



**NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL
SCIENCES OF UKRAINE**

Department of Pharmacology, Parasitology and Tropical Veterinary Medicine

“APPROVED”
Dean of the Veterinary Medicine Faculty
 **ВІЛІКHOVSKII**
2023

APPROVED
at a working meeting of the the Department of Pharmacology,
Parasitology and Tropical Veterinary Medicine
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Head of Department

Vadym ISCHENKO

CONSIDERED
Guarantor of EP "Veterinary Medicine"

Natalia GRUSHANSKA

PROGRAM OF THE COURSE

«Veterinary pharmacology»

Specialization 211 – «Veterinary Medicine»

Educational program «Veterinary Medicine»

Faculty of Veterinary Medicine

Developer: **I. M. Derkach**, PhD, Associate Professor of of the Department of
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Kyiv – 2023

1. Description of the course «Veterinary pharmacology»

Field of knowledge, specialization, educational program, educational degree	
Educational degree	<i>Master's</i>
Specialization	<i>211 «Veterinary medicine»</i>
Educational program	<i>«Veterinary medicine»</i>
Characteristics of the discipline	
Type	<i>Compulsory</i>
Total number of hours	<i>180</i>
Number of ECTS credits	<i>6</i>
Number of content modules	<i>5</i>
Form of assessment	<i>Semester test, exam</i>
Indicators of the course for full-time form of study	
Course (year of study)	<i>3</i>
Semester	<i>6, 7</i>
Lecture classes	<i>60 hr.</i>
Laboratory classes	<i>75 hr.</i>
Individual assignments	<i>45 hr.</i>
Number of weekly classroom hours for the full-time form of study	<i>5 hr.</i>

2. Purpose, objectives, and competencies of the course

Pharmacology is an experimental science that studies changes in the living organism under the influence of drugs for their use in the practice of veterinary medicine and the search for new effective drugs.

The uniqueness of the discipline lies in the combination of modern domestic and foreign knowledge of veterinary pharmacology. The basis of training is a comprehensive approach that combines theoretical, practical and innovative training. To study the educational discipline, educational and methodological materials are used, the authors of which are scientific and pedagogical workers of the Department of Pharmacology, Parasitology and Tropical Veterinary Medicine of the Faculty of Veterinary Medicine of the NULES of Ukraine. A certified electronic training course <https://elearn.nubip.edu.ua/course/view.php?id=2710> is used.

The purpose of the course is to study the basics of prescribing and the requirements for issuing them, the technology of manufacturing dosage forms, pharmacodynamics (mechanism of action, pharmacological effects) and

pharmacokinetics (absorption, distribution, biotransformation, excretion) of drugs of various pharmacological groups.

Knowledge of pharmacotherapy, pharmacoprophylaxis and pharmacostimulation provided by the work program in the discipline "Veterinary pharmacology" is necessary in the general system of training a doctor (master's degree) in veterinary medicine. In turn, this will enable the future specialist to skillfully choose (and combine) the most appropriate drugs for effective treatment of sick animals, disease prevention or stimulation of physiological functions.

Objectives. Based on the qualifications of the doctor (master) of veterinary medicine, student must have the following knowledge about the main groups of drugs (substances, drugs):

1. name of the drug (Ukrainian, Latin, synonyms);
2. chemical structure;
3. chemical and physical properties;
4. patterns of absorption, distribution of metabolism and excretion from the body;
5. mechanism of local and resorptive action, the essence of action on pathogens;
6. indications and contraindications to their use;
7. therapeutic doses for different species of animals, routes of administration and the most rational dosage forms;
8. side effects of drugs and toxicity, emergency measures in case of overdose.

As a result of studying the discipline the student **must know:**

- name in Ukrainian and Latin, the most commonly used synonyms, origin, chemical structure and composition of dosage forms, physical and chemical properties relevant to storage and use;
- ways of introduction into the body and features of absorption, biotransformation, excretion from the body;
- mechanism of local, reflex and resorptive action on the body of animals, pathogens of parasitic and infectious diseases;
- indications and contraindications to use;
- targeted therapeutic doses for animals of different species;
- the most rational dosage forms;
- methods of prescribing, toxicity and adverse side effects;
- methods of treatment of poisoning in case of overdose;
- where to find and how to interpret relevant and reliable information on the relationship between the use of antimicrobials for the treatment of animals and the development of antibiotic resistance in humans;
- the procedure for their registration and storage requirements;
- access to relevant sources of information about the licensed veterinary drugs;

must be able to:

- use appropriately known veterinary preparations, including their

registration and storage;

- explain and apply in practice the concept of the period of excretion (withdrawal) of drugs from the body of animals in order to prevent residual amounts of drugs in products of animal origin intended for human consumption; know where to find modern and relevant information about this issue;

- understand the known mechanisms of antibiotic resistance of the known pathogens;

- explain convincingly the relationship between the use of antimicrobials for animal treatment, livestock products used for human consumption, and the development of adverse side effects in humans (sensitization, allergic reactions, toxic effects, antibiotic resistance, etc.);

- apply appropriate medicines and biological agents to ensure safety of the food chain and environmental protection (eg: proper disposal of biological waste);

- prescribe official and main dosage forms;

- choose the right dose and determine the frequency of medication;

- use medicines for different species of animals;

- determine the therapeutic efficacy of drugs;

- prescribe antidote therapy in case of drug poisoning;

- make simple and complex dosage forms.

Acquisition of competencies:

Integral competence (IC):

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

General competencies (GC):

GC 2. Ability to apply knowledge in practical situations.

GC 7. The ability to conduct research at the appropriate level.

GC 9. The ability to make reasonable decisions.

GC 12. The desire to preserve the environment.

Professional (special) competencies (PC):

PC 2. The ability to use tools, special devices, devices, laboratory equipment and other technical means to carry out the necessary manipulations during professional activities.

PC 8. The ability to plan, organize and implement measures for the treatment of animals of different classes and species that are sick with non-communicable, infectious and invasive diseases.

PC 13. The ability to develop strategies for the prevention of diseases of various etiologies.

PC 18. The ability to use specialized software to perform professional tasks.

PC 20. The ability to organize, implement and control the flow of documents

during professional activities.

Program learning outcomes (PLO):

PLO 1. Know and correctly use the terminology of veterinary medicine.

PLO 2. Use information from domestic and foreign sources to develop diagnostic, treatment and business strategies.

PLO 3. To determine the essence of physico-chemical and biological processes that occur in the body of animals in normal and pathological conditions.

PLO 4. Collect anamnestic data during registration and examination of animals, make decisions regarding the choice of effective methods of diagnosis, treatment and prevention of animal diseases.

PLO 6. To develop quarantine and health measures, methods of therapy, prevention, diagnosis and treatment of diseases of various etiologies.

PLO 7. Formulate conclusions regarding the effectiveness of selected methods and means of keeping, feeding and treating animals, prevention of contagious and non-contagious diseases, as well as production and technological processes at enterprises for keeping, breeding or exploiting animals of various classes and species.

PLO 8. Monitor the causes of the spread of diseases of various etiologies and biological pollution of the environment with livestock waste, as well as veterinary materials and means.

PLO 9. Develop measures aimed at protecting the population from diseases common to animals and humans.

PLO 15. Know the rules of storage of various pharmaceuticals and biological preparations, ways of their enteral or parenteral use, understand the mechanism of their action, interaction and complex action on the animal body.

PLO 19. To carry out educational activities among industry workers and the population.

3. Program and structure of the course

Names of content modules and topics	Number of hours			
	Total	including		
		Lect.	Lab.	Indep.
Content Module 1. General pharmacology and basics of recipes				
Veterinary pharmacology and its tasks. Pharmacotherapy. Pharmacokinetics. Ways of introducing drugs into the animal's body	2	2		
General characteristics of the veterinary formulation. Prescription, its meaning, structure, prescription requirements and dispensing procedure. Pharmacopoeia	2		2	
Physicochemical factors of drug transport across cell membranes and their distribution in animals. Biotransformation of drugs and their excretion from the body	2	2		

Schemes and methods of writing prescriptions. Measurement of mass and volume of medicinal substances. Dose, dosage principles. Pharmacy. Storage of medicinal substances	2		2	
Pharmacodynamics. Types of action of medicinal substances. Long-term effects of drugs. The mechanism of action of drugs. Factors influencing the action and pharmacological activity of drugs. Features of pharmacological action of drugs in case of repeated use. Interaction of drugs	2	2		
Concept of dosage form, classification of dosage forms. Specific veterinary dosage forms. Solid dosage forms	2		2	
Mild dosage forms	2		2	
Liquid dosage forms. Aerosol dosage forms	2		2	
Prescribing	6			6
Pharmacy workshop	2		2	
Modular control	2		2	
Total for content module 1	26	6	14	6
Content Module 2. Drugs that act on the central nervous system				
Drugs that act mainly on the central nervous system. Drugs for anesthesia. The mechanism of action of anesthetics. Stages, levels and types of anesthesia. Drugs for inhalation anesthesia. Prescribing	10	2	2	6
Drugs for non-inhalation anesthesia. Psychotropic substances (sedatives, neuroleptics and tranquilizers)	4	2	2	
Analgesics. Non-narcotic analgesics. Narcotic analgesics (non-steroidal anti-inflammatory drugs NSAIDs)	4	2	2	
Drugs that stimulate the function of the central nervous system. Psychostimulants. Analeptics. General tonics	4	2	2	
Modular control	2		2	
Total for content module 2	24	8	10	6
Content Module 3. Drugs acting on the peripheral nervous system				
Drugs that act mainly on the peripheral nervous system. Classification. Drugs that suppress the function of afferent nerves. Local anesthetics (requirements, classification, mechanism of action). Types of local anesthesia. Characteristics of drugs	4	2	2	
Drugs that protect sensitive nerve endings from irritation. Emollients, enveloping drugs, binders and adsorbents. Prescribing	16	2	2	12
Drugs that stimulate sensitive nerve endings. Irritants. Essential oils. Vomiting, ruminating and expectorants. Laxatives. Bitters	6	2	4	

Drugs that affect the efferent nerves. Anatomical and physiological features of efferent nerves. Synapse structure. M- and H-cholinomimetics of direct action. M- and H-cholinomimetics of indirect action. M-cholinomimetics. H-cholinomimetics	6	2	4	
Drugs of cholinolytic action. Classification of cholinolytic agents. M-cholinolytic agents. H-cholinolytic agents. Muscle relaxants	4	2	2	
Drugs of adrenomimetic and adrenolytic action. Adrenomimetic means of direct and indirect action. Adrenolytic agents. Antihistamines	4	2	2	
Modular control	2		2	
Total for content module 3	42	12	18	12
Content Module 4. Drugs that regulate the functions of systems and organs				
Drugs acting on the cardiovascular system. Cardiac glycosides. Drugs that normalize heart rate. Antispasmodics	4	2	2	
Drugs acting on the cardiovascular system. Cardiac glycosides. Drugs that normalize heart rate. Antispasmodics	4	2	2	
Diuretics (diuretics). Drugs that stimulate liver function (cholagogues). Drugs that affect the tone and contraction of the uterus	4	2	2	
Drugs that regulate metabolic processes. Vitamins and vitamin preparations: classification, mechanism of action and characteristics of certain groups. Multivitamins. Prescribing	16	2	2	12
Hormonal drugs. Classification of hormones and hormonal drugs. The mechanism of action of hormonal drugs. Estrogens, progestogens and androgens. Drugs of pituitary hormones and adrenal cortex. Prostaglandins	4	2	2	
Tissue drugs. Enzyme and bacterial drugs. Drugs of amino acid	4	2	2	
Drugs that affect the metabolism of minerals. Drugs of macro- and micronutrients. Complex drugs of mineral substances	4	2	2	
Modular control	2		2	
Total for content module 4	42	14	16	12
Content Module 5. Antimicrobial and antiparasitic drugs				
Antimicrobials. Medicinal dyes. Sulfanilamides. Nitrofurans.	4	2	2	9
Antibiotics: classification by origin, structure, strength and spectrum of antimicrobial action. Rules of rational use of antibiotics and their pharmacokinetics. Negative consequences of irrational use of antibiotics. Characteristics of penicillin antibiotics	9	2	2	

Characteristics of cephalosporin antibiotics, aminoglycosides, tetracyclines, macroliths and chloramphenicol. Characteristics of polymyxin antibiotics (polypeptide antibiotics), fluoroquinolones, antifungal antibiotics and avermectins. Antiviral drugs. Phytoncides. Polyphytes. Phytomines. Prescribing	12	4	4	
Antiseptics and disinfectants. Factors influencing their action. Requirements for antiseptics and disinfectants. Oxidizers. Halogen-containing drugs. Iodine drugs. Aliphatic drugs	4	2	2	
Disinfectants. Detergents (soaps and detergents). Formaldehyde drugs, phenols, cresols and their derivatives. Quaternary ammonium compounds	4	2	2	
Antiparasitic drugs. Anthelmintics. Insecticides and acaricides. Drugs for rodent control	6	4	2	
Antiviral drugs. Antiprotozoal drugs. Eimeriostatic drugs	3	2	1	
Drugs of radioprotective action. Homeopathy. Antidote drugs.	2	2		
Modular control	2		2	
Total for content module 5	46	20	17	9
Total hours	180	60	75	45

4. Laboratory class topics

№	Topic title	Number of hours
	Module 1. GENERAL PHARMACOLOGY AND FUNDAMENTALS OF RECIPES	
1.	General characteristics of the veterinary formulation. Prescription, its meaning, structure, prescription requirements and dispensing procedure. Pharmacopoeia	
2.	Schemes and methods of writing prescriptions. Measurement of mass and volume of medicinal substances. Dose, dosage principles. Pharmacy. Storage of medicinal substances	
3.	Concept of dosage form, classification of dosage forms. Specific veterinary dosage forms. Solid dosage forms	
4.	Soft dosage forms	
5.	Liquid dosage forms. Aerosol dosage forms	
6.	Pharmacy workshop	
7.	Modular control (Colloquium №1)	
	Module 2. DRUGS ACTING ON THE CENTRAL NERVOUS SYSTEM	
8.	Drugs for anesthesia. Inhaled drugs. Non-inhalation drugs. Barbiturates. Alcohols	
9.	Psychotropic substances (sedatives, neuroleptics and tranquilizers)	
10.	Non-narcotic analgesics. Salicylic acid and its derivatives, aniline and pyrazolone derivatives. Analgesics of other groups	
11.	Psychostimulants. General tonics. Analeptics	

12.	Modular control (Colloquium №2)	
	Module 3. DRUGS ACTING ON THE PERIPHERAL NERVOUS SYSTEM	
13.	Local anesthetics. Synthetic compounds of nitrogen. Substituted amides of acetanilide and choline carboxylic acid	
14.	Substances that stimulate sensitive nerve endings. Irritants, means, essential oils. Expectorants, ruminators, emetics	
15.	Bitterness and laxatives. Drugs that stimulate liver function (cholagogues).	
16.	Substances that protect sensitive nerve endings	
17.	Drugs that affect the efferent nerves. Means of cholinomimetic action. M and H cholinomimetics of direct and indirect action	
18.	M-cholinomimetics. M-cholinolytics.	
19.	Ganglionic drugs. H-cholinomimetics H-cholinolytics	
20.	Adrenergic drugs. Antihistamines.	
21.	Modular control (Colloquium №3)	
	Module 4. MEANS REGULATING THE FUNCTIONS OF SYSTEMS AND ORGANS	
22.	Drugs that affect the cardiovascular system. Cardiac glycosides. Means that normalize heart rate. Antispasmodics	
23.	Agents acting on blood clotting processes. Blood substitutes	
24.	Diuretics (diuretics). Cholagogues. Uterine drugs	
25.	Vitamin drugs. General characteristics, classification, drugs	
26.	General characteristics of hormones and hormonal drugs. Drugs of female sex hormones. Yellow body drugs. Drugs of male sex hormones. Drugs of pituitary hormones. preparations of the adrenal cortex. Drugs of hormones of the pancreas and thyroid glands. Prostaglandins	
27.	Tissue drugs. Enzyme drugs, bacterial drugs. Drugs of amino acids.	
28.	Drugs that affect the metabolism of minerals. Drugs of macro- and microelements	
29.	Modular control (Colloquium №4)	
	Module 5. ANTIMICROBIAL AND ANTI-PARASITIC DRUGS	
30.	Medicinal dyes with predominant antimicrobial action. Medicinal dyes with predominant antiprotozoal action. Sulfanilamide drugs. Complex drugs of sulfanilamides with trimethoprim. Nitrofurans	
31.	Antibiotics. Mechanism of antimicrobial action. Penicillins. Cephalosporins.	
32.	Aminoglycosides. Tetracyclines. Chloramphenicol. Macrolides and azalides. Polymyxins (polypeptide antibiotics)	
33.	Fluoroquinolones. Avermectins. Antibiotics of different groups. Fungicidal antibiotics. feed antibiotics. Phytoncides. Polyphytes. Phytomines	
34.	Antiseptic drugs. Oxidizers. Halogens and halogen-containing agents. Aliphatic drugs. Detergents	
35.	Disinfectants. Formaldehyde group preparations. Chlorine preparations. Chlorine drugs. Acids and alkalis. Phenols, cresols and their derivatives. Quaternary ammonium compounds	
36.	Antiparasitic drugs. Anthelmintic drugs. Insecticides and acaricides	
37.	Antiviral drugs. Antiprotozoal agents. Eimeriostatic agents	
38.	Modular control (Colloquium №5)	

5. Independent work topics

№	Topic title	Number of hours
1.	Writing prescriptions for solid, soft and liquid dosage forms	4
2.	Comparative characteristics of means for inhalation and non-inhalation anesthesia, advantages and disadvantages of their use.	2
3.	Comparative characteristics of medicinal substances that protect sensitive nerve endings from irritation. Prescribing emollient, enveloping, astringent and adsorbing medicinal products	5
4.	Comparative characteristics of drugs that regulate metabolic processes. Prescribing vitamin preparations: individual groups and multivitamins	12
5.	Procedure for using antimicrobial drugs in veterinary medicine. Prescribing antimicrobial drugs	7

6. Samples of control questions, tests for assessing the level of knowledge acquisition by students

1. The main ways of biotransformation of drugs in animals.
2. Features of action of medicines at simultaneous use.
3. General characteristics of enzyme drugs.
4. General characteristics of antipyretics and anti-inflammatory drugs.
5. Structure and classification of cholinergic synapses.
6. Principles of drug dosing. The breadth of pharmacological action.
7. General patterns of pharmacokinetics of drugs.
8. Liquid dosage forms. Requirements for tinctures and extracts.
9. General principles of treatment of animals in case of drug overdose.
10. General characteristics of vitamin drugs.
11. Individual sensitivity of animals to drugs. Idiosyncrasy, tachyphylaxis.
12. Liquid dosage forms. Requirements for solutions.
13. General characteristics of zoocides.
14. General characteristics of anthelmintic drugs.
15. Features of the action of drugs depending on the concentration in the dosage form.
16. Mild dosage forms. Requirements for boluses and pills.
17. General characteristics of drugs that depress the central nervous system.
18. Liquid dosage forms. Requirements for infusions and decoctions.
19. General characteristics of alkalis and acids.
20. General characteristics of sulfur preparations.
21. General characteristics of drugs that act on the efferent nerves.
22. Features of the dosing depending on the age and physiological condition of animals. General principles of dosing.
23. General characteristics of drugs for non-inhalation anesthesia.
24. General characteristics of sulfonamide drugs.
25. Mild dosage forms. Requirements for ointments and liniments.
26. Features of the drug when used in animals of different species.
27. General characteristics of drugs of the phenol group.

28. General characteristics of antibiotics.
29. Methods of studying the pharmacodynamics of drugs.
30. The measure of weight and volume in the recipe. The concept of LD0, LD50, LD100.
31. General characteristics of medicinal dyes.
32. General characteristics of drugs that affect the afferent nerves.
33. General characteristics of tissue drugs.
34. General characteristics of acids.
35. Features of the action of drugs depending on the chemical structure.
36. General characteristics of local anesthetics.
37. General characteristics of antimicrobials. Classification.
38. General principles of storage, release and use of drugs.
39. Pharmacy. Types of pharmacies and requirements for them.
40. Pharmacodynamics of drugs. Types of action of drugs.
41. General characteristics of hormonal drugs.
42. A brief history of pharmacology.
43. General characteristics of salts of alkali and alkaline earth metals.
44. General characteristics of heavy metal drugs.
45. General characteristics of antidotes.
46. Estrogenic hormonal drugs.
47. Vitamin drugs. Drugs of vitamin C.
48. Expectorants of plant and mineral origin.
49. Classification of drugs that protect sensitive nerve endings from irritation.
50. Pure bitters.
51. Hormonal drugs of the thyroid gland.
52. Hormonal drugs of the adrenal cortex.
53. Irritants. Drugs containing essential oils.
54. Antipyretics. Drugs of the salicylic acid group.
55. Drugs of foxglove.
56. Drugs for non-inhalation anesthesia. Ethyl alcohol.
57. Local anesthetics.
58. Vomiting agents of plant origin.
59. Diuretics of plant and mineral origin.
60. Hormonal drugs of the parathyroid gland.
61. Local anesthetics. Anesthesine, novocaine.
62. Binders of plant origin. Tannin, tanofom.
63. Irritants. Ammonia preparations.
64. Psychotropic drugs. Caffeine drugs.
65. Stimulants that act mainly on the spinal cord.
66. Drugs of Iron.
67. Drugs for non-inhalation anesthesia. Barbiturates.
68. Emollients. Vegetable oils and petroleum products.

69. Stimulants that act mainly on the medulla oblongata. Drugs of camphor groups.
70. Features of storage of medicinal substances.
71. Drugs for non-inhalation anesthesia. Chloral hydrate.
72. Drugs of mustard.
73. Vitamin drugs. Drugs of Vitamin K.
74. Androgenic hormonal drugs.
75. Binders of mineral origin. Drugs of zinc.
76. Drugs of vitamins B1 and B12.
77. Narcotic analgesics in veterinary medicine.
78. Aromatic bitters.
79. Antihistamines. Diphenhydramine, diprazine.
80. Hormonal drugs of the pituitary gland.
81. Adsorbents of vegetable and mineral origin.
82. Vomiting drugs of reflex action. Drugs of hellebore.
83. Antipyretics. Drugs of pyrazolone group.
84. Vitamins. Drugs of vitamins D2 and D3.
85. Vitamin drugs. Drugs of vitamin B12.
86. Drugs of lilies of the valley.
87. Vitamin drugs. Drugs of Vitamin A.
88. Sedatives and neuroleptics. Bromine drugs.
89. Vomiting drugs of central action.
90. Arsenic drugs with antiparasitic action.
91. Antimicrobial drugs from the group of phenol.
92. Antibiotics. Penicillin drugs.
93. Diuretics. Herbal drugs.
94. Anthelmintics. Drugs ivomek, oversect.
95. Disinfectants from the group of alkalis.
96. Antimicrobial drugs that give oxygen.
97. Iodine drugs.
98. Antiparasitic drugs. Drugs from the group of ivermectins.
99. Sulfanilamide drugs of medium duration of action.
100. M-cholinomimetics. Drugs.
101. M- and N-cholinomimetics of direct action. Drugs.
102. Antibiotics. Drugs from the group of macrolides (erythromycin, oleandomycin, tylosin).
103. Antibiotics. Tetracycline drugs.
104. Anthelmintics. Classification. Drugs praziquantel and pyrantel.
105. Anthelmintics. Drugs from the group of albendazole.
106. Insecticides. Drugs from the group of carbamic acid derivatives (sevin, baygon).
107. Pesticides. Zinc phosphide, barium carbonate, ratindan.
108. Anticholinesterase drugs. Drugs.
109. M- and N-cholinomimetics of indirect action. Drugs.

110. Cholagogues of plant origin.
111. Antibiotics. General characteristics, classification. Side effect.
112. M-cholinolytic agents. Atropine drugs.
113. N-cholinomimetics. Drugs.
114. Anthelmintics. Herbal drugs.
115. Antimicrobial and antiparasitic drugs from the group of nitrofurans.
116. Antimicrobial and antiparasitic drugs - quinoline derivatives (trichomonacid, enteroseptol, piroplasmin).
117. Antimicrobial and antiparasitic drugs - derivatives of benzidine (trypan blue).
118. Drugs of heavy metals with antimicrobial action.
119. Insecticides. Drugs from the group of pyrethroids. Stomazan, cypermethrin.
120. Antimicrobial and antiparasitic drugs – derivatives of aniline and rosaniline (pyoctanine, diamond green).
121. Sulfanilamide drugs of prolonged action.
122. Sulfanilamide drugs of long action.
123. Adrenomimetics of direct action.
124. Antimicrobial drugs from the chlorine group.
125. Anthelmintics. Drugs of mineral origin.
126. Adrenolytic agents. Drugs from rye horns.
127. Anthelmintics. Drugs from the group of chlorinated hydrocarbons.
128. Antimicrobial drugs of the iodine group.
129. Antimicrobials containing cresol.
130. Sulfanilamide drugs of short action.
131. Antiparasitic drugs from the sulfur group.
132. Adrenomimetics of indirect action. Drugs.
133. N-cholinolytic agents. Muscle relaxants.

<i>Test tasks of different types</i>	
1. Mark the drugs that act on the efferent nerves according to the pharmacological group:	
1 Arecoline hydrobromide, pilocarpine hydrochloride, aceclidine	A. anticholinesterase drugs
2 Physostigmine salicylate, proserine, galantamine hydrochloride	B. M- and N-cholinomimetics
3 Atropine sulfate, scopolamine hydrobromide, platyphylline hydrotartrate	C. M-cholinolytics
2. What are the natural sources of salicylic acid?	
<i>(write the correct answer in the answer sheet)</i>	
3. Which Latin names of dosage forms correspond to those in Ukrainian?	
1 infusion	A Mucilago
2 medical fees	B Species
3 mucus	C Infusum
4 decoction	D Decoctum
4. Irritants, acting on sensitive receptors, have local, reflex, "distracting" and resorptive effects, right or wrong?	
1	True
2	Wrong
5. Cardiac glycosides are contained in:	
1. Dope ordinary	
2. Foxglove	

3. Peppermint 4. Echinacea purpurea	
6. Which group of drugs has mechanism of action which associated with antagonism with paraaminobenzoic acid?	
<i>(write the correct answer in the answer sheet)</i>	
7. How many parts does the recipe consist of?	
<i>(write the correct answer in the answer sheet)</i>	
8. Which group of drugs is not used as disinfectants?	
1. Phenols 2. Chlorine preparations 3. Acids 4. Alkali	
9. List the routes of administration of calcium chloride.	
<i>(write the correct answer in the answer sheet)</i>	
10. Purine alkaloid is:	
1. Camphor 2. Strychnine 3. Corazol 4. Securinin 5. Caffeine	
11. Mark the following drugs and the groups of laxatives accordingly:	
1 sodium sulfate, magnesium sulfate	A. synthetic laxatives
2 castor oil, sunflower oil, linseed oil	B. laxative vegetable oils
3 sabur, rhubarb root, buckthorn bark, senna leaves	C. plant laxatives containing anthraglycosides
4 phenolphthalein, isaphenine	D. salt laxatives
12. What are the features of the pharmacological action of theobromine, theophylline and theminal?	
<i>(write the correct answer in the answer sheet)</i>	
13. Dosage form is:	
1	medicinal substance (substances) in the appropriate dosage form, which has a rational name and which is allowed for commercial release, clinical trials or practical application.
2	materials of various origins used to obtain medicinal substances suitable with their physical and chemical properties for therapeutic and prophylactic purposes or pharmacological research.
3	medicinal substance or raw material, which by special technological processing in a pharmacy or pharmaceutical plant is given a special form, the most convenient and appropriate to achieve the highest therapeutic or prophylactic effect
4	a substance of inorganic or organic nature (vegetable, animal, mineral, microbial, synthetic origin) that has biological or pharmacological activity and can be used to treat sick animals and humans, or is a means for prevention of disease or pharmacological research.
14. N-cholinomimetics excite N-cholinoreceptors of carotid glomeruli, and reflexively act as stimulators of respiration through the center of the medulla oblongata, narrow blood vessels and increase blood pressure, right or wrong?	
1	True
2	Wrong
15. Name the Latin names of ointments, infusions, decoctions, mucus?	
<i>(write the correct answer in the answer sheet)</i>	
16. What are the properties of methyl salicylate?	
1. well soluble in oils powder 2. white, well soluble in water crystals 3. slightly yellowish liquid with a specific odor 4. white water-soluble plates	
17. Which acid derivatives are novocaine, dicaine?	
<i>(write the correct answer in the answer sheet)</i>	
18. Pantocide belongs to the group:	

1. chlorine	
2. iodine	
3. sulfur	
4. formaldehyde	
5. phenols	
19. What are the features of non-narcotic analgesics?	
<i>(write the correct answer in the answer sheet)</i>	
20. M-cholinolytic substances block M-cholinoreactive systems, as a result of which they become insensitive to acetylcholine, which is manifested by decreased glandular secretion, weakening of the smooth muscles of the digestive tract, bronchi, decreased bronchial secretion, increased heart rate, dilated pupils (mydriasis), increased intraocular pressure and farsightedness, true or wrong?	
1	True
2	Wrong
21. In the preparation of oil emulsion, which of these components correspond to a ratio of 2: 1: 17?	
2	oil
1	emulsifier
17	water
4. What is indicated in Designatio materiarum ?	
<i>(write the correct answer in the answer sheet)</i>	
6. What is the name of the group of drugs, the action of which is reduced to increased secretion of saliva and gastric juice, which occurs reflexively due to irritation of taste-sensitive receptors in the oral cavity?	
<i>(write the correct answer in the answer sheet)</i>	
7. Which hormonal drug has a positive effect on phospholipid metabolism, lipid utilization and accelerates fat metabolism?	
1. Insulin	
2. Cortisone	
3. Thyroidin	
4. Lipocaine	
8. What is the name of a group of drugs whose mechanism of action is to inactivate thrombogenic substances and / or to counteract the normal synthesis of prothrombin in the liver?	
<i>(Enter the correct answer in the answer sheet)</i>	
9. Choose an antibiotic from the group of macrolides:	
1. Emonovocillin	4. Erythromycin
2. Kanamycin	5. Streptomycin
3. Gentamicin	
10. Hexamethylenetetramine belongs to the group of :	
1. Alkali	4. Formaldehyde
2. Acids	5. Sulfur
3. Phenol	

7. Teaching methods

Lecture presentations, video recordings of lectures, electronic lecture notes (in the form of a resource book on an electronic course), electronic and printed educational and methodological developments are used for the study of the discipline in order for students to assimilate the lecture material in the educational process.

More than 400 samples of medicinal products in natural form and in original packaging, atlas and herbariums of medicinal plants, exhibition stands of medicinal products of leading domestic and foreign pharmaceutical manufacturers, visual material on general and special pharmacology in the form of classroom stands,

electronic and printed educational methodical developments, H5P applications are used for students' assimilation of the material of laboratory classes.

Of the equipment in the educational laboratory, pharmacy dishes, infusion devices, scales, microscopes, photoelectrocolorimeters, dispensers, and bolus dispensers are used. From the technical means of education a laptop, a multimedia projector are used.

In the educational process, methods of partial search, or heuristic method, reproductive method, and method of problem presentation are used.

8. Forms of assessment

Control of students' knowledge and skills (current and final) in the discipline is carried out according to the credit-module system of the organization of the educational process. The student's rating for mastering the discipline is determined on a 100-point scale. It consists of a rating for academic work, for the assessment of which 70 points are assigned, and a rating for attestation (credit) – 30 points.

In laboratory classes, each student performs individual tasks on each topic.

9. Distribution of grades received by students

Evaluation of student knowledge is carried out on a 100-point scale and is converted to national grades according to Table 1 "Regulations and Examinations and Credits at NULES of Ukraine" (order of implementation dated 03.03.2021, protocol №7).

Student rating, points	National grade based on exam results	
	Exams	Credits
90-100	Excellent	Passed
74-89	Good	
60-73	Satisfactory	
0-59	Unsatisfactory	Not passed

In order to determine the rating of a student (listener) in the discipline R_{dis} (up to 100 points), the rating from the exam R_{ex} (up to 30 points) is added to the rating of a student's academic work R_{aw} (up to 70 points): $R_{dis} = R_{aw} + R_{ex}$.

10. Educational and methodological support

1. Guidelines for laboratory classes of the discipline «Veterinary pharmacology» Module 2. Drugs affecting the central nervous system) / [I. M. Derkach, V.B. Duhnysky, V. D. Ischenko, et al.] // К.: Видавничий центр «Компринт». – 2022. – С. 32.

2. Guidelines for laboratory classes of the discipline «Veterinary

pharmacology» Module 3. Drugs affecting the peripheral nervous system / [I. M. Derkach, V.B. Duhnysky, V. D. Ischenko, et al.] // К.: Видавничий центр «Компринт». – 2022. – С. 32.

3. Guidelines for laboratory classes of the discipline «Veterinary pharmacology» Module 4. Drugs regulating the functions of organs and system / [I. M. Derkach, V.B. Duhnysky, V. D. Ischenko, et al.] // К.: Видавничий центр «Компринт». – 2022. – С. 32.

4. Guidelines for laboratory classes of the discipline «Veterinary pharmacology» Module 5. Antimicrobial and antiparasitic drugs / [I. M. Derkach, V.B. Duhnysky, V. D. Ischenko, et al.] // К.: Видавничий центр «Компринт». – 2022. – С. 32.

5. Fundamentals of prescription writing “Guideline for practical training in “Veterinary pharmacology” course for students of Faculty of Veterinary Medicine / V.B. Duhnysky, I. M. Derkach, V. D. Ischenko, et al. // К.: Видавничий центр «Компринт». – 2017. – С. 45.

6. Guidance for educational practice for the students of degree "Bachelor" taught cours "Veterinary Pharmacology" / V. B. Duhnysky, I. M. Derkach // К.: Видавничий центр «Компринт». – 2017. – С. 38.

11.Recommended sources of information

Basic literature

1. Veterinary pharmacology / Dukhnicky V., Derkach I., Vosnuk T. – К., 2019.

2. Fundamentals of prescription writing / I.M. Derkach – Kyiv : Comprint, 2022. 128 p.

3. Ветеринарна фармакологія: підручник / Хмельницький Г.О., Духницький В.Б. – К., 2017. – 571 с.

4. Аптечний практикум (навчальний посібник для лабораторних занять з дисципліни «Ветеринарна фармакологія» для студентів ОС «Бакалавр» та «Магістр» / В.Б. Духницький, І.М. Деркач – К.: ЦП Компринт, 2017, 162 с.

5. Сучасна фармакологічна термінологія у ветеринарній медицині/ В.Б. Духницький, І.М. Деркач – К.: ЦП Компринт, 2017, 202 с.

6. Довідник з ветеринарної фармакології / В.Б. Духницький, І.М. Деркач, В.Д. Іщенко, О.К. Гальчинська – Київ : ЦП «Компринт», 2019. – 232 с.

Additional literature

7. Державна фармакопея України. Перше видання. – Х.: РЕПІГ, 2002. Ветеринарні препарати / О.І. Канюка, І.І. Харів, В.М. Гунчак, Д.Ф. Гуфрій. – Львів, 2006. – 641 с.

8. Comparative and Veterinary Pharmacology / Cunningham F., Elliott J., Lees P. // Springer Heidelberg Dordrecht London New York, 2010. – 351 p.

9. Handbook of Veterinary Pharmacology / Walter H. Hsu // Wiley-Blackwell, 2008. – 564 p.

10. Pharmacology / Franklin A. Ahrens // Williams&Wilkins, 1996. – 313 p.

Internet sources

1. Handbook of comparative veterinary pharmacokinetics and residues of rescities and environmental contaminants [Электронный ресурс] // Veterinary books – Режим доступа до ресурсу: https://books.google.com.ua/books?id=nNbXUFMiD4AC&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

2. Pharmacology and therapeutics for dentistryhttps [Электронный ресурс] // Veterinary books – Режим доступа до ресурсу: https://books.google.com.ua/books?id=utVOHYuhxioC&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

3. Veterinary anaesthesia and pain managment secrets [Электронный ресурс] // Veterinary books – Режим доступа до ресурсу: https://books.google.com.ua/books?id=12tfG6xnIwYC&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

4. Small animal clinical pharmacology and terapeutic [Электронный ресурс] // Veterinary books – Режим доступа до ресурсу: https://books.google.com.ua/books?id=yDjDr_MLGSsC&printsec=frontcover&hl=ru&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false