



MINISTRY OF HEALTH OF UKRAINE
NATIONAL UNIVERSITY OF PHARMACY
Faculty of pharmacy
Department of pharmaceutical technology of
drugs

**TECHNOLOGY OF VETERINARY
PREPARATIONS**

(the name of educational component)

**WORK PROGRAM
of a course**

training for master
(Higher Educational Level Name)
in specialty « 22 Public Health »
(Code and Specialty Name)
field of knowledge « 226 Pharmacy, industrial pharmacy »
(Code and Knowledge Field Name)
of educational program « Pharmacy for foreign students (Language of Instructions - English) »
(Educational Program Name)
in specialization(s) _____
(name of specialization, if available)

2023
year of creation

Work program of a course «Technology of veterinary preparations» in specialty 226 Pharmacy, industrial pharmacy of educational program Pharmacy for foreign students (Language of Instructions - English) for applicants for higher education 4 year.

Educational course team:

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(indicate the authors' full name, their positions, scientific and academic degree)

The work program was reviewed and approved at the meeting of the pharmaceutical technology of drugs

Record No. 1 from "1" of September 2023

Head of the department



_____ prof. Liliia VYSHNEVSKA

The work program was approved at a meeting of the specialized methodological commission for technological disciplines

Record No. 1 from 1 September 2023

Head of the specialized commission



_____ prof. Olena RUBAN

1. The Description of the Course

The language of the study: English.

Course Status: selective.

Prerequisites for studying the educational component: the educational component is based on the theoretical provisions of physics, mathematics, botany, anatomy and physiology of animals, microbiology, physical and colloidal chemistry, as well as pharmacognosy, pharmaceutical chemistry, pharmacology, pharmaceutical chemistry, and integrates with these disciplines.

The **subject** of the study of the selective educational component "Technology of veterinary preparations" is the state of the market for veterinary drugs and animal protection products in Ukraine and the availability of veterinary drugs to navigate in the nomenclature of domestic and foreign veterinary drugs.

Interdisciplinary connections: the educational component is based on the theoretical positions of physics, mathematics, botany, human anatomy and physiology, microbiology, physical and colloidal chemistry, as well as pharmacognosy, pharmaceutical chemistry, pharmacology, pharmaceutical and pharmaceutical chemistry and integrates with these educational components.

Information volume of the academic educational component. The study of the academic educational component is allocated 90 hours 3 ECTS credits.

2. Objectives and tasks of the course

The objective of teaching the course "Technology of veterinary preparations" is to deepen professional knowledge of the Technology of veterinary preparations and animal protection products, to determine the effect of storage conditions and the type of packaging on their stability.

The **main tasks** of the course "Technology of veterinary preparations" are:

- learn the basic concepts and terms of veterinary medicine and veterinary pharmacy; directions of state regulation of production and sale of veterinary drugs;
- learn the structure of the recipe for veterinary drugs; principles of drug dosage in veterinary practice;
- to master the theoretical foundations of pharmacy and industrial technology of various dosage forms used in veterinary medicine;
- master the constant control of veterinary drugs and animal protection products.

3. Competence and planned educational outcomes

The course "Technology of veterinary preparations" provides acquisition of *competencies* by applicants for higher education:

- *integrated:*

the ability to consider typical and specialized practical problems in professional pharmaceutical activity using the provisions and methods of fundamental, professionally oriented, including technological sciences, solve complex issues, formulate judgments on insufficient and limited information, substantiate, clearly and unambiguously convey their conclusions and knowledge to a professional and non-professional audience.

- *general:*

GC 6. Knowledge and understanding of the subject area and understanding of professional activity.

GC 11. Ability to evaluate and ensure the quality of performed works.

- *special (professional, subject):*

PC14. The ability to organize and carry out the production activities of pharmacies for the manufacture of medicinal products in various dosage forms according to the prescriptions of doctors and orders of medical institutions, including the justification of technology and the selection of auxiliary materials in accordance with the rules of Good Pharmacy Practice (GPP).

Integrative final program learning results, the formation of which is facilitated by the educational component.

Integrative final program learning outcomes (PLO), the formation of which is facilitated by the educational component:

PLO 3. To comply with the norms of the sanitary and hygienic regime and the requirements of safety equipment when carrying out professional activities.

PLO 4. Demonstrate the ability to independently search, analyze and synthesize information from various sources and use

these results to solve typical and complex specialized tasks of professional activity.

PLO 5. To position one's professional activity and personal qualities on the pharmaceutical labor market; formulate the goals of one's own activity taking into account public and industrial interests.

PLO 7. Perform professional activities using creative methods and approaches.

PLO 26. Choose a rational technology, manufacture medicinal products in various dosage forms according to the prescriptions of doctors and orders of medical institutions, prepare them for release. Perform technological operations: weigh, measure, dose various medicinal products by weight, volume, etc. Develop and draw up technological documentation for the manufacture of medicinal products in pharmacies.

As a result of studying the course, the applicant for higher education will be able to *know*:

- basic concepts and terms of veterinary medicine and veterinary pharmacy;
- directions of state regulation of production and sale of veterinary drugs;
- the structure of the prescription and registration dossier for veterinary drugs;
- principles of dosage of medicines in veterinary practice;
- theoretical foundations of the Technology of veterinary preparations and animal protection products in pharmacy and field conditions;
- determination of the influence of storage conditions and the type of packaging on the stability of veterinary drugs and animal protection products.

do:

- to formulate the basic concepts and terms of veterinary medicine and veterinary pharmacy;
- to use normative and reference literature on the issues of prescribing, preparing and standardizing the quality of veterinary medicinal products;
- navigate the range of domestic and foreign veterinary drugs;
- to formulate directions of state regulation of production and sale of veterinary drugs;
- take into account the factors affecting the dosage of medicinal substances for animals;
- to substantiate the technology of veterinary medicinal products in the form of various dosage forms (solid, soft veterinary dosage forms, veterinary medicinal products with a liquid dispersion medium, suppository dosage forms, pressurized medicinal products, aseptic dosage forms, specific veterinary dosage forms);
- to evaluate the quality of medicinal products for the treatment of animals, to register them before the release.

have:

- basic concepts and terms of veterinary medicine and veterinary pharmacy;
- directions of state regulation of production and sale of veterinary drugs;
- knowledge on the structure of the prescription and registration dossier for veterinary drugs;
- principles of drug dosage in veterinary practice;
- theoretical foundations of the Technology of veterinary preparations and animal protection products in pharmacy and field conditions;
- knowledge to determine the effect of storage conditions and the type of packaging on the stability of veterinary drugs and animal protection products.

4. Structure of the course

Names of content modules and topics	The amount of hours			
	full time study			
	the whole amount	including		
l		p.l.	self-stude	
Semantic module 1. The current state of veterinary pharmacy. Technology of veterinary preparations				

Theme 1. The current state of veterinary pharmacy. State regulation of the production and sale of veterinary drugs.	14	2	4	8
Theme 2. Solid veterinary dosage forms.	13	1	4	8
Theme 3. Veterinary drugs with liquid dispersion medium.	14	2	4	8
Theme 4. Soft veterinary dosage forms. Medicines for rectal and vaginal use.	14	2	4	8
Theme 5. Specific veterinary dosage forms. Medicines contained under pressure in veterinary practice.	13	1	4	8
Theme 6. Semestr module control	22		4	18
The whole amount of hours for the course	90	8	24	58

5. Contents of the course

Theme 1. The current state of veterinary pharmacy.

Basic concepts and terms of veterinary medicine: veterinary medicine, veterinary pharmacy, veterinary drugs, feed, feed additives, animals, etc. The main tasks of veterinary medicine. Government bodies in the field of veterinary medicine. The history of the development of veterinary medicine The emergence of veterinary pharmacy. Tasks of the Technology of veterinary preparations as a science and academic educational component. International cooperation in the field of veterinary medicine. Bureau International des Epizootics, its tasks and functions. International Veterinary Code.

State regulation of the production and sale of veterinary drugs.

State regulation of the production and sale of veterinary drugs. The structure of the registration dossier. Current state of the market for veterinary drugs. The range of veterinary drugs on the Ukrainian market. Good manufacturing practice requirements for the preparation of non-sterile and sterile veterinary medicinal products. Basic requirements for the premises of the pharmacy, its employees, etc. Peculiarities of writing prescriptions for veterinary drugs in accordance with the order of the State Committee of Veterinary Medicine of Ukraine No. 97 dated 03.06.2008. Principles of dosage of drugs in veterinary practice. Factors affecting the dosage of medicinal substances for animals.

Theme 2. Solid veterinary dosage forms.

Veterinary dosage forms: classification, routes of administration, principles of selection of dosage forms for the treatment of animals.

Powder in veterinary practice. Requirements for them. Dusti. Characteristic. Use in veterinary practice. Premix as a specific veterinary dosage form. Classification of premixes by composition, purpose, depending on the pharmacological group of substances. Biologically active and auxiliary substances from prefixes. The value of antioxidants, detergents and others in premixes. Introduction of premixes into animal feed and use in veterinary practice. Briquettes. Use in veterinary practice.

Theme 3. Veterinary drugs with liquid dispersion medium.

Liquid dosage forms for internal use in veterinary practice (solutions, potions, drops, syrups) and external use (ear and nasal drops, baths, etc.).

Liquid specific dosage forms for external use in veterinary practice (bathing concentrates, solutions for irrigation, spot application, for treating udder, washing the udder, etc.), impregnation concentrates, etc. Shampoos in veterinary practice.

Theme 4. Soft veterinary dosage forms. Medicines for rectal and vaginal administration.

Characteristics of soft dosage forms. Classification. Application for the treatment of animals.

Characteristics of rectal dosage forms used in veterinary practice.

Medicines for vaginal use. Porridge and boluses as veterinary dosage forms. Prescription rules for boluses and gruels. Calculation of medicinal and auxiliary substances for the preparation of boluses and cereals. Technology and application of boluses and cereals in veterinary medicine.

Medical plasters, their classification by functional purpose, composition and state of aggregation.

Application for the treatment of animals.

Theme 5. Specific veterinary dosage forms. Medicines under pressure in veterinary practice.

Characteristics of drugs under pressure; the positive aspects of their use in veterinary practice. Classification by action and application. Specific veterinary dosage forms.

Stripes. Characteristic. Use for the treatment of bees. Collars as a veterinary dosage form. Characteristics of application in veterinary medicine. Features of their use in veterinary practice. Diet rations. Use in veterinary practice.

Intrauterine rigid dosage forms (tablets, capsules, sticks). HFC requirements for them. Foam tablets in the form of sticks. Application for the treatment of animals. Intracarcaral hard drugs. Definition. Characteristic.

Characterization of rare dosage forms for intrauterine use in the treatment of animals (solutions, suspensions, emulsions). Features of application in veterinary practice. Intramamar veterinary drugs.

Theme 6. Final module control.

Final module control is carried out in order to check the level of assimilation of theoretical material.

Theoretical knowledge is controlled by a written survey on individual cards.

6. Topics of lectures

№	Name of theme	The amount of hours
		full time study
1	Veterinary medicine as a science and its tasks. The current state of veterinary pharmacy.	1
2	State regulation of the production and sale of veterinary drugs. International cooperation in the field of veterinary medicine.	1
3	Solid veterinary dosage forms.	1
4	Veterinary drugs with liquid dispersion medium for internal use.	1
5	Veterinary drugs with liquid dispersion medium for external use.	1
6	Soft veterinary dosage forms.	1
7	Veterinary products for rectal and vaginal use.	1
8	Specific veterinary dosage forms. Medicines under pressure.	1

7. Topics of seminars

Not included in the work curriculum

8. Topics of practical lessons

№	Name of theme	The amount of hours
		full time study
1	Veterinary medicine as a science and its tasks. The current state of veterinary pharmacy.	4
2	State regulation of the production and sale of veterinary drugs. International cooperation in the field of veterinary medicine.	4
3	Solid veterinary dosage forms.	4
4	Veterinary drugs with liquid dispersion medium.	4
5	Soft veterinary dosage forms. Medicines for rectal and vaginal use.	4
6	Specific veterinary dosage forms. Medicines under pressure.	2
	Semestr module control	2

9. Topics of laboratorial lessons

Not included in the work curriculum

10. Self-study work

№	Name of theme	The amount of hours
		full time study
1	Veterinary medicine as a science and its tasks. The current state of veterinary pharmacy State regulation of production and sale of veterinary drugs International cooperation in the field of veterinary medicine.	4
2	Solid veterinary dosage forms.	4
3	Veterinary drugs with liquid dispersion medium.	10
4	Soft veterinary dosage forms. Medicines for rectal and vaginal use.	10
5	Medicines under pressure.	10
6	Specific veterinary dosage forms. Preparation for the final modular control.	20
The whole amount of hours		58

Tasks for self-study work

- To get acquainted with the history of the development of veterinary medicine, the emergence of veterinary pharmacy.
- Get acquainted with the work of the Bureau International des Epizootics, its tasks and functions. International Veterinary Code. Factors affecting the dosage of the drug for animals.
- To master the classification of veterinary forms and the principles of selection of dosage forms for animals.
- Master the choice of excipients in the technology of solid veterinary dosage forms. To get acquainted with the features of application in veterinary practice, their characteristics and application for the treatment of animals.
- Get acquainted with the characteristics of medical soap and its use in veterinary practice. To get acquainted with the characteristics and classification of syrups, their nomenclature and application in veterinary practice.
- To get acquainted with the characteristics of industrial production of veterinary extraction dosage forms.
- Analyze the use of liniment in veterinary practice.
- Consider the carriers of medicinal substances in ointments for the treatment of animals and their characteristics.
- Become familiar with the basics of suppositories for the treatment of animals and their characteristics. To learn the rules for introducing medicinal substances with different physical and chemical properties into suppository bases.
- Get acquainted with the characteristics of premixes and their use in veterinary practice.
- Get acquainted with the characteristics of excipients in premix technology.
- Analyze the assortment of premixes on the Ukrainian market.
- Understand the rules of prescribing boluses and gruels, their packaging and design for vacation.

11. Individual tasks

Not included in the work curriculum

12. Criteria and evaluation order of educational outcomes

The criteria for assessing the knowledge and skills of applicants for higher education in the

educational component "Technology of veterinary preparations" have been developed in accordance with the "Regulations on the procedure for assessing students' knowledge in the credit-modular organization of the educational process at NUPh".

The assessment of a student's progress in the educational component is rating, it is set on a 100-point scale and has a definition according to the ECTS system and according to the traditional scale adopted in Ukraine. At the Department of Drug Technology, students' work is assessed in points on a 100-point scale.

Assessment of current educational activities (carried out during each seminar) - test written control, control of theoretical knowledge and practical skills. When mastering each topic of the module for the current educational activity, students are given points for all types of activities, which are summed up at the end of the study of the module.

The assessment (in points) is reflected in the calendar-thematic plans of the seminars.

When assessing the assimilation of the topic, the theoretical preparation of the student, practical skills, testing and the ability to solve situational problems are taken into account.

The number of points received by a student in a seminar is 6-10 (full-time), 9-15 (evening), 18-30 (correspondence).

In the event that a student came to the lesson unprepared, he must be present at the lesson. After an individual conversation with the teacher on the topic of the lesson, the student is allowed to practical work.

At the department of drug technology, if they are absent from class for any reason (respectful or disrespectful), students must complete the classes in full, with admission from the dean's office to their own or the teacher on duty according to the schedule of the department in a free laboratory.

The sum of points for the study of FM is the sum of the points received by the student during the study of all topics of the content module.

Criteria for assessing	Points
	full time study
Student showed a high level of training, namely: <ul style="list-style-type: none"> ➤ showed comprehensive and in-depth knowledge of theoretical material on the topic of the lesson, set out in the manual, lecture texts and recommended additional literature; ➤ actively participated in the discussion on the topic of the lesson ➤ solved a situational problem ➤ gave comprehensive answers to the theoretical questions of the teacher. 	8-9
Student showed a sufficient level of preparation, namely: <ul style="list-style-type: none"> ➤ showed full knowledge of the theoretical material on the topic of the lesson, set out in the textbook and lecture texts; ➤ answered theoretical questions of the teacher with minor flaws; ➤ solved the situational problem not quite independently. 	6-7
Student is not sufficiently prepared for the lesson, namely: <ul style="list-style-type: none"> ➤ showed knowledge of theoretical material on the topic of the lesson in an amount that is considered necessary and sufficient; ➤ solved a situational problem with the help of a teacher. 	5
The student did not prepare for the lesson, namely: <ul style="list-style-type: none"> ➤ did not get acquainted with the theoretical material on the topic of the lesson set out in the textbook and lecture texts; ➤ did not solve the situational problem. 	0

The assimilation of the topic (current control) is carried out at each seminar lesson in accordance with the specific goals of the topic, during the individual work of the teacher with the student for topics that the student works independently (not included in the structure of the seminar lesson) by oral questioning.

Self-study work is monitored during each seminar lesson, during the control of the content module and during the final modular control.

The final control of the assimilation of the module is carried out upon its completion at the last seminar lesson by means of a written questioning on the cards (control of theoretical knowledge). Students who have completed all types of work stipulated by the curriculum and, while studying the module, have scored at least the minimum number of points are allowed to the final control.

The assessment of the module is defined as the sum of the assessments of the current educational activity and the assessment of the final module control. The assessment of a student's progress in the educational component is rating, it is set on a 100-point scale and has a definition according to the ESTS system and according to the traditional scale adopted in Ukraine. The module is considered credited if the student scored less than 60 points.

For students who want to improve their performance in the educational component, the final control of the mastery of the module is carried out additionally according to the schedule approved by the educational institution.

Criteria for assessing	Points
<p><i>Theoretical preparation:</i></p> <ul style="list-style-type: none"> ➤ gave an exhaustive answer to a theoretical question; <p><i>practical training:</i></p> <ul style="list-style-type: none"> ➤ gave answers to 9-10 test tasks without errors. 	36-40
<p><i>Theoretical preparation:</i></p> <ul style="list-style-type: none"> ➤ answered a theoretical question with minor flaws; <p><i>practical training:</i></p> <ul style="list-style-type: none"> ➤ answered a theoretical question with minor flaws. 	31-35
<p><i>Theoretical preparation:</i></p> <ul style="list-style-type: none"> ➤ answered theoretical questions with errors or did not give at all; <p><i>practical training:</i></p> <ul style="list-style-type: none"> ➤ gave answers to 6 test tasks. 	25-30
<p><i>Theoretical preparation:</i></p> <ul style="list-style-type: none"> ➤ did not answer a theoretical question; <p><i>practical training:</i></p> <ul style="list-style-type: none"> ➤ did not answer the test tasks. 	0-24

Scoring scheme and distribution of points

Ongoing testing and independent work								Sum
Module 1								
	T1	T2	T3	T4	T5	T6	MC	
Full time study	6-10	6-10	6-10	6-10	6-10	6-10	25-40	61-100
36-60								

T1, T2 ... T6 – module themes.

13. Forms of progress and final tests of academic achievements credit.

14. Teaching course materials

1. Academic education program.
2. Calendar plan of lectures and practical classes.
3. Totorial.
4. Multimedia texts of lectures.
5. Video films.
6. Methodical recommendations for classroom work of students.

7. Methodological support of control of students' knowledge (control tasks and tests), criteria for their assessment, standards of answers.
8. –Tests to determine the basic, current and final level of knowledge. A set of situational tasks for classes.
9. Educational equipment, technical teaching aids.

Reading suggestions Main

1. Tykhonov O. I., Yarnykh T. G., Rukhmakova O. A. Pharmacy - based technology of drugs : the manual for applicants of higher education. 2019. Kharkiv : NUPhGolden Pages. – 301 p
2. Technology of veterinary preparations: method. rec. for preparation for the control of the content module / T. G. Yarnykh [et al.] ; under the editorship T. G. Yarnykh. - Kharkiv: NUPh, 2023. - 30 p.
3. Technology of veterinary preparations: method. rec. for independent work of students of higher education/ T. G. Yarnykh [etc.] ; under the editorship T. G. Yarnykh. - Kharkiv: NUPh, 2023. - 48 p.

Subsidiary

1. State Pharmacopoeia of Ukraine / SE "Ukrainian Scientific Pharmacopoeia Center for the Quality of Medicinal Products". 1st edition Kharkiv: State Enterprise "Ukrainian Scientific Pharmacopoeial Center for the Quality of Medicinal Products", 2014. Vol. 2. 724 p.
2. State Pharmacopoeia of Ukraine / SE "Ukrainian Scientific Pharmacopoeia Center for the Quality of Medicinal Products". 2nd edition Kharkiv: State Enterprise "Ukrainian Scientific Pharmacopoeia Center for the Quality of Medicines", 2015. Vol. 3. 732 p.
3. State Pharmacopoeia of Ukraine / SE "Ukrainian Scientific Pharmacopoeia Center for the Quality of Medicinal Products" 2nd ed. Kharkiv: State enterprise "Ukrainian Scientific Pharmacopoeia Center for the Quality of Medicinal Products". 2015. Vol. 1. 1128 p.

1. Information resources on the Internet

1. Сайт кафедри аптечної технології ліків: www.atl.nuph.edu.ua
2. Центр дистанційних технологій НФаУ – <http://pharmel.kharkiv.edu>
3. Електронний архів бібліотеки НФаУ . <http://lib.nuph.edu.ua>