-2</i>	To be responsible for the timeliness of decisions, for acquisition of modern knowledge and for developing the professional knowledge and skills with high level of autonomy	
<i>K-3</i>	To know the problems of environmental protection, the requirements	PLR-3

	of the sanitary and hygienic regime and the conditions of labor protection	
Sk-3	To be able to form requirements for environmental protection and compliance with sanitary and hygienic regime and labor protection conditions; to interpret the requirements of laws and regulations on labor protection; to draw conclusions about the presence of harmful factors during the performance of professional duties; to provide labor protection of pharmaceutical personnel	
C-3	To develop measures for preserving and protecting the environment	
AR-3	To be responsible for the implementation of environmental protection measures within own competence	
K-4	To know the environmental factors and endogenous factors that contribute to the spread of diseases of internal organs, dangerous infectious and parasitic diseases	PLR-13
Sk-4	To organize scientific and practical seminars for medical staff and lectures for the population on the rational use of medicines, medicinal herbal raw materials, the harmfulness of drug and potent drug abuse, measures to prevent drug dependence	
C-4	To carry out systematic preventive work and use antiepidemic measures to prevent infectious diseases	
AR-4	To be responsible for the quality and timeliness of preventive and antiepidemic measures	
K-5	To know the general requirements for storage of medicines in pharmacies, hazardous factors of technological process, principles of selection of appropriate equipment in accordance with the requirements of GMP	PLR-3 PLR-19
Sk-5	To provide appropriate storage conditions for medicines and to control the conditions of storage of raw materials at pharmaceutical enterprises, to make the hygienic assessment of modern technological processes in the pharmaceutical industry	
C-5	To carry out constant monitoring of proper storage of medicines and medical devices at pharmaceutical enterprises	
AR-5	To be responsible for the storage of medicines and medical devices in accordance with Good Storage Practices (GSP) in healthcare facilities and to be responsible for working condition	

### 6. Course format and scope

Course format (specify full-time or part-time)	Full-time course	
Type of classes	Number of hours	Number of groups
Lectures	10	-
Practical	20	
Seminars	–	
Self-educational work	60	

### 7. Theme and content of the course

Code of type of classes	Theme	Content of training	Learning result code	Teachers
<b>Module 1. General issues of hygiene and ecology</b>				
L-1	Hygiene as a science. Ecology as science The impact of the environment on health. Sanitary and environmental legislation	Hygiene as a science, its purpose, task, content, connection with other sciences. Prophylactic orientation of domestic medicine, public and personal prevention, primary, secondary and tertiary. Hygiene in pharmacy as a part of hygienic science. The importance of hygiene for the	K-1,2,3,4 Sk-1,2,3,4 C-1,2,3,4 AR-1,2,3,4	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko

		<p>formation of professional thinking and practical activity of masters in the specialty "Pharmacy". Fundamentals of hygiene methodology: general philosophical laws and categories, their use in hygiene. Laws of hygiene, their essence. Definition and interpretation of concepts: health, illness, health, environment, environmental factors. Methods of hygienic research, their classification. Empirical, scientific-experimental and modern stages of the formation and development of hygiene. Development of hygienic science in Ukraine. Subject, task, structure of modern ecology. Concepts and terms: ecology, biosphere, noosphere, biogeocenosis, biosystem, population, abiotic and biotic factors, adaptation. Ecology and medical disciplines (in particular hygiene, biology, physiology. Basic ecological laws and methods of ecology. The value of environmental education for the master's degree in pharmacy. Emergence and stages of ecology development. The modern period of ecology formation. Achievements of the national science in the field of ecology. Influence of environmental factors on individual and public health. Monitoring of the environment. Sanitary and environmental legislation of Ukraine, its importance for the implementation of preventive measures. The concept of hygienic and environmental regulation. Regulatory bases of environmental protection and health. International cooperation in the field of environmental protection</p>		
L-2	<p>Hygienic significance of atmospheric air, water and soil. Sources of environmental pollution and problems of</p>	<p>Hygienic value of physical factors of air (solar radiation, temperature, humidity, direction and speed of the air, atmospheric pressure), weather and climate. The structure of the atmosphere. Natural chemical composition of air, its physiological role and hygienic value. The structure of the hydrosphere. World</p>	<p>K-1,2,3,4 Sk-1,2,3,4 C-1,2,3,4 AR-1,2,3,4</p>	<p>assoc. prof. A.V. Sybirnyy, assoc. prof. L.P. Kozak, assist. prof. S.T. Yurchenko</p>

	<p>environmental protection</p>	<p>reserves of water. Water as environmental factors, its physiological, hygienic and economic importance. Power supply, their comparative hygienic characteristics. Water as a causative factor of infectious diseases and infectious nature. The structure of the lithosphere. Soil as a factor in the environment and its hygienic value. The role of soil in the origin and dissemination of infectious diseases and</p>		
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		<p>infestations. Biogeochemical provinces and endemic disease. The main sources of environmental pollution. The main chemical pollutants (pesticides, heavy metals, polychlorinated biphenyls, dioxins, oxides of sulfur, nitrogen, carbon, etc.). Air pollution by emissions vehicles. Influence on the environment of thermal and hydroelectric power plants, gas and dust emissions of industrial enterprises. The greenhouse effect, smog, acid rain and the ozone layer of the atmosphere. Sources of environmental pollution by medical and pharmaceutical waste, classification of waste by hazard classes. Influence of military activity on the environment. Measures for the protection of atmospheric air, sources of water supply and drinking water, soil. Concept about sanitary-protective zones of industrial enterprises, zones of sanitary protection of water sources. Methods of disposal and utilization of solid domestic and industrial waste. Ways of sewage treatment and of disposal and utilization of medical products, medical and pharmaceutical waste</p>		
L-3	Sanitary-hygienic measures during emergency situations of peacetime	<p>Identification and classification of emergencies. Sanitary and hygienic measures to be taken during emergencies and disasters of peacetime. The concept of “personal” and “social” (collective) hygiene. The basic directions of work of sanitary-hygienic service in areas of disasters and natural disasters. Hygienically significant objects in areas of disasters and natural disasters that must be under constant control. Hygienic requirements for accommodation of evacuated population. Hygienic requirements for accommodation of evacuated population. Bath-washing troops service. Hygienic requirements for the removal and disinfection of garbage and impurities. Sanitary cleaning of the field of combat and disaster areas. The order of gathering and burial of the dead evacuated population. Bath-washing troops</p>	<p>K-1,2,3,4 Sk-1,2,3,4 C-1,2,3,4 AR-1,2,3,4</p>	<p>assoc. prof. A.V. Sybirnyy, assoc. prof. L.P. Kozak, assist. prof. S.T. Yurchenko</p>

		<p>service. Hygienic requirements for the removal and disinfection of garbage and impurities. Sanitary cleaning of the field of combat and disaster areas. The order of gathering and burial of the dead. International and national structures that provide aid for disasters victims and liquidate disasters’ consequences. Hygienic requirements for placement, food and water provision in a disaster setting. Principles of</p>		
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		organization and conduction of sanitary inspection of field accommodation, water and food provision and working conditions of disasters liquidators		
P-1	Methods of hygienic research. Hygienic estimation of microclimatic conditions in different premises	<p>Methods of hygienic research: methods of studying the state of the environment and its hygienic assessment, methods of studying the environmental impact on health. Microclimate, its components, influence on body heat transfer, heat transfer ways. Hygienic norms of microclimate parameters (temperature, humidity, air velocity, radiation temperature) of pharmacies, pharmaceutical enterprises, medical and preventive establishments, public and residential premises. Hygienic value of atmospheric pressure. Hygienic estimation of spatial temperature regime of premises, humidity, radiation temperature, devices. Changes in the state of health and diseases that arise as a result of the influence on the human body of a heating and cooling microclimate. Ways for optimize the microclimate of the premises. Hygienic value of heating, its kinds.</p> <p>Sources of infection with acute respiratory disease COVID-19 caused by coronavirus SARS-COV-2 and features of the spread of the pathogen among people. Measures of general and individual prevention of coronavirus infection</p>	K-1,2,3,5 Sk-1,2,3,5 C-1,2,3,5 AR-1,2,3,5	<p>assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko</p>
P-2	Hygienic estimation of the direction and speed of air movement. Determination of natural and artificial ventilation of premises	<p>The concept of “rose of the wind” and its hygienic significance. Hygienic estimation of air speed in premises of pharmacies, pharmaceutical enterprises, medical and preventive establishments, public and residential premises, devices. The value of individual components of human exhaled air. Hygienic value of carbon dioxide as an indirect indicator of anthropogenic air pollution of premises, air oxidation, principles of methods of determination, hygienic norms. Ventilation of premises, its kinds and hygienic value. Air conditioning. The concept of the air cube, the required and actual volumes and multiplicity of ventilation. Calculation of the efficiency of indoor ventilation and their hygienic assessment. Norms of the frequency of air</p>	K-1,2,3 Sk-1,2,3 C-1,2,3 AR-1,2,3	<p>assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko</p>

		exchange in different premises. Relation between volume and multiplicity of ventilation and scientific substantiation of norms of living space		
P-3	Hygienic estimation of natural and artificial	Hygienic value of natural and artificial lighting of pharmacy premises, pharmaceutical enterprises, medical and preventive establishments, public and	K-1,2,3,4 Sk-1,2,3,4 C-1,2,3,4 AR-1,2,3,4	<p>assoc. prof. L.P. Kozak, assoc. prof.</p>



	illumination of premises and ultraviolet	residential premises. Artificial lighting of premises, its kinds. Indicators of the natural and artificial illumination of the premises, hygienic standards for premises of different purposes. The principle of operation of a luxmeter. Calculated method for studying artificial illumination. Effect of excessive and insufficient illumination on the visual analyzer, functional state of the central nervous system, human capacity. Hygienic value of ultraviolet radiation of the Sun, its spectrum on the Earth's surface. Biogenic and abiogenic effects of ultraviolet radiation (UVR). Methods of research and evaluation of UVR. Biodose, optimal and preventive dose of UVR. The use of artificial sources of ultraviolet radiation for the rehabilitation of the premises of pharmacies, pharmaceutical enterprises and treatment and prophylactic establishments		A.V. Sybirnyy, assist. prof. S.T. Yurchenko
P-4	Hygienic requirements for drinking water and its hygienic evaluation according to the results of laboratory analysis of samples. Methods of improving the quality of drinking water	Hygienic requirements for the quality of drinking water intended for human consumption. Indicators of epidemic (microbiological and parasitological), sanitary and chemical (organoleptic, physical and chemical and toxicological) and radiation safety, indicators of the physiological value of the mineral composition of drinking water, their hygienic value. Assessment of drinking water quality. Methods of water purification: basic and special. Methods of water disinfection, their hygienic value. Comparative characteristics of methods of chlorination of water. Chlorination of water with normal doses and hyperchlorination. Hygienic value and principle of determination of residual chlorine in tap water	K-1,2,3 Sk-1,2,3 C-1,2,3 AR-1,2,3	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
P-5	Methods of energy expenditure and nutrients requirements calculation. Hygienic estimation of nutritional status	Energy expenditure of the organism, components of daily energy consumption and energy balance of the person. Groups of physical activity. The concept of the coefficient of physical activity. Standards of physiological needs in energy and basic nutrients of different population groups. Method of determination of daily energy consumption by calculated methods (WHO, 1986) and individual needs for basic nutrients and energy. Features of the determination of daily energy needs and	K-1,2,3 Sk-1,2,3 C-1,2,3 AR-1,2,3	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko

		the basic elements of children and the elderly. The concept of the nutritional status, methodology for studying and assessing. Vitamin and mineral deficiency, causes of their occurrence, prevention.		
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		Criteria for assessing energy and vitamin nutrition adequacy		
SEW-1	Hygienic estimation of the impact of climate and weather on human health. Helio-meteorotropic reactions and diseases	Weather, weather forming conditions and weather characterizing conditions. Types of atmospheric circulation: anticyclones, cyclones, atmospheric fronts. Medical weather classifications. Effect of weather on human health (direct and indirect). The climate, its hygienic significance, classification. Climate-forming and climatic characterizing factors and indicators. Climate zones of Ukraine. Spa therapies and climate therapy. Acclimatization as a complex social and hygienic process. Method of hygienic estimation of direct and indirect influence of climate and weather on human health. Helio-meteorotropic reactions and diseases, their prophylaxis	K-1,2,3 Sk-1,2,3 C-1,2,3 AR-1,2,3	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
SEW-2	Sources and types of water supply. Infectious and non-infectious diseases transmitted through water, their prevention	Hygienic, physiological and economic value of water. Water supply standards for covering physiological, communal, economic and industrial needs. Sources of water supply, their types, comparative hygienic characteristics, pollution routes and their consequences for public health. Centralized and decentralized water supply systems, their comparative hygienic characteristics. Infectious water-transmitted diseases. Signs of water epidemics. Non-infectious water-related diseases. Measures for the prevention of water-transmitted infectious and non-infectious diseases	K-1,2,3,4 Sk-1,2,3,4 C-1,2,3,4 AR-1,2,3,4	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
SEW-3	Hygienic significance of soil. Sanitary cleaning of inhabited places	Hygienic and ecological significance of the soil. Classification of soils by mechanical composition. Physical properties of the soil. Sources of soil pollution. Indicators of the sanitary state of the soil: epidemic, chemical and radiation safety, physical, physical and chemical. Self-cleaning of soil. Hygienic assessment of the sanitary state of the soil. Soil as a factor in the transmission of pathogens of infectious diseases and the spread of invasions. Geochemical factors of the spread of endemic diseases. Systems of clearing of inhabited places, hygienic characteristics of methods of clearing from liquid and solid wastes. Current hygienic and bioethical problems of settlement of inhabited places	K-1,2,3,4 Sk-1,2,3,4 C-1,2,3,4 AR-1,2,3,4	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
SEW-4	Nutrition and health. Scientific foundations of	The value of proteins, fats, carbohydrates, vitamins, minerals in the diet of a healthy and sick person. Theories of nutrition,	K-1,2,3,4 Sk-1,2,3,4 C-1,2,3,4	assoc. prof. L.P. Kozak, assoc. prof.

	rational nutrition. Nutrition under the circumstances of unfavorable environment.	functions of food and types of nutrition. Hygienic requirements for rational nutrition. Physiological norms of energy consumption and nutrients for different groups of population. Features of nutrition	AR-1,2,3,4	A.V. Sybirnyy, assist. prof. S.T. Yurchenko
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	Peculiarities of interaction of food substances with medicines	for children and the elderly. Hygienic requirements for daily diet and regime of diet. Indices of hygienic assessment of the quality of the diet. Means of medical control of nutrition of different population groups. Alimentary and alimentary-dependent diseases, their prophylaxis. The main sources of nutrients and energy. The problem of food contamination with chemicals and the organization of preventive measures. Interaction of nutrients and medicines. Effect of food on absorption of medicinal substances, their therapeutic effect and metabolism. Influence of medicinal substances on the processes of absorption of nutrients in the digestive tract		
SEW-5	Prevention of food poisonings	Quality and safety of food products. Microbiological criteria and standards for food safety. Residual quantities of chemicals in foods. Food poisonings (FP), their classification (microbial and non-microbial etiology), causes of their occurrence. Investigation of cases of FP. Basic principles of prevention of FP	K-1,2,3,4 Sk-1,2,3,4 C-1,2,3,4 AR-1,2,3,4	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
SEW-6	Biosphere, its origin and evolution. Ecosystems: structure, classification, functioning. Socio-ecosystem structure	Biosphere, its origin and evolution. Characteristics of the components of the biosphere. The structure of the atmosphere, the environmental significance of the atmosphere. Chemical and physical properties of the hydrosphere, water resources of the planet. Lithosphere, its function. Functioning of the biosphere. The first and second laws of thermodynamics, concept of entropy. Teaching of academician V.I. Vernadsky about the biosphere and noosphere. Ecological system, definition, characteristic. Signs and classification of the ecological systems. Basic ecosystems of the biosphere. Features of the formation of water, air, terrestrial ecosystems. Flow of energy and substances in ecosystems. Autotrophic and heterotrophic organisms. Biogeocenosis, their energy and productivity. Development and evolution of ecosystems. The main types of environmental pyramids. Urbose ecosystems and socioecosystems. Structure of the socioecosystem	K-1,2,3 Sk-1,2,3 C-1,2,3 AR-1,2,3	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
SEW-7	Methods of environment protection from energy pollution (noise, vibration,	Sources of noise and vibration. Electromagnetic pollution, its sources. Measures for protecting the environment from harmful effects of noise, vibrations, electromagnetic fields	K-1,2,3 Sk-1,2,3 C-1,2,3 AR-1,2,3	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof.

	electromagnetic fields)			S.T. Yurchenko
SEW-8	Energy and	Ecological system, definition,	K-1,2,3	assoc. prof.

	material streams in ecosystems. Biogeochemical cycles	characteristic. Classification of ecosystems. Basic ecosystems of the biosphere. Features of the formation of water, air, terrestrial ecosystems. Biogeochemical cycles, their ecological significance. Flow of energy and substances in ecosystems. Biogeochemical cycle of macroelements. The cycle of trace elements. Features of the cycle of heavy metals. Influence of anthropogenic and technogenic factors on the cycle of substances	Sk-1,2,3 C-1,2,3 AR-1,2,3	L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
SEW-9	Ecology and health. General regularities of human adaptation to different environmental conditions. Ecologically caused and ecologically dependent diseases	Human ecology in different climatic conditions. Acclimatization. The notion of biorhythms. Biorhythmology. The general laws of adaptation of the human organism to different environmental conditions. Stress, Eustress, Distress. Urboecology. Urbanization, its positive and negative aspects. The degradation of the biosphere in large cities. Housing Ecology. Planting of cities. Pollution of the environment and human health. The role of environmental factors in the formation of human health. Human health as an integral indicator of the state of the environment. Influence of abiotic, biotic and anthropogenic factors on human health and life expectancy. Concepts of ecologically and environmentally dependent diseases	K-1,2,3 Sk-1,2,3 C-1,2,3 AR-1,2,3	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
SEW-10	Radiation hygiene. Hygienic problems of radiation safety of the staff working with the sources of ionizing radiation; radiation public safety	Radiation hygiene as a branch of radiation medicine and hygiene. Ionizing radiation, their classification. The notion of radioactivity, radionuclide, isotopes, types of nuclear transformations. Qualitative and quantitative characteristics of radionuclides and ionizing radiation. The notion of activity of radionuclides, doses of ionizing radiation (absorbed, exposure, equivalent, effective). Sources of ionizing radiation. The concept of external and internal radiation. Natural radiation background. Biological action of ionizing radiation. Consequences of the accident at the Chernobyl Nuclear Power Plant. Hygienic regulation of ionizing radiation. Basic radiation and hygiene regulations. Principles of radiation protection (time, distance, number, screen)	K-1,2,3 Sk-1,2,3 C-1,2,3 AR-1,2,3	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
SEW-11	Ecologic situation in Ukraine. Ecologic-hygienic and medical-social consequences of Chornobyl nuclear disaster	Pollution of atmospheric air, water objects and soil in Ukraine. Zoning of the territory of Ukraine by degree of pollution. Chernobyl accident. Scale of environmental pollution as a result of the accident. Exclusion zones, guaranteed voluntary resettlement, reinforced and periodic radioactive control, legal regime	K-1,2,3 Sk-1,2,3 C-1,2,3 AR-1,2,3	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko

		in them. The content of radioactive substances in food and drinking water, their		
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		permissible levels. Influence of radiation pollution on flora and fauna, general and oncological morbidity of the population		
SEW-12	Pesticides, agrochemicals and public biosafety	Concepts of pesticides and agrochemicals. Classifications of pesticides by chemical structure, purpose, degree of danger. Mineral macro- and microfertilizers. Ways of migrating pesticides in the environment. Receipt of pesticides and components of mineral fertilizers into the body. Impact of pesticides and agrochemicals on the environment and public health. Long-term effects of pesticides. Contamination of soil and water with components of nitrogen fertilizers. The hygienic regulation of pesticides and nitrates in water and food products. The concept of the permissible daily dose and permissible daily intake, the maximum allowable level of pesticides in food products and the acceptable level of nitrates in plant products. Requirements for pesticides and agrochemicals taking into account environmental biosecurity. The main directions of solving the problems of biosphere pollution with pesticides and agrochemicals	K-1,2,3 Sk-1,2,3 C-1,2,3 AR-1,2,3	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
SEW-13	Biotechnology. Genetic engineering. Potential hazards of wide use of biotechnology	Definition of the concept of biotechnology. Stages of development, priority tasks. Biotechnology methods. Use of biotechnology in the pharmaceutical industry. Microbiological synthesis. Genetic engineering, definition of the concept. Basic principles of genetic engineering. The concept of genetically modified organisms and products, their benefits and disadvantages. Potential danger of widespread introduction of biotechnology. Consequences of the influence of biological agents and biotechnological products on environment and human health. Legislative regulation of food safety in the European Union and Ukraine	K-1,2,3,4 Sk-1,2,3,4 C-1,2,3,4 AR-1,2,3,4	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
SEW-14	Negative consequences of wide use of computers and mobile phones on the human health	The main negative factors of using computer and mobile phone, their influence on bioelectric activity of the brain, visual analyzer, endocrine and immune systems, indicators of attention, sleep. Requirements for the organization of the workplace and the working position by working with the computer. Hygienic rules for safe using of computers and mobile phones	K-1,2,3 Sk-1,2,3 C-1,2,3 AR-1,2,3	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
SEW-15	Military action as pollution factor	Ecologically unsafe military sites. Sources and ways of chemical pollution of soil, water, atmospheric air, energetic pollution. Ecological changes due to military action during peace time. Ecosystem ecological	K-1,2,3,4 Sk-1,2,3,4 C-1,2,3,4 AR-1,2,3,4	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof.

		weapons. Ecocide and its consequences. Environmental consequences of nuclear, chemical, and bacteriological weapons use		S.T. Yurchenko
SEW-16	Natural and anthropogenic disasters	Definition of disasters and accidents. Classification of disasters according to conditions, speed of occurrence and development. Definition of natural and anthropogenic (technogenic) disasters. London and Los-Angeles smogs. Chemically unsafe sites. Chemical disasters, Chernivtsy' disease. Toxic food poisonings (Minamata's disease, Itai-Itai, Yusho disease etc.). Radiation and nuclear disasters. Using radioactive, chemical and pathologic bio-agents with terroristic aims. Human factor role in technogenic catastrophes. Ecological and medical disaster consequences. International and national organizations for liquidation of consequences of natural, technogenic and social catastrophes	K-1,2,3,4 Sk-1,2,3,4 C-1,2,3,4 AR-1,2,3,4	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
SEW-17	Hygienic basis of the healthy lifestyle, personal hygiene. Foundations of psychohygiene. Sanitary education and hygienic education of general public	The concept of the healthy lifestyle. Importance of physical training for human health. Principles and methods of body tempering. Harmful effects of active and passive smoking, alcohol consuming, drugs use, ways of prevention. Personal hygiene, its importance for preservation and improving of health. Main elements of personal hygiene. The concept of psychohygiene, its goals. Psychological foundations of daily life optimization. The concept of mental health and criteria of its estimation. The role, goals, methods and means of sanitary education. Organization and forms of sanitary education. Sanitary educational work in professional activity of provisors	K-1,2,3,4 Sk-1,2,3,4 C-1,2,3,4 AR-1,2,3,4	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
<b>Module 2. Hygiene of pharmacies, chemical and pharmaceutical enterprises</b>				
L-4	Hygienic demands to location, planning and equipment of chemists and pharmaceutical enterprises. Sanitary regimen of their exploitation	Main types of pharmaceutical institutions. Principles of pharmacies and pharmaceutical plants positioning in cities, main requirements for the land lot. Main hygienic requirements for planning of pharmacies, pharmaceutical warehouses, control and analytical laboratories and pharmaceutical plants. Hygienic requirements for internal planning and sanitary-technical equipment of pharmacies. Hygienic norms of microclimate parameters, ventilation rate, insolation regimen, natural and artificial illumination of pharmacies	K-1,2,3,5 Sk-1,2,3,5 C-1,2,3,5 AR-1,2,3,5	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
L-5	Basis of hygiene of labour. Hygienic classification of labour. Industrial	Occupational hygiene, its goals and tasks. Work and labour. Physiology of work, physiologic changes associated with working, exertion and overexertion, ways	K-1,2,3,5 Sk-1,2,3,5 C-1,2,3,5 AR-1,2,3,5	assist. prof. S.T. Yurchenko, assoc. prof. L.P. Kozak

	hazards and occupational diseases. Hygiene of labour at the chemical and pharmaceutical enterprises and chemists	of prevention. Hygienic classification of labour, classification criteria. Classes of labour conditions and process. Ergonomics. Occupational hygiene at pharmaceutical plants. Occupational hazards, professional diseases and poisonings. Industrial dust, its classification. Non-specific effects of medicine aerosol in pharmacies and pharmaceutical plants. Medicines as industrial poisons. Changes of general resistance due to prolonged contact with medicines in pharmacies and pharmaceutical plants. Carcinogenic, mutagenic and allergenic substances in medicines production, prevention of their effects on the personnel. State hygienic directive “The List of Carcinogenic Substances and Industrial Processes”. Medicines that commonly cause allergic reactions. Ways of prevention of chemical substances, particularly medicines, hazardous effects on the human body. Maximum allowed concentrations of hazardous substances in the air of the working zone. Impact of noise, vibration, and electromagnetic fields (EMF) of different frequency on the personnel. Physical characteristics of noise, vibration, and EMF. Ways of prevention of harmful effects of noise, vibration and EMF. Maximal allowed levels of noise, vibration, and EMF at industrial objects. Impact of forced working posture, overexertion of certain organs and systems, monotonous labour, ways of prevention		
P-6	Hygienic estimation of location, planning, layout, sanitary and technical equipment, sanitary-hygienic and antiepidemic regimens in pharmacies	Typical construction project, its main parts, situational plan. Hygienic requirements for the land lot of a pharmacy. Groups, content and minimal area of different types of pharmacies. Scheme of positioning of the main structural parts of a pharmacy. Equipment placing. Hygienic requirements for internal planning of the aseptic compound of a pharmacy. Aspects of technologic process of medicine preparation and distribution in a pharmacy. Requirements for the sanitary-hygienic and sanitary-antiepidemic regimens in pharmacies	K-1,2,3,5 Sk-1,2,3,5 C-1,2,3,5 AR-1,2,3,5	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
P-7	Hygienic assessment of microbiologic, dust and chemical pollution of the air of pharmacies	Sources of air pollution in pharmacies, main pollutants. Microbial contamination of the air. Conditions and methods of air sampling for microbiological assessment. Bacteriological requirements for the air in pharmacies. Parameters of clean air and methods of air sanitation. Dust, its classification according to origin, chemical composition, dispersion. Fibrogenic,	K-1,2,3,4,5 Sk-1,2,3,4,5 C-1,2,3,4,5 AR-1,2,3,4,5	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko

		allergenic, irritating and other types of harmful effects of dust on human body, prophylaxis of dust pathology. Methods of sampling and evaluation of dust content in the air. Hygienic norms for dust in the air of a pharmacy. Main chemical pollutants, their impact on the personnel. Methods of sampling and evaluation of gases and vaporous content in the air of a pharmacy, hygienic norms		
P-8	Conditions and nature of labour of the personnel in pharmaceutical industry and pharmacies; prevention of occupational diseases	Influence of the process and conditions of labour on health and efficiency of the personnel of pharmaceutical plants and pharmacies. Estimation of working conditions in pharmaceutical institutions according to work intensity. Occupational hazards at pharmaceutical plants and in pharmacies, their characteristics. Occupational hygiene in the production of synthetic medicines, antibiotics, herbal remedies, tablets, solutions. Occupational morbidity prevention, means of individual protection of respiratory organs and skin Means and measures of individual protection of pharmacy workers and workers of the pharmaceutical industry from coronavirus infection COVID-19	K-1,2,3,4,5 Sk-1,2,3,4,5 C-1,2,3,4,5 AR-1,2,3,4,5	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
P-9	Methods of ecologic expertise conduction at pharmaceutical plants	Aims and main tasks of ecologic expertise, its types. Objects with high ecologic hazard. Main principles, objects and subjects, stages and procedure of the ecologic expertise. Content of ecological expertise conclusions. The Law of Ukraine “Concerning the Ecologic Expertise” (1995). Methods of calculation of maximal allowable emission and effectiveness of atmosphere protective structures. Methods of calculation of maximal allowable discharge and effectiveness of water-protection structures	K-1,2,3 Sk-1,2,3 C-1,2,3 AR-1,2,3	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
SEW-18	Hygienic norms as a foundation of environment and public health protection	Hygienic norms: the aims, the types. Main principles of hygienic norms development. Features of hygienic norms of the working zone air, atmospheric air, natural water reservoirs, atmospheric air, soil, food products. Hygienic norms of medicines in the atmospheric air and natural water reservoirs. Ecologic norms and directives. Technical directives, maximum allowable levels of atmospheric pollution and pesticides additions into the soil	K-1,2,3 Sk-1,2,3 C-1,2,3 AR-1,2,3	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
SEW-19	Occupational toxicology. Hygienic estimation of hazardous chemical substances.	Toxicology as a science. Prophylactic toxicology. Scheme of toxicology experiment, acute, subacute and chronic experiments. Toxicometry, its main parameters. Toxicokinetics and toxicodynamics. Cumulation, its types.	K-1,2,3 Sk-1,2,3 C-1,2,3 AR-1,2,3	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof.



	Combined effects of xenobiotics and	Long-term effects, specific and allergenic effects of xenobiotics and medicines. The		S.T. Yurchenko
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	medicines, prognosis of their impact of human body	concepts of combined, complex, added effects. Main types of combined effects (antagonism, potentiating, additivity). The formula of added toxicity. Mechanisms of xenobiotics interaction. The concept of inhibitors and inductors of monooxygenase system. Prognosis of combined effect		
SEW-20	Hygienic estimation of contemporary technologic processes of synthesis of medicines, antibiotics and herbal remedies	Main groups of pharmaceutical plants. Hygienic estimation of main contemporary technologic processes and raw material used for synthesis of medicines, antibiotics, herbal remedies; occupational hazards at different stages of technologic processes. Hygienic principles of medicines production set up. GMP system. Ways of improving working conditions at pharmaceutical plants	K-1,2,3,4,5 Sk-1,2,3,4,5 C-1,2,3,4,5 AR-1,2,3,4,5	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko
SEW-21	Environmental pollution with medicines and its impact on public health	Sources and ways for medicines to enter the environment. Concept of pharmacologic pollution. Migration chains of medicines in the environment. The problem of medicines biotransformation. Medicines as a source of heavy metal pollution. Hazards of medicines and chemosynthetisers for different ecosystems. Concepts of photoallergy, phototoxicity, medicines as photosensibilisers. The concept of MAC of certain antibiotics and hormones in milk and meat. Combined effects of medicines in the environment. Ways of environment protection from pharmaceutical pollution	K-1,2,3,4,5 Sk-1,2,3,4,5 C-1,2,3,4,5 AR-1,2,3,4,5	assoc. prof. L.P. Kozak, assoc. prof. A.V. Sybirnyy, assist. prof. S.T. Yurchenko

There are traditional teaching methods (verbal, visual, practical), methods of teaching and learning activities (explanatory and illustrative one, method of problem statement, scientific and research methods), methods of stimulation and motivation of educational and cognitive activity (methods of stimulation and motivation of training, methods of control and self-control as teaching methods), methods of control of stimulation and motivation of educational and cognitive activity of students (control by the teacher, self-control, mutual control, self-correction, mutual corrections, corrections and integrated methods) in educational process in teaching discipline “Hygiene in pharmacy and ecology”.

### 8. Verification of learning outcomes

#### Current control

The current control aims to check the assimilation of students’ learning material and is carried out during each practical lesson on the basis of a comprehensive assessment of the student’s activities and acquired competencies (knowledge, skills, abilities, communication, etc.). It includes control of the initial level of knowledge, the quality of practical work, the level of theoretical training and the results of the initial control of the level of knowledge. Standardized methods of control (testing, structured written work, structured practical skills that are close to real) are used to assess students’ learning activities. A 4-point scale is used to assess students’ current performance. The received mark is entered in the student’ academic journal.

Learning result code	Code of type of classes	Method of verification of learning outcomes	Enrollment criteria
K-1,2,3,4,5 Sk-1,2,3,4,5	L-1 – L-5	<b>Individual spoken (written interview)</b> includes selective	<b>5 (excellent)</b> - the student has gained great theoretical knowledge of the topic and basic

<p>C-1,2,3,4,5 AR-1,2,3,4,5</p>	<p>P-1 – P-9</p>	<p>control questions according to methodical guidelines to themes of practical classes and lecture course</p> <p><b>Test control</b> performed by the student at the preparatory or final stage of the practical classes</p> <p><b>Solve typical and atypical tasks:</b> the algorithm of solving the tasks assumes:</p> <ul style="list-style-type: none"> <li>- reading the task and clarifying the content;</li> <li>- writing the main information of task;</li> <li>- task analysis, selection of standards or formulas that are needed for the solution, drawing up a plan for task solving;</li> <li>- analysis of the obtained results, writing a conclusion and recommendations.</li> </ul>	<p>aspects of scientific sources and recommended literature, thinks logically and makes the answer, freely uses the acquired knowledge in analyzing practical material, expresses his attitude to certain problems, demonstrates a high level of practical skills; gives 90-100% correct answers to MCQs; correctly solves the situational task in accordance with the algorithm of its solution, makes reasoned conclusions and gives the necessary recommendations;</p> <p><b>4 (good)</b> - the student has gained good theoretical knowledge of the topic and basic aspects of scientific sources and recommended literature, thinks, argues it; has practical skills, expresses views on certain problems, but assumes certain inaccuracies and errors in the logic of the presentation of theoretical knowledge or in the implementation of practical skills; gives 70-89,9% of correct answers to MCQs; solves the situational problem correctly in accordance with the algorithm of its solution, but the conclusion is inaccurate or incomplete;</p> <p><b>3 (satisfactory)</b> - the student has has gained enough level of theoretical knowledge of the topic and basic aspects of recommended literature, but has lack of stable knowledge, confuses concepts, his (her) answers are unconvincing, additional questions cause uncertainty in student; answering questions of a practical nature reveals inaccuracies in knowledge, is unable to assess facts and phenomena and relate them to future activities, makes mistakes in the implementation of practical skills; gives 60-69,9% of correct answers to MCQs; solves the situational task not completely (the algorithm of solution is not observed, makes mistakes in calculations or incorrect conclusions);</p> <p><b>2 (unsatisfactory)</b> - the student has not gained enough level of theoretical knowledge of the topic and the basic aspects of recommended literature, has not known the scientific facts, definitions, there is no scientific thinking, practical skills are not formed; gives less than 60% correct answers to MCQs; does not solve the situational problem.</p>
	<p>SEW-1 – SEW 21</p>	<p>Students write MCQs, control questions and tasks of topics that are submitted for independent work in a separate notebook, performance of them is checked by the teacher and their enrollment is fixed in the academic journal</p>	<p><b>“Enrolled”</b> - the self-educational work is designed in accordance with the requirements of guideline, contains the necessary theoretical material, answers to MCQs and situational tasks;</p> <p><b>“Not enrolled”</b> - the self-educational work doesn’t correspond the requirements of guideline, is fragmentary, there is significant errors in the answers to the</p>

### Final control

The general system of evaluation	Participation in the studying process during the semester has finished by credit as a result of the current educational activity on a 200-point scale	
Scales evaluation	Traditional 4-point scale, multipoint (200-point) scale, ECTS rating scale	
Admission conditions to final control	The student has attended all practical classes and received not less than 120 points for current educational activity	
The type of the final control	The technique of final control	Enrollment criteria
Credit as a result of the current educational activity	All topics of current control should be passed by student. Marks of a 4-point scale are converted into scores on a multipoint (200-point) scale in accordance with the Regulation "Criteria, rules and procedures for evaluation the results of students' educational activities"	<i>The maximum number of points is 200</i> <i>The minimum number of points is 120</i>

*The calculation of the number of points is based on the current grades obtained by the student on a 4-point (national) scale during the study of the discipline, by calculating the arithmetic mean value (M), rounded to two decimal places. The resulting value is converted into points on a multipoint scale as follows:*

$$x = \frac{M \times 200}{5}$$

*For convenience, the table of recalculation on a 200-point scale is given:*

#### **Recalculation of the average mark for current educational activity into a multipoint scale (final control – credit)**

4-point scale	200-point scale	4-point scale	200-point scale	4-point scale	200-point scale	4-point scale	200-point scale
5	200	4,47	179	3,94	158	3,42	137
4,97	199	4,45	178	3,92	157	3,4	136
4,95	198	4,42	177	3,89	156	3,37	135
4,92	197	4,4	176	3,87	155	3,35	134
4,9	196	4,37	175	3,84	154	3,32	133
4,87	195	4,35	174	3,82	153	3,3	132
4,85	194	4,32	173	3,79	152	3,27	131
4,82	193	4,3	172	3,97	151	3,25	130
4,8	192	4,27	171	3,74	150	3,22	129
4,77	191	4,24	170	3,72	149	3,2	128
4,75	190	4,22	169	3,7	148	3,17	127
4,72	189	4,19	168	3,67	147	3,15	126
4,7	188	4,17	167	3,65	146	3,12	125
4,67	187	4,14	166	3,62	145	3,1	124
4,65	186	4,12	165	3,6	144	3,07	123
4,62	185	4,09	164	3,57	143	3,05	122

4,6	184	4,07	163	3,55	142	3,02	121
4,57	183	4,04	162	3,52	141	3	120
4,55	182	4,02	161	3,5	140	less than 3	not enough
4,52	181	3,99	160	3,47	139		
4,5	180	3,97	159	3,45	138		

### 9. Course policy

1. The norms of ethics and deontology should be adhered by the student.
2. The academic integrity should be adhered by the student certainly:
  - independent performance of all types of work, tasks, forms of control provided by the syllabus of the discipline “Hygiene in pharmacy and ecology”;
  - to make links to sources of information in the case of using the ideas, statements, information, etc.;
  - to follow the principles of legislation on copyright and related rights;
  - to provide reliable information about the results of own educational (scientific, creative) activities and the used research methods and sources of information;
  - educational practical classes, which is missed by the student, should be gained by him (her) in extracurricular time independently (theoretical questions of the educational topic, making of MCQs, solving of situational tasks) and the next making of educational and practical tasks during making up according to the schedule.

### 10. Literature

#### Principal:

1. Hygiene and ecology : ed. by V.G. Bardov. Vinnytsa : Nova Knyga, 2018. 688 p.

#### Additional:

1. Мізюк М.І. Гігієна: Підручник. К. : Здоров'я, 2002. 288 с.
2. Мізюк М.І. Гігієна: Посібник для практичних занять. К. : Здоров'я, 2002. 251 с.
3. Загальна гігієна : посібник для практичних занять ; за ред. І.І. Даценко. Львів : Світ, 2001. 471с.

### 11. Equipment, material and software of the discipline / course

- Educational and professional program of higher education of the second (Master's degree) level in branch of knowledge 22 “Health Care”. Qualification: Pharmacist, Master of Pharmacy. Lviv, 2020.
- Syllabus of the course.
- Abstracts of lectures on the discipline.
- Methodical recommendations for lectures.
- Guidelines for teachers to each topic of practical classes.
- Guidelines for students to each topic of practical classes.
- Guidelines for self-educational work for students.
- Tests and control tasks for practical classes.
- Situational tasks to each topic of practical classes and self-educational work.
- The list of questions and practical skills for final control.
- Regulatory and legislative documents.
- Demonstration materials, instructions for using the technique studying devices and equipment: psychrometers, anemometers, barometer, thermometer, lactometer, luxmeter, multimedia projector, overhead projector, training tables.
  - Electronic educational resources (EER):
    - Educational and methodical (syllabus, thematic plans of lectures, practical classes and self-educational works).
    - *Methodical guidelines of practical classes and self-educational works for students.*
    - *Educational (textbooks, manuals, lectures).*
    - *Additional (official regulatory and legislative documents).*
    - EER to control students' knowledge (tests of different levels of difficulty and situational tasks for each topic of practical classes and self-educational work).

**Information resources**

Official web resources of the President of Ukraine, the Verkhovna Rada of Ukraine, the Ministry of Education and Science of Ukraine, the Ministry of Health of Ukraine and other central authorities of Ukraine, web resource of Danylo Halytsky Lviv National Medical University (LNMU), website of the Department of General Hygiene with Ecology of LNMU, educational web resource of other higher medical educational institutions of Ukraine.

**12. Additional information**

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*Website of department:* <https://new.meduniv.lviv.ua/kafedry/kafedra-zagalnoyi-gigiyeny-z-ekologiyeyu/>

***Syllabus compilers:***

*Moskvyak N.V., PhD, Assoc. Professor*

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***Head of department:***

*Fedorenko V.I., D.M.Sc., Professor*

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