

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

Department of Biochemistry named after academician Maxim Hulyi



«APPROVED»

Dean of the Faculty of Veterinary  
Medicine

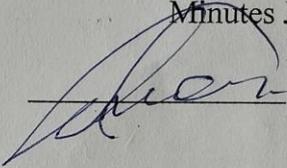
Mikola TSVILIKHOVSKYI  
“ ” 2024

«APPROVED»

at the meeting of the department of biochemistry  
named acad. Maxim Hulyi

Minutes №12 of 14.05.2024

Head of Department

  
Viktor TOMCHUK

” REVIEWED”

Program Coordinator Veterinary  
Medicine

  
Nataliya GRUSHANSKA

**CURRICULUM OF ACADEMIC DISCIPLINE**

**Veterinary clinical biochemistry**

Field of knowledge 21 "Veterinary Medicine"

Specialty 211 "Veterinary Medicine"

Academic programmer Veterinary Medicine

Faculty Veterinary Medicine

Authors:

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Kyiv – 2024

## Description of the course Veterinary clinical biochemistry

Academic degree, specialty, academic programme	
Academic degree	<i>Master's</i>
Specialty	211 – "Veterinary Medicine"
Academic programme	Veterinary Medicine
Characteristics of the discipline	
Type	Compulsory
Total number of hours	120
Number of ECTS credits	4
Number of modules	2
Course project (work) (if any)	
Form of assessment	<i>Credit</i>
Indicators of the discipline for full-time and part-time forms of university study	
	Full-time
Year of study	4
Semester	7
Lectures	<i>15 hours</i>
Laboratory classes	<i>45 hours</i>
Self-study	<i>60 hours</i>
Number of hours per week for full-time students	<i>4 hours</i>

### 1. Aim, objectives, competences and expected learning outcomes of the discipline

**Aim** of the course – to give students the necessary theoretical knowledge and practical skills for obtaining equipment and learning diverse biological material obtained from sick animals for clinical and biological research and laboratory analysis, including for a correct interpretation of the results of these studies.

**Objectives** of the course. A study of the course the student should:

- **know** the features of biochemical processes in the body during different animal diseases and indicators that characterize them, to understand the molecular mechanisms of pathogenesis of many diseases of various etiologies;
- **be able to** receive a variety of biological material, conduct necessary laboratory tests and among a large number of laboratory methods to select the most informative measure the effectiveness of drugs and the degree of recovery processes in the affected tissues and organs and to

interpret the obtained results, comparing them with the symptoms of disease.

***Acquisition competencies:***

**Integrated competency (IC):**

Ability to solve complex tasks and problems in the industry of veterinary medicine, which involves carrying out research and/or implementation of innovations and is characterized uncertainty of conditions and requirements.

**General competencies (GC):**

1. Ability to abstract thinking, analysis and synthesis.
2. Ability to apply knowledge in practical situations.
3. Knowledge and understanding of the subject area and profession.
4. Ability to communicate in the state language both orally and in writing.
5. Ability to conduct research at the appropriate level.
6. Ability to make informed decisions.
7. The desire to preserve the environment.

**Special (professional) competencies (SC):**

1. Ability to use tools, special devices, instruments, laboratory equipment and other technical means to carry out the necessary manipulations during professional activities.
2. Ability to follow the rules of labor protection, asepsis and antiseptics during professional activities.
3. Ability to take, pack, record and send samples of biological material for laboratory research.
4. Ability to organize and conduct laboratory and special diagnostic tests and analyze their results.
5. Ability to apply knowledge of biosafety, bioethics and animal welfare in professional activities.
6. Ability to develop and implement measures to protect the population from diseases common to animals and humans.
7. Ability to protect the environment from contamination by livestock waste, as well as materials and veterinary products.
8. Ability to use specialized software to perform professional tasks.
9. Ability to organize, implement and control the flow of documents during professional activities.

**Expected Learning Outcomes (ELO):**

Attestation is carried out in the form of a single state qualifying exam.

**2. Programme and structure of the discipline for:**

-full-time (part-time) form of study

Names of content modules and topic	Number of hours						
	Full-time form						
	Weeks	Total	including				
			L	P	Lab	Ind	Self
1	2	3	4	5	6	7	8
<b>Content module 1. General veterinary clinical biochemistry</b>							
Topic 1. Objects and methods in clinical biochemistry.	1	11	1	-	2	-	8
Topic 2. Disorders of protein metabolism in the case of diseases of the internal organs of animals.	2-3	17	2	-	8	-	7
Topic 3. Laboratory diagnosis of disorders of carbohydrate metabolism in the case of diseases of the internal organs of animals.	4-5	15	2	-	6	-	7
Topic 4. Laboratory diagnosis of disorders lipid metabolism in the case of diseases of the internal organs of animals.	6-7	16	2		6		8
Total for content module 1	*	59	7	-	22	-	30
<b>Content module 2. Special clinical biochemistry</b>							
Topic 5. Clinical fermentologia. Enzymodiagnosics in the pathology of the internal organs of animals.	8-9	16	2	-	6	-	8
Topic 6. Clinical chemistry with the pathology of the digestive system, liver and pancreas.	10-11	16	2	-	6	-	8
Topic 7. Biochemistry and pathobiochemistry blood system in animals in the pathology of internal organs.	12-13	15	2	-	6	-	7
Topic 8. Laboratory diagnosis in the pathology of the urinary system	14-15	14	2	-	5	-	7
Total for content modules 2	*	61	8	-	23	-	30

Total hours	15	120	15	-	45		60
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### 3. Topics of laboratory class

№	Topic title	Hours
1	Safety at work in biochemical laboratories. Preparation of biological material for the clinical and biochemical studies. Laboratory examination of gastric juice.	3
2	Studies of total protein and protein fractions of blood serum, the interpretation of changes.	6
3	Proteinuria, qualitative and quantitative methods for determination of protein in the urine. The remaining (non-protein) nitrogen and its components, the clinical significance of their research.	4
4	Metabolism of carbohydrates and clinical significance of study parameters of carbohydrate metabolism. Glycosuria, clinical and diagnostic value of research available glucose in the urine.	4
5	Metabolism of lipids and clinical diagnostic value of the study of lipid metabolism. Investigation of ketone bodies in urine.	4
6	Studies of water and electrolyte metabolism and clinical diagnostic value of these studies.	4
7	Investigation of serum enzymes and their significance in the diagnosis of diseases of the internal organs.	6
8	Hemoglobinopathies. Clinical significance study of hemoglobin in the blood	4
9	Clinical biochemistry with liver disease. Determination of total bilirubin and its fractions in biological material.	6
10	Thymol test. Biochemical methods immunodeficient state of the animals. Electrophoresis of serum proteins in polyacrylamide gels.	4
Total		45

### 4. Topics for self-study

№	Topic title	Hours
1	Rules for taking samples of biological material.	12
2	Peculiarities of protein metabolism in liver, lung, heart and kidney tissues.	12
3	Peculiarities of carbohydrate metabolism in liver, lung, heart and kidney tissues.	12
4	Peculiarities of lipid metabolism in liver, lung, heart and kidney tissues.	12

5	Organ-specific enzymes of organs and tissues for the diagnosis of diseases	12
Total		60

### 5. Tools for assessing expected learning outcomes:

- credit;
- module tests;
- abstracts;
- graphic design works;
- presentation of laboratory and practical works;
- other types.

### 6. Teaching methods:

- verbal method (lecture, discussion, interview, etc.);
- practical method (laboratory, practical classes);
- visual method (illustration, demonstration);
- processing learning resources (note-taking, summarising, reviewing, writing an abstract);
- video method (remote, multimedia, web-based, etc.);
- self-study (completing assignments);
- individual research work;
- other types.

### 7. Assessment methods:

- credit;
- oral or written assessment;
- module tests;
- team projects;
- essays and reports;
- presentation of laboratory and practical works;
- presentations at academic events
- other types.

### 8. Distribution of points received by students

The assessment of students' knowledge and skills is conducted by means of a 100-point scale and is converted into national grades according to Table 1 of the current *Exam and Credit Regulations at NULES of Ukraine*.

Student's rating, points	National grading of exams and credits
	credits
90-100	pass
74-89	
60-73	
0-59	fail

To determine a student's rating in the discipline **RDIS** (up to 100 points), the received assessment rating **RA** (up to 30 points) is added to the academic performance rating **RAP** (up to 70 points): **RDIS = RAP + RA**.

## 9. Teaching and learning aids

- e-learning course of the discipline  
(<https://elearn.nubip.edu.ua/course/view.php?id=1345>);
- lectures and presentations (in electronic form);
- textbooks, manuals, tutorials;
- guidelines for studying a discipline by full-time and part-time students;
- internship programmes of the discipline (if included in the curriculum).

## 10. Recommended sources of information

1. Tomchuk V.A., Gryshchenko V.A., Tsvilikhovskyi V.I. "Veterinary Clinical Biochemistry": Підручник / К: NULES of Ukraine Publishing House, 2023, 327 p.

2. Tomchuk V.A., Gryshchenko V.A., Tsvilikhovskyi V.I. Veterinary clinical biochemistry: textbook / Part 1. К.: НУБіП України, 2016. 268 p.

3. Tomchuk V.A., Gryshchenko V.A., Tsvilikhovskyi V.I. Veterinary clinical biochemistry: textbook / Part 2. К.: НУБіП України, 2017. 365 p.

4. Ветеринарна клінічна біохімія: навч. посіб. / Мельничук Д. О. та ін.; 2-ге вид. перероб і доп. Київ: НУБіП України, 2014. 456 с.

5. Біохімія тварин з основами фізичної і колоїдної хімії: підручник / [Томчук В.А., Грищенко В.А., Калачнюк Л.Г. та ін.] – К.: НУБіП України, 2020. – 447 с.

6. Ветеринарна клінічна біохімія / Левченко В. І., та ін. ; 2-ге видання, перероб. та доп. Біла Церква: Аграрна наука, 2019. 416 с.