MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
STATE BIOTECHNOLOGICAL UNIVERSITY
Faculty of Veterinary Medicine

APPROVED by
Head of the Epizootology and Microbiology Department


(signature) R.V. Severin (surname and initials)

«20» June 2025 p

EPIZOOTOLOGY AND MICROBIOLOGY DEPARTMENT
(name of the department)

WORKING PROGRAM
OF EDUCATIONAL DISCIPLINE
VETERINARY VIROLOGY
(code and name of academic discipline)

Level of higher education	The second level of higher education (master's) (name)
Branch of knowledge	21 Veterinary medicine (code and name)
Specialty	211 Veterinary medicine (code and name)
Educational program	educational and professional program "Veterinary Medicine" (name)

Kharkiv – 2025

Compilers: associate professors Severyn R.V., Garagulya G.I.,
candidates of veterinary sciences Basko S.O.
(academic title, position, surname and initials)

The working program of the academic discipline was approved at an extended meeting of the department Department of epizootology and microbiology
Minutes dated the_26_» _June__2025, No._13_.

The work program has been agreed.

Guarantor of the educational program "Veterinary Medicine"
(name of OPP)

June the 23d 2025 (_____) Naumenko S.V.
(signature) (surname and initials)

Translated and layout created by R.V.Severin, cand. of vet. sci., associate professor, Head of the Department of Epizootology and Microbiology of SBTU

The validity period has been extended to:

" __ " _____ 20 __ . Minutes № ___ from ____ " _____ 20 ___ p.
head of the department _____ _____ (_____)
(name of department) (signature) (surname and initials)

" __ " _____ 20 __ . Minutes № ___ from ____ " _____ 20 ___ p.
head of the department _____ _____ (_____)
(name of department) (signature) (surname and initials)

" __ " _____ 20 __ . Minutes № ___ from ____ " _____ 20 ___ p.
head of the department _____ _____ (_____)
(name of department) (signature) (surname and initials)

1 Description of the academic discipline

<table>
<tr><td rowspan="2">Name of indicators</td><td colspan="4">Characteristics of the academic discipline</td></tr>
<tr><td colspan="4">full-time education</td></tr>
<tr><td rowspan="2">Number of credits
6</td><td colspan="4">Discipline status:</td></tr>
<tr><td colspan="4">mandatory</td></tr>
<tr><td rowspan="3">Sections - 2</td><td colspan="4">Year of training:</td></tr>
<tr><td>3-th</td><td>-th</td><td>-th</td><td>-th</td></tr>
<tr><td colspan="4">Semester</td></tr>
<tr><td rowspan="11">The hours' amount of discipline 180.</td><td>5-th</td><td>6-th</td><td>-th</td><td>-th</td></tr>
<tr><td colspan="4">Lectures</td></tr>
<tr><td>30 hours</td><td>hours</td><td>hours</td><td>hours</td></tr>
<tr><td colspan="4">Laboratory</td></tr>
<tr><td>44 hours</td><td>hours</td><td>hours</td><td>hours</td></tr>
<tr><td colspan="4">Self-study</td></tr>
<tr><td>76 hours</td><td>hours</td><td>hours</td><td>hours</td></tr>
<tr><td colspan="4">Educational practice</td></tr>
<tr><td>30 hours</td><td>- hours</td><td>- hours</td><td>- hours</td></tr>
<tr><td colspan="4">Term paper</td></tr>
<tr><td>- hours</td><td>- hours</td><td>- hours</td><td>30 hours</td></tr>
<tr><td rowspan="2">Weekly hours for full-time education:
classrooms – 74
independent work of the acquirer - 76</td><td colspan="4">Type of control:</td></tr>
<tr><td>Final exam.</td><td>-</td><td>-</td><td>-</td></tr>
</table>

1. The purpose and tasks of the discipline

The goal of the "Veterinary Virology" discipline is to provide students with thorough knowledge of viruses, their biological properties, genetics, ecology, and the diseases they cause in animals and humans.

The task of studying the discipline consists in forming in the future doctor of veterinary medicine an understanding of the role of viral infections in the pathology of animals and humans, problems in their diagnosis, treatment and prevention.

The subject of study of the academic discipline is the study by students of the properties of viruses and the mastering of methods of virological research in the course of laboratory diagnostics of viral infections and the main regularities of their specific prevention.

The basic disciplines for the successful assimilation of the program material of the discipline are the assimilation of the following courses: "Zoology", "Latin language (terminology)", "Anatomy of domestic animals", "Genetics", "Chemistry

(organic and inorganic)", "Cytology, histology and embryology ", "Animal physiology", "Veterinary microbiology", "Veterinary immunology", "Veterinary ecology".

This educational discipline ensures the formation of the following program learning outcomes:

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 7. Formulate conclusions regarding the effectiveness of selected methods and means of keeping, feeding and treating animals, prevention of contagious and non-communicable diseases, as well as production and technological processes at enterprises for keeping, breeding or exploiting animals of various classes and species.
PLO 9. Develop measures aimed at protecting the population from diseases common to animals and humans.

2. Program of study discipline

Chapter 1 General veterinary virology

Topic 1. Basic signs and properties of viruses.
Brief content of the topic: Characteristics of viruses according to their characteristics: reproduction, ecology, classification, genetics of viruses; pathogenesis of viral infections. Basic concepts and terms of virology.
Recommended reading (links)
http://moodle.btu.kharkiv.ua/course/view.php?id=520

Fenner's Veterinary Virology. Book • Fifth Edition • 2016

Topic 2. Basics of diagnosis, prevention and treatment of viral infections.
Summary of the topic: Laboratory animals as a test system for the cultivation of viruses; rules for selecting material for laboratory diagnosis of viral infections. Methods of culturing viruses in cell cultures and chicken embryos. Methodical approaches to the diagnosis of viral infections. Systematics and classification of viruses; main approaches to treatment. Prevention of viral infections. Serological, allergic and other reactions in virological studies. Features of the immune response in viral infections;
Recommended reading (links)
http://moodle.btu.kharkiv.ua/course/view.php?id=520

Fenner's Veterinary Virology. Book • Fifth Edition • 2016

Chapter 2 Special veterinary virology

Topic 3. Summary of the topic: DNA-genomic viruses of agricultural and domestic animals.
Brief content of the topic: DNA-genomic viruses of farm and domestic animals and the diseases they cause; laboratory diagnosis of animal diseases caused by DNA-genomic viruses.
Recommended reading (links)
http://moodle.btu.kharkiv.ua/course/view.php?id=520

Fenner's Veterinary Virology. Book • Fifth Edition • 2016

Topic 4. Summary of the topic: RNA-genomic viruses of agricultural and domestic animals.
Brief content of the topic: RNA-genomic viruses of agricultural and domestic animals and the diseases they cause; laboratory diagnosis of animal diseases caused by RNA-genomic viruses. Prions of farm and domestic animals and the diseases they cause; laboratory diagnosis of animal diseases caused by prions.
Recommended reading (links)
http://moodle.btu.kharkiv.ua/course/view.php?id=520

Fenner's Veterinary Virology. Book • Fifth Edition • 2016

4. Structure of the academic discipline

Name sections and topics	Total hours full-time education				
	Total volume	Auditory hours			Independent work
		Total amount	Lectures	Practical classes	
1	**2**	**3**	**4**	**5**	**6**
Chapter 1. General veterinary virology					
Topic 1. The main signs and properties of viruses.	**24**	**10**	**4**	**6**	**14**
Topic 2. Basics of diagnosis, prevention and treatment of viral infections	**34**	**18**	**6**	**12**	**16**
Together for section 1.	**58**	**28**	**10**	**18**	**30**
Chapter 2 Special veterinary virology					
Topic 3. Animal DNA-genomic viruses and the diseases they cause.	**46**	**24**	**10**	**14**	**22**

Topic 4. RNA genomic viruses of animals and the diseases they cause.	**46**	**22**	**10**	**12**	**24**
Together for section 2	**92**	**46**	**20**	**26**	**46**
Educational practice				**30**	
Hours in total	**180**	**74**	**30**	**74**	**76**

5 THEORETICAL LESSON (LECTURES)

N by order	**The name of the topic of the lecture**	**Hours**
		d/f
Chapter 1. General veterinary virology		
1.	Introduction to virology.	2
2.	Reproduction of viruses	2
3.	Genetic of Viruses. Pathogenesis of Viral Infections	2
4.	Immune response to viruses.	2
5.	Diagnosis of viral infections.	2
5.	Preventing viral diseases. Antiviral drugs	2
7.	Rabies.	2
8.	Influenza virus	2
9.	Family Paramyxoviridae	2
Chapter 2 Special veterinary virology		
10.	Family Picornaviridae	2
11.	Family Coronaviridae	2
12.	Family Flaviviridae. Family Retroviridae	2
13.	Family Arteriviridae. Family Caliciviridae.	2
14.	Family Reoviridae. Family Birnaviridae. Family Arenaviridae. Family Astroviridae. Family Bornaviridae.	2
15.	Family Poxviridae. Family Herpesviridae. Family Adenoviridae.	2
	Total lectures:	**30**

6 LABORATORY CLASSES

	Name topics	Total hours
1	Rules of work in the virological laboratory. Laboratory animals. Methods of infection of laboratory animals.	2
2	Rules and methods of obtaining and transporting virus-containing	2

	material. Methods of light and electron microscopy in virological research.	
3	Cultivation of viruses in chicken embryos. Accounting for the results of infection of chicken embryos.	4
4	Cultivation of viruses in cell cultures. Infection of cell cultures. Cytopathic action of the virus.	4
5	Virus titration methods. Calculation of virus titer according to the method of Reed and Mench.	2
6	Hemagglutinating viruses. Studying the methods of staging HA. Serological methods of diagnosis of viral infections.	4
7	Diffusion precipitation reaction. Polymerase chain reaction.	2
8	Neutralization reaction (NT) and its modifications. Titration of viruses in NT.	2
9	The method of fluorescent antibodies (MFA) is an immunofluorescence reaction. Enzyme immunoassay.	4
10	Laboratory diagnosis of rabies.	2
11	Laboratory diagnosis of smallpox mammals and birds.	2
12	Laboratory diagnosis of foot and mouth disease. The use of RZK in virology.	2
13	Differential laboratory diagnostics of viral respiratory diseases of cattle.	4
14	Differential laboratory diagnosis of viral respiratory diseases of pigs, horses, and poultry.	4
15	Differential laboratory diagnosis of viral respiratory diseases of small animals (dogs, cats, rabbits).	4
	Total	44

7. Independent work

	Name topics	Total hours
1	• Biophysical properties of viruses. • Persistence of viruses in the environment. • Evolution of viruses. Ecology of viruses. • Gnotobiots and SPF-animals and their use in virological studies • Cellular and humoral factors of antiviral immunity. Immunopathology of viral infections. • Comparative characteristics of test systems for cultivation of animal viruses • Main groups of drugs for the treatment and prevention of viral	38

	infections. • Comparative characteristics of serological reactions: RGAd, RZHAd and RNGAd.	
2	• Features of diagnosis of diseases characteristic of several species (rabies and animal prion diseases, Aujeski's disease, foot-and-mouth disease, influenza) • Features of diagnosis of cattle diseases (cattle leukemia, infectious rhinotracheitis, viral diarrhea of cattle, PG-3 RSI) • Features of diagnosis of diseases of small cattle (malignant catarrhal fever, scrapie, DRH plague) • Features of diagnosis of swine diseases (KHS, ASF, respiratory and reproductive syndrome, parvovirus infection, viral transmissible gastroenteritis, viral encephalomyelitis of pigs, vesicular disease and vesicular exanthema of pigs) • Features of diagnosis of poultry diseases (Newcastle disease, bird flu, Marek's disease, poultry leukemia, infectious bursal disease, infectious laryngotracheitis, infectious bronchitis) • Features of diagnosis of horse diseases (influenza, rhinopneumonia, equine infectious anemia, African horse sickness) • Features of diagnosis of diseases of small animals (plague of carnivores, parvovirus and adenovirus infection of dogs, panleukopenia of cats, calicivirus and coronavirus of cats)	38
	Total	**76**

8 Teaching methods

(According to the structure of the academic discipline)

1. Lecture classes: lecture, story, explanation, illustration, conversation.

2. Laboratory classes: conversation, explanation, demonstration, illustration, laboratory method, practical work, work with a book.

3. Self-study: work with a book.

**The content of the section is of a recommendatory nature and is adjusted according to the content of the academic disciplines.*

9 Control methods

- ❖ oral interview;
- ❖ test control;
- ❖ credit;
- ❖ exam.

During the current and final control, the means of assessing the results of learning in the discipline are standardized computer tests.

The final semester control (credit) is determined by the sum of the actually scored rating points from the current control and the individual educational and research task.

Current control is carried out during the semester by means of a survey (oral or test), as well as checking the quality of mastering the topics of independent work.

When choosing the criteria for assessing the assimilation of the discipline program by the applicant, the implementation of the program and the assimilation of the material in terms of lecture and laboratory classes, as well as the implementation of the independent work provided for by the program, were taken into account.

All types of control (oral interview, written interview, test interview) are closely related and organized in such a way as to stimulate the effective independent work of applicants and ensure an objective assessment of the level of their knowledge.

After completing the study of the discipline (part of the discipline), the final control is carried out in the form of an exam (test) and the applicant can score from 60 to 100 points inclusive during the semester at the control points.

**The content of the section is of a recommendatory nature and is adjusted in accordance with the content of the academic discipline.*

10 Distribution of points received by applicants (credit)

In the process of studying the course, the success of applicants is determined by conducting ongoing and final controls (credit and exam).

Current testing, answers in class and control of independent work				Total points
Chapter 1		Chapter 2		**60-100**
T 1	T 2	T 3	T 4	
0-100	0-100	0-100	0-100	
Overall rating score (ORS = R+E)				**0-100**

T__, T__... T__– topics of chapters.

The grade that a higher education applicant receives for conducting an intermediate (current) control (CurC) consists of the points that the applicant receives during testing (T), which are 30%; the points that the applicant receives during activity in classes (Cl), which are 40%; and the points for mastering the independent work block (InW), which are 30%.

$$CurC = \mathbf{T}x\mathbf{0,3}+\mathbf{Cl}x\mathbf{0,4}+\mathbf{InW}x\mathbf{0,3}$$

In each section of the educational component, current control is carried out (**current control** - CurC).

For applicants in the fall (spring) semester, when the final knowledge test is completed with an undifferentiated credit (UDC), the final sum of points (UDC points) is the arithmetic average of the points of the four current tests of the fall (spring) semester:

UDC points **=** **(**CurC **1+** CurC **2** **+** CurC **3** **+** CurC **4) / 4**

Based on the results of the semester control, the applicant's transcript is assigned a "pass/fail" grade on the national scale.

11 Distribution of points received by applicants (exam)

<table>
<tr><td colspan="4">Current testing, answers in class and control of independent work</td><td colspan="2">Total points</td></tr>
<tr><td colspan="2">Chapter 1</td><td colspan="2">Chapter 2</td><td>According to the results of the chapters (R)</td><td>Exam (E)</td></tr>
<tr><td>T 1</td><td>T 2</td><td>T 3</td><td>T 4</td><td rowspan="2">((T1+T2+... T4)/n)x60%</td><td rowspan="2">Ex40%</td></tr>
<tr><td>0-100</td><td>0-100</td><td>0-100</td><td>0-100</td></tr>
<tr><td colspan="4">Overall rating score (ORS = R+E)</td><td colspan="2">0-100</td></tr>
</table>

T1, T2... T4 – topics of chapters, n – number of topics.

The final control of the academic performance of applicants is carried out in the form of an exam based on the results of computer testing. The exam grade for the educational component (discipline) is determined on a 100-point scale.

The exam grade (EG) is 40% of the total final grade (FG).

EG = ETS x 0,4

where: ES – exam score; ETS– exam testing scores, which account for 40% of the points scored during exam testing.

The final grade for the discipline is given on a 100-point scale. It is calculated as the average arithmetic value (AAV) of all the grades received by the student from the current control (CurC) of the assimilation of the material of the sections, with their subsequent conversion into points according to the following formula:

AAV = (CurC chapter1 **+** CurC chapter.2 **+** CurC chapter.3 **+** CurC chapter.4**) /** 4

CurCS = AAV x 0,6

where: CurCS – current control scores, which make up 60% of the total final score; AAV is the arithmetic average value of all grades received by the student from the current control

The applicant can score up to 60 points inclusive at the control points of the mastery of the sections within 2 semesters.

Thus, the final grade (FG) is calculated using the formula:

FG = EG + CurCS

The results of the tests are displayed in the DBTU Moodle system. All forms of control are included in the 100-point assessment scale.

12 Scale: national and ECTS and assessment criteria for determining the level of knowledge and skills

The control of students' knowledge and skills in the discipline is carried out in accordance with the use of the European system of transfer and accumulation of ECTS credits.

Basic provisions:

The total number of current control measures that a student must pass in the discipline is determined taking into account the number of credits in the discipline.

Based on the results of the current control measure, the student's level of assimilation of the educational material is assessed according to the national scale and the ECTS scale.

The number of points received by the student in the assessment of the final control is correlated with the marks on the national scale and the ECTS scale in accordance with Table 1.

1. Rating scale

100-point scale	**National scale**	**interpretation**	**ECTS scale**
90 – 100	excellent	**Excellent -** excellent answer, the work is fulfilled with only a small number of errors	**A**
82 – 89	good	**Very well-** above average with a few errors	**B**
74 – 81		**Well -** in general the correct answer, the work with a certain number of serious errors	**C**
64 – 73	satisfactory	**Satisfactorily –** not bad, but with big number of errors	**D**
60 – 63		**Quite satisfactorily –** the work meets the minimum criteria	**E**
35– 59	unsatisfactory	**Unsatisfactorily –** with the possibility to	**FX**

		pass again	
0-34		**Unsatisfactorily –** with compulsory passing of the work once again	**F**

Passing current tests is mandatory. A section is considered passed if the student has scored the minimum required number of points or more.

The results of the rating for the section are brought to the attention of students no later than the third working day after the control event and, in the absence of claims from the students, are considered final.

If the student does not agree with the decision to assign him rating points for the section, then he must immediately after their announcement file a written appeal to the head of the department and, within the specified period, take an oral attestation for the section before the commission. The composition of the appeal commission in each specific case is determined by the head of the department. The decision of the commission is final.

A student who did not appear for the current test has the right to take the missed current test during the assessment week.

The final rating of current performance in the discipline is calculated by averaging the ratings from all sections. The semester grade is given to the student taking into account the results of the final and current tests. The maximum number of points that a student can receive when studying a discipline is 100.

The exam involves a final test. If permission is granted for automatic exam enrollment, a student who has passed all current tests on time and has been certified with an "excellent" grade based on their results can receive a credit automatically. The semester grade in this case is the average grade for the sections.

The teacher is required to submit the completed credit and examination report to the academic department within the following deadline: for the exam - no later than the next business day after its completion.

The mastery of the independent work block is assessed on a scale according to the following regulations (Table 2)

Table **2.**

Assessment criteria (100-point system, oral interview).

The level of formation of a student's knowledge and skills in the academic discipline, both during the final and current control, is assessed on a 100-point scale with subsequent conversion of grades into the national scale and the ECTS grading scale.

№	**Criteria**	Maximum number of	Description

		points	
1	Completeness of the answer	30 points	The answer covers all the main aspects of the question, reveals its content in accordance with the curriculum.
2	Correctness and accuracy of presentation	20 points	The answer does not contain factual, logical or terminological errors.
3	Consistency and logic	10 points	The answer is logically structured, without inconsistent or chaotic fragments.
4	Language and style of presentation	10 points	The expression is competent, clear, using professional terminology.
5	Independent thinking	10 points	The student demonstrates the ability to draw his own conclusions, analyze, compare, give examples.
6	Additional knowledge (outside the main program)	10 points	The answer contains references to modern sources, interdisciplinary connections, and the latest data.
7	Ability to answer additional questions	10 points	The student confidently responds to the teacher's clarifying or in-depth questions, provides additional arguments or examples.

The conversion of grades on a 100-point scale to the national scale and ECTS scale is carried out according to the table:

Total points for all types of learning activities	**Mark according to ECTS scale**	**Mark according to national scale**
90 – 100	A	excellent
82 – 89	B	good
74 – 81	C	
64 – 73	D	satisfactory
60 – 63	E	
35 – 59	FX	unsatisfactory
0 – 34	F	

Activity in classes is assessed on a scale with a maximum of 100 points in accordance with the following regulations (Table 3)

Table 3.

ACTIVITY ASSESSMENT SCALE IN CLASSES

ECTS scale	National scale	Points	Score interpretation
A	**Excellent**	**90-100**	the student works actively during classes, provides complete answers to the teacher's questions and shows a deep mastery of the material, is able to express his own opinion when discussing situational tasks, demonstrates the ability to independently and reasonedly present the material, analyze phenomena and facts, make independent generalizations and conclusions, correctly completes educational tasks, has a full synopsis of theoretical material, regularly visits the Moodle system
B	**Very well**	**82-89**	the student works actively during the lessons, the questions are covered in full, the presentation of the material is logical, substantiated by facts, with references to literary sources, the coverage of the questions is completed with conclusions, the student has shown the ability to analyze facts and events, as well as to complete educational tasks. However, there are inaccuracies in the answers, some minor errors, the presence of a full summary of the theoretical material, regular visits to the Moodle system
C	**Well**	**74-81**	the student works actively during the lessons, the questions are covered in full, the presentation of the material is logical, substantiated by facts, with references to literary sources, the coverage of the questions is completed with conclusions, the student has shown the ability to analyze facts and events, as well as to complete educational tasks. However, there are inaccuracies in the answers, some minor errors, there is insufficient reasoning when presenting the material, there is an incomplete synopsis of the theoretical

			material, partial access to the Moodle system
D	**Satisfactorily**	**64-73**	The student has generally mastered the essence of the issues on the topic, demonstrates knowledge of the lecture material and educational literature, tries to analyze facts and events, draw conclusions and solve situational problems. However, in class he behaves passively, responds only to the teacher's call, gives incomplete answers to questions, makes gross mistakes when covering theoretical material, incomplete notes on theoretical material, partial access to the Moodle system
E	**Quite satisfactorily**	**60-63**	the student lacks understanding of the main essence of the questions, conclusions, generalizations, demonstrated inability to solve situational problems, incomplete note-taking of theoretical material, partial access to the Moodle system
FX, F	**Unsatisfactorily**	**0-59**	lack of desire to participate in the discussion of issues, lack of notes, irregular visit to the Moodle system

Example: a student wrote the test tasks of the current control for 85 points. Multiply by 0.3. The result for the tests is 25.5 points. For independent work, the student received 88 points. Multiply by 0.3. The result for it is 26.4 points. For activity in classes - the student received 74 points. Multiply by 0.4. We get 29.6. In total, the number of points for the current control is 81.5 points. We average towards a larger number and get 82 points, which is equal to good B.

Regarding the final certification of the student, the result obtained for the student's current work (average value for 4 sections, multiplied by 0.6) and the final test work (multiplied by 0.4) is taken into account.

Example: Section I – 83 points, Section II – 95 points, Section III – 73 points, Section IV – 88 points. The sum of the points for the sections is 339 / 4 = 84.75 (85) points – this is the average value. Next, 85 × 0.6 = 51 points. The student wrote the final exam with 91 points. 91×0.4 = 36.4 points. Therefore, the total number of points for the discipline is 51.0 + 36.4 = 87.4. We average towards a smaller number and get 87 points, which is equal to a good or B grade.

13 Methodological supports

http://moodle.btu.kharkiv.ua/course/view.php?id=520

14 RECOMMENDED BOOK

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Electronic information resources

(Link)

https://www.youtube.com/watch?v=6fwu7AES9z8
https://www.youtube.com/watch?v=AomdQO0tskU
https://www.youtube.com/watch?v=vmlLj1aLZ7s
https://www.youtube.com/watch?v=oYnXeAPieN0
https://www.youtube.com/watch?v=h9lxx6x3HAM
https://www.youtube.com/watch?v=nwYlk4eB7yA

15 Changes and additions

(to methodological support and recommended literature)

What is being removed from the work program	What is being added to the work program	Date of consideration by the department