



MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

State Biotechnological University

Educational and scientific institute/faculty

faculty of veterinary medicine

(the name of the educational and scientific institute/faculty)

"Approved"

The head of the department

internal diseases and clinical

diagnosis of animals

(name of department)

(O.V. Matsenko)

(signature)

(full name)

"__"__2025 y.

Department of "internal diseases and clinical diagnosis of animals"

(name of department)

WORK PROGRAM

OF EDUCATIONAL DISCIPLINE

"Methods of laboratory clinical diagnosis of animal diseases"

(code and name of the academic discipline)

Level of higher
education

second

(name)

Field of study

21 Veterinary medicine

(code and name)

Specialty

211 Veterinary medicine

(code and name)

Educational program

Veterinary medicine

(name)

for students of the 6th year (admission based on
complete general secondary education)

English language of education

Kharkiv – 2025

Compilers: candidate of veterinary sciences, associate professor Vikulina G.V.

(academic title, position, surname and initials)

The working program of the academic discipline was approved at an extended meeting of the department " _____ "
(name of department)

Protocol from: " ____ " _____ 20__ year № ____

The work program has been agreed

Guarantor of the educational program _Veterinary medicine_____
(name of EPP)

« ____ » _____ 20__ year (_____) _____ S.V. Naumenko _____
(signature) (full name)

The validity period has been extended to:

" ____ " _____ 20__ p. protocol № ____ from " ____ " _____ 20__ y.
head of department _____ (_____)
(name of department) (signature) (full name)

" ____ " _____ 20__ p. protocol № ____ from " ____ " _____ 20__ y.
head of department _____ (_____)
(name of department) (signature) (full name)

" ____ " ____ 20 ____ p. protocol № ____ from " ____ " ____ 20 ____ y.
head of department _____ (name of department) _____ (signature) (_____ (full name))

1 Description of the academic discipline

Name of indicators	Characteristics of the academic discipline					
	full-time education		external form of education			
Number of credits <u>5</u>	Discipline status:					
	<i>mandatory/optional</i>					
Sections - <u>1</u>	Year of study:					
		<u>6</u>				
	Semester					
The total number of hours <u>90</u>		<u>12</u>				
	Lectures					
	__ hours	<u>18</u> hours	__ hours	__ hours		
	Practical (seminar)					
	__ hours	<u>36</u> hours	__ hours	__ hours		
	Laboratory					
	__ hours		__ hours			
	Independent work					
	__ hours	<u>36</u> hours	__ hours	__ hours		
Weekly hours for full-time education: classrooms – <u>54</u> ; independent work of the acquirer – <u>36</u>	Type of control:					
	—	the assessment is differentiated	—	—		

2 The purpose and tasks of the discipline

The purpose of the discipline is formation of students' competencies to conduct and analyse laboratory and special diagnostic studies of biological fluids of animals of various species, to make informed decisions and evaluate the condition of animals according to laboratory indicators, to ensure the quality of laboratory studies.

The task of studying the discipline is based on ability to organize, conduct and analyse laboratory and special diagnostic studies using modern devices; ability to conduct quality control of laboratory research; ability to correctly collect samples of biological fluids and keep them suitable for analysis; ability to assess the condition of animals based on indicators of laboratory analysis of biological fluids and to develop therapeutic and preventive measures.

The subject of study. Methodology for determining the content of laboratory indicators, modern research technologies, principles and rules of laboratory clinical diagnosis of animal diseases, quality control of laboratory research. Expression of research results in the SI system, devices and analysers, their use. Biometric processing of research results. Clinical-biochemical assessment of metabolic disorders in the animal's body due to internal pathology, assessment of the animal's condition in case of an emergency. Haemostasis system and hemostatic tests. Endocrinopathies. Clinical and biochemical constellations in the diagnosis of animal diseases. Examination of effusions, synovial fluid, cerebrospinal fluid, biopsies, bone marrow. Immune reactions of the body and their evaluation according to laboratory parameters. Laboratory examination of urine and faeces.

Assimilation of courses "Animal biochemistry", "Pathological physiology", "Clinical diagnosis of animal diseases", "Veterinary clinical biochemistry", "Internal diseases of animals".

3 Program of educational discipline

Methodology for determining the content of laboratory indicators, modern research technologies, principles and rules of laboratory clinical diagnosis of animal diseases, quality control of laboratory research. Expression of research results in the SI system, devices and analyzers, their use. Biometric processing of research results.

Clinical-biochemical assessment of metabolic disorders in the animal's body due to internal pathology, assessment of the animal's condition in case of an emergency. Hemostasis system and hemostatic tests. Endocrinopathies. Clinical and biochemical constellations in the diagnosis of animal diseases. Examination of effusions, synovial fluid, cerebrospinal fluid, biopsies, bone marrow. Immune reactions of the body and their evaluation according to laboratory parameters. Laboratory examination of urine and feces.

4 The structure of the academic discipline

Name sections and topics	Number of hours							
	Full-time				correspondence form			
	classrooms			inde nt	classrooms			nde nt
	or al	y t	including		or al	y t	including	

			lectures	laboratory	practical				lectures	laboratory	practical	
1	2	3	4	5	6	7	8	9	10	11	12	13
Topic 1 - Clinical laboratory diagnostics in veterinary medicine	10	8	2	0	6	2						
Topic 2 - Emergency conditions and their clinical and biochemical assessment	12	6	2	0	4	6						
Topic 3 – Animal endocrinology	14	8	2	0	6	6						
Topic 4 - Clinical and biochemical constellations in the diagnosis of animal diseases	12	8	2	0	6	4						
Topic 5 – Laboratory examination of urine	8	4	2	0	2	4						
Topic 6 – Laboratory profiles of small animal diseases	18	12	4	0	8	6						
Topic 7 – Exotic animal laboratory diagnosis	16	8	4	0	4	8						
Hours in general	90	54	18	0	36	36						

5 Seminar classes (if provided)

№	Name of the subject of the lesson	Number of hours	
		full-time	c/f
	not provided		
	Together		

6 Practical classes (if provided)

№	Name of the subject of the lesson	Number of hours	
		full-time	c/f
1	Organization of laboratory work and its modern	2	

	equipment		
2	Methods of evaluating the results of clinical and biochemical research	2	
3	Planning of laboratory studies of various biological fluids. Examination of effusions, synovial fluid, cerebrospinal fluid and tissue samples	2	
4	Clinical and laboratory assessment of the animal's condition in case of shock, collapse, dehydration, ketoacidosis. Clinical and laboratory assessment of the condition of the animal in case of poisoning. Clinical and laboratory evaluation of the animal's condition in case of cardiovascular, respiratory, renal insufficiency and hepatic coma.	4	
5	Interaction between the nervous and endocrine systems. Releasing factors: liberins and statins. Causes of endocrinopathies	2	
6	Clinical biochemistry during dysfunction of the internal secretion of the pancreas, thyroid gland, adrenal glands, hypothalamus and pituitary gland.	4	
7	Establishing the diagnostic value of laboratory tests. Diagnostic constellations of blood and urine laboratory parameters	6	
8	Functional renal tests. Abnormalities in urine chemistry	2	
9	Diagnosis by laboratory findings in small animals	4	
10	Diagnosis by clinical signs and dynamic testing in small animals. Laboratory profiles of diseases of small animals	4	
11	Interpretation of results from clinical pathologic testing of ferrets, rabbits, hystricomorph rodents, rats and mice. Interpretation of results from clinical pathologic testing of birds	2	
12	Interpretation of results from clinical pathologic testing of snakes, lizards, amphibians, fish	2	
	Together	36	

7 Laboratory classes (if provided)

№	Name of the subject of the lesson	Number of hours	
		full-time	c/f
	not provided	2	
	Together		

8 Independent work

№	Name of topic	Number of hours
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		full-time	c/f
1	Methodology for determining the content of laboratory indicators	18	
2	Clinical and biochemical assessment of metabolic disorders in the animal body	18	
	Together	36	

9 Teaching methods

(According to the structure of the academic discipline)

1. Lectures.
2. Laboratory classes.
3. Self-study.

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

10 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.*

11 Distribution of points received by students

Current testing and independent work		Total points
Section		
T1-7	$((T_1+T_2+\dots T_9)/n) \times 60\%$ AD $\times 40\%$	Overall rating score (ORS =
0-100	0-100	

			S+AD) 0-100
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T__, T __... T__– topics of sections.

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%.

$$\text{CurC} = T \times 0,3 + Cl \times 0,4 + InW \times 0,3$$

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:

$$\text{UDC points} = (\text{CurC 1} + \text{CurC 2} + \text{CurC 3} + \text{CurC 4}) / 4$$

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

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).

$$\text{EG} = \text{ETS} \times 0,4$$

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:

$$\text{AAV} = (\text{CurC chapter.1} + \text{CurC chapter.2} + \text{CurC chapter.3} + \text{CurC chapter.4}) / 4$$

$$\text{CurCS} = \text{AAV} \times 0,6$$

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:

$$\mathbf{FG = EG + CurCS}$$

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 Implementation of a course project (work), (course complex test task) (if provided)

Implementation of a course project (work) or a course complex test task is regulated by the curriculum. The requirements for the content and design are established by the methodological recommendations of the relevant department, which, in turn, are based on current regulatory documents.

Evaluation criteria:_____

13 Scale: national and ECTS and criteria assessment to determine 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. 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 pass again	FX
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 points	Description
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	10 points	The answer is logically structured,

	logic		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 reasonably 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, $85 \times 0.6 = 51$ points. The student wrote the final exam with 91 points. $91 \times 0.4 = 36.4$ 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.

14 Methodological support

Material and technical support

1. Syringes, needles for taking blood, catheters, probes, laboratory utensils, heparin, sodium citric acid, thymol crystal, water bath, thermostat, centrifuge, photoelectrocolorimeter, semi-automatic biochemical analyzer
2. Sets of dishes and reagents for determining laboratory parameters in stabilized blood, serum (plasma), protein-free filtrate, etc.
3. Sets of dishes and reagents for determining laboratory parameters in urine and feces
4. Tables. Multimedia support
5. Results of laboratory tests of blood, urine, feces, etc.
6. Folders with illustrative and demonstration material
7. Text book from clinical laboratory diagnosis of animal diseases, 2025.

15 Recommended Books

Main literature:

- Kaneko J., Harvey J., Bruss M. Clinical Biochemistry of Domestic Animals, 6th Edition. – Academic Press, 2008. – 928 p.
- Squires E. James. Applied animal endocrinology. - CABI Publishing, 2003. – 252 p.
- Atlas of comparative diagnostic and experimental hematology / Clifford Smith and Alfred Jarecki; foreword by Harold Tvedten. – 2nd ed. 142 p.
- David L. Panciera, Anthony P. Carr. Endocrinology for the small animal practitioner. – Teton NeewMedia, 2005. – 195 p.
- Kerr M.G. Veterinary laboratory medicine: clinical biochemistry and haematology. – John Wiley & Sons, 2008. – 386 p.

- Harvey J.W. et al. Clinical biochemistry of pregnant and nursing mares //Veterinary clinical pathology. – 2005. – T. 34. – №. 3. – C. 248-254.
- Kramer J.W., Hoffmann W.E. Clinical enzymology //Clinical biochemistry of domestic animals. – Academic Press, 1997. – C. 303-325.
- Radostits O.M. et al. Veterinary clinical examination and diagnosis. – WB Saunders, 2000.
- Cerón J.J. et al. The effects of different anticoagulants on routine canine plasma biochemistry //The Veterinary Journal. – 2004. – T. 167. – №. 3. – C. 294-301.
- Newsholme, E. A. Functional biochemistry in health and disease / Eric Arthur Newsholme and Tony R. Leech, 2010. – 561 p.
- Rosenthal, Miriam D. Miriam D. Rosenthal and Robert H. Glew. Medical biochemistry: Human metabolism in health and disease, 2009. – 439 p.
- N. Mallikarjuna Rao. Medical Biochemistry. – New Age International Publishers, 2006. – 838 p.

16 Electronic information resources

(Links)

<http://moodle.btu.kharkiv.ua/course/view.php?id=433>

17 Changes and additions

(to methodological support and recommended literature)

What is removed from the work program	What is entered in the work program	Date of consideration by the department