

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

**Department of Veterinary Epidemiology and Animal Health**

**«CONFIRM»**

Dean of the Faculty of  
Veterinary Medicine

\_\_\_\_\_ M. Tsviliovskiy  
on « \_\_\_\_\_ » \_\_\_\_\_ 2024

**«APPROVED»**

at the meeting of Department of Veterinary  
Epidemiology and Animal Health

The Protocol № 5 on «15» May 2024

Acting as Head of Department

\_\_\_\_\_ V. Melnyk

**«REVIEWED»**

Guarantor of EP "Veterinary Medicine"

\_\_\_\_\_ N. Grushanska

**WORKING PROGRAM OF EDUCATIONAL DISCIPLINE  
"VETERINARY MICROBIOLOGY"**

Field of knowledge 21 Veterinarian

Specialty 211 Veterinary Medicine

Educational program - Veterinary Medicine

Faculty of Veterinary Medicine

Developer - **G. Kozlovska**, Associate Professor at the Department of Veterinary  
Epidemiology and Animal Health, Candidate of Veterinary Sciences, Associate  
Professor

## Description of the discipline "VETERINARY MICROBIOLOGY"

Field of knowledge, specialty, educational program, educational degree		
Educational degree	Master	
Specialty	211 Veterinary Medicine	
Educational program	Veterinary Medicine	
Characteristics of the discipline		
Kind	Regulatory	
Total hours	180	
Number of ECTS credits	6	
Number of thematic modules	4	
Course project (work) (if it is in the working educational plan)	-	
Form of control	an examination	
Indicators discipline for full-time and extramural study		
	full-time study	extramural study
Year of training	2	
Semester	3	
Lectures	30 hours	
Practical classes, seminars	30 hours	
Laboratory classes	30 hours	
Self-work	90 hours	
Self-work under supervising tutor		
Number of weekly hours for full-time study	6 hours	

### 1. Purpose, tasks and competencies of the discipline

The purpose of the discipline "Veterinary Microbiology" is to form a future specialist in veterinary medicine knowledge and skills related to microorganisms, including biology and ecology of microorganisms, bacterial pathogens of animal diseases and diseases of food origin, principles and methods of laboratory diagnosis of infectious animal diseases.

#### *Tasks of the course:*

- ✓ study of morphology, physiology, genetics and ecology of microorganisms;
- ✓ study of the relationship of microorganisms between themselves and other organisms;
- ✓ study of pathogens of microbial nature - pathogens in animals and diseases of food origin;
- ✓ study of the immune system, means of specific diagnosis and prevention of infectious diseases of bacterial and fungal nature;
- ✓ study of the problem of antibiotic resistance in bacteria.

#### **Acquisition of competencies:**

*Integral competence (IC):* the ability to solve complex tasks and problems in

veterinary microbiology, which involves conducting research and/or innovation and is characterized by the uncertainty of conditions and requirements.

**General competencies (GC):**

- ✓ ability to abstract thinking, analysis and synthesis;
- ✓ ability to apply knowledge in practical situations;
- ✓ ability to conduct research at the appropriate level;
- ✓ knowledge and understanding of veterinary microbiology;
- ✓ ability to make informed decisions;
- ✓ desire to preserve the environment.

**Professional (special) competencies (PC):**

- ✓ ability to follow the rules of labor protection, asepsis and antiseptics during professional activities;
- ✓ ability to carry out procedures for selection, packaging, preservation and transfer of samples of biological material for microbiological research;
- ✓ ability to organize, conduct and analyze the results of microbiological research;
- ✓ ability to protect the environment from pollution during microbiological research.

**Program learning outcomes (PL):**

- ✓ Know and correctly use microbiological terminology.
- ✓ Use information from domestic and foreign sources to develop strategies in microbiological diagnostics.
- ✓ Develop measures aimed at protecting the population from bacterial diseases common to animals and humans.
- ✓ Understand the logical sequence of actions and be able to draw up appropriate documentation during microbiological research.
- ✓ Know the rules and requirements of biosafety, bioethics and animal welfare.
- ✓ To have specialized software tools for performing professional tasks.

**2. Program and structure of the discipline for: full-time education.**

Titles of thematic module and themes	Hours					
	Full-time					
	Total	including				
L		Lab	P	Ind	Self	
1	2	3	4	5	6	7
<b>Module 1. Morphology, taxonomy and physiology of microorganisms</b>						
Theme 1. Introductory lecture. Subject and problems of microbiology.		2	2	2		6
Theme 2. Morphology and taxonomy of microorganisms.		2	2	2		6
Theme 3. Morphology of microscopic fungi and base of their taxonomy.		2	2	2		6
<b>Total for the thematic module 1.</b>	<b>36</b>	<b>6</b>	<b>6</b>	<b>6</b>		<b>18</b>

<b>Module 2. Genetics and ecology of microorganisms</b>						
Theme 4. Physiology of microorganisms.		2	2	2		6
Theme 5. Genetics of microorganisms.		2	2	2		6
Theme 6. Ecology of microorganisms.		2	2	2		6
<b>Total for the thematic module 2.</b>	<b>36</b>	<b>6</b>	<b>6</b>	<b>6</b>		<b>18</b>
<b>Module 3. Bacterial causative agents of animals: bacilli, clostridia, cocci, enterobacteria.</b>						
Theme 7. The causative agent of anthrax.		2	2	2		6
Theme 8. Pathogenic cocci.		2	2	2		6
Theme 9. Causative agent of anaerobic infections.		2	2	2		6
Theme 10. Pathogenic enterobacteria		2	2	2		6
<b>Total for the thematic module 3.</b>	<b>48</b>	<b>8</b>	<b>8</b>	<b>8</b>		<b>24</b>
<b>Module 4. Bacterial pathogens of animals: listeria, pasteurilla, yersinia, leptospira, mycoplasma, chlamydia, rickettsia.</b>						
Theme 11. Brucella and tularemia pathogen		2	2	2		6
Theme 12. The causative agent of tuberculosis.		2	2	2		6
Theme 13. The causative agent of swine. Pasterellosis. Listeriosis.		2	2	2		6
Theme 14. Pathogenic leptospira.		2	2	2		6
Theme 15. Pathogenic mycoplasmas. Chlamydia and Rickettsia.		2	2	2		6
<b>Total for the thematic module 4.</b>	<b>60</b>	<b>10</b>	<b>10</b>	<b>10</b>		<b>30</b>
<b>Total hours</b>	<b>180</b>	<b>30</b>	<b>30</b>	<b>30</b>		<b>90</b>

### 3. Themes of practical studies

#	Name of theme	Hours
<b>Module 1. Morphology, taxonomy and physiology of microorganisms</b>		
1	Rules and safety at work in the microbiological laboratory. Light microscope. The main forms of bacteria	5
2	Preparation, fixation and staining of smears simple method. Special staining techniques of bacteria	5
3	The study of bacteria in the living state. Morphology of microscopic fungi and their methods research.	5
<b>Module 2. Genetics and ecology of microorganisms</b>		
4	Methods of sterilization. Equipment in Microbiology laboratory. Nutrient media for culturing microorganisms.	5

5	Technology seeding bacteria on nutrient media. Pure cultures of microorganisms.	5
6	Cultural properties of microorganisms. Biochemical properties of microorganisms.	5
<b>Total hours</b>		<b>30</b>

#### 4. Themes of laboratory studies

#	Name of theme	Hours
<b>Module 3. Bacterial causative agents of animals: bacilli, clostridia, cocci, enterobacteria.</b>		
1	Effect on bacteria physical, chemical and biological factors. Methods for studying microbial antagonism. Sanitary and microbiological objects of the environment.	2
2	The causative agent of anthrax. Pathogenic coccus.	4
3	Pathogenic clostridia.	2
4	The causative agent of colibacillosis and salmonellosis	4
<b>Module 4. Bacterial pathogens of animals: listeria, pasteurilla, yersinia, leptospira, mycoplasma, chlamydia, rickettsia.</b>		
5	The causative agent of brucellosis. The causative agent of intestinal yersiniosis.	4
6	The causative agent of tuberculosis. The causative agent of pseudotuberculosis. The causative agent of leptospirosis.	2
7	The causative agent of erysipelas. Listeria. The causative agent of pasteurellosis.	4
8	Pathogenic mycoplasmas. Chlamydia and Rickettsia.	4
9	Pathogens of mycoses and mycotoxicosis.	4
<b>Total hours</b>		<b>30</b>

#### 5. Themes of self-work

#	Name of theme	Hours
<b>Module 1. Morphology, taxonomy and physiology of microorganisms</b>		
1	The use of microorganisms in various fields (food, pharmaceutical, medical, oil refining, etc.).	6
2	Methods of preservation of microorganisms. Methods of lyophilic drying of microorganisms.	6
3	Chemical nature, classification and functions of microbial toxins.	6
<b>Module 2. Genetics and ecology of microorganisms</b>		
4	Bacteria as possible agents of bacteriological weapons	6
5	Sanitary-indicative microorganisms	6
6	Immunoprophylaxis and immunotherapy of infectious diseases	6
<b>Module 3. Bacterial causative agents of animals: bacilli, clostridia, cocci, enterobacteria.</b>		
7	The causative agent of borreliosis (biology, pathogenic properties, laboratory diagnosis)	6
8	Proteus as pathogens of food poisoning	6
9	Staphylococcal toxicosis (etiology, pathogenesis, laboratory diagnosis)	6
10	Pathogens of hemophilia (biology, pathogenic properties, laboratory diagnosis)	6
<b>Module 4. Bacterial pathogens of animals: listeria, pasteurilla, yersinia, leptospira, mycoplasma, chlamydia, rickettsia.</b>		
11	Allergic methods for the diagnosis of zoonoses	6
12	Pathogens of mycotoxicosis	6

13	The causative agent of intestinal yersiniosis (biology, pathogenic properties, laboratory diagnosis)	6
14	Listeria as a causative agent of food poisoning	6
15	Pathogenic spirochetes in human infectious pathology	6
<b>Total hours</b>		<b>90</b>

### 6. Means of diagnosing learning outcomes:

- ✓ exam;
- ✓ module tests.

### 7. Teaching methods:

- ✓ verbal method (lecture, discussion, interview, etc.);
- ✓ practical method (laboratory, practical classes);
- ✓ visual method (illustration method, demonstration method);
- ✓ work with educational and methodical literature (summarizing, summarizing, annotating, reviewing, writing an essay);
- ✓ video method (remote, multimedia, web-oriented, etc.);
- ✓ independent work (task performance).

### 8. Evaluation methods:

- ✓ exam;
- ✓ oral or written survey;
- ✓ modular testing;
- ✓ protection of laboratory work.

### 9. Distribution of points that get students.

Assessment of student knowledge is on a 100-point scale and is translated into national assessments according to table. 1 "Regulations on examinations and tests in NULES of Ukraine".

Student rating, points	The assessment is national	
	examination	test
90-100	Perfectly	Passed
74-89	Good	
60-73	Satisfactory	
0-59	Unsatisfactorily	Non passed

To determine the student's rating for mastering the discipline  $R_{DIS}$  (up to 100 points), the rating obtained from the certification  $R_{SER}$  (up to 30 points) is added to the student's rating for the educational work  $R_{EW}$  (up to 70 points):  $R_{DIS} = R_{EW} + R_{SER}$

### 10. Educational and methodological support

1. Electronic training course of the academic discipline <https://elearn.nubip.edu.ua/course/view.php?id=1151>

2. Veterinary Microbiology: textbook / G. V. Kozlovska, M. V. Melnyk. – Kyiv: PC “Komprint”, 2023 – 252 p.

3. Veterinary Microbiology / D. Scott McVey, Melissa Kennedy, M.M. Chengappa / Wiley-Blackwell; 3rd Edition, 2013. 648 p.

4. Clinical Veterinary Microbiology / Bryan Markey, Finola Leonard, Marie Archambault, Ann Cullinane / Wiley-Blackwell; 2 edition, 2011. 928 p.

5. Ветеринарна мікробіологія: підручник / В. Г. Скибіцький, В. В. Власенко, Г. В. Козловська та ін.; за ред. В. Г. Скибіцького, В. В. Власенка. - 2-ге вид., змінене і доп. Київ: ЦП «Компринт», 2016. 420 с.

6. Програма та методичні вказівки з навчальної практики з дисципліни «Ветеринарна мікробіологія» / Г. В. Козловська, Ф. Ж. Ібатулліна, М. В. Мельник. Київ: ЦП «Компринт», 2017. 14 с.

### **Information Resources**

1. [http://www.microbiologyonline.org.uk/media/transfer/doc/sgm\\_basic\\_practical\\_microbiology\\_2.pdf](http://www.microbiologyonline.org.uk/media/transfer/doc/sgm_basic_practical_microbiology_2.pdf)

2. <http://www.imv.kiev.ua/index.php/ru/publications/magazin/archiv-magazin><http://jcm.asm.org/>

3. <http://www.microbiologyinpictures.com/index.html>

4. <http://www.microbiologyinpictures.com/microbiology%20images%20links.html>