

НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ БІОРЕСУРСІВ І
ПРИРОДОКОРИСТУВАННЯ УКРАЇНИ

Кафедра ЕПІЗООТОЛОГІЇ, МІКРОБІОЛОГІЇ І ВІРУСОЛОГІЇ



«ЗАТВЕРДЖУЮ»

Декан факультету ветеринарної медицини

Микола ЦВІЛІХОВСЬКИЙ

_____ 2023 р.

«СХВАЛЕНО»

на засіданні кафедри епізоотології,

мікробіології і вірусології

Протокол №4 від «17» квітня 2023 р.

Завідувач кафедри епізоотології,

мікробіології і вірусології

Володимир МЕЛЬНИК

«РОЗГЛЯНУТО»

Гарант ОП «Ветеринарна медицина»

д.вет.н., професор, завідувач кафедри терапії

і клінічної діагностики

Наталія ГРУШАНСЬКА

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

Specialty 211 Veterinary Medicine

Educational program - Veterinary Medicine

Faculty of Veterinary Medicine

Developer - **G. Kozlovska**, Associate Professor at the Department of Epizootology, Microbiology and Virology, Candidate of Veterinary Sciences, Associate Professor

1. 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	2023 - 2024	
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	12 hours	

2. 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.

3. 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
Module 1. Morphology, taxonomy and physiology of microorganisms						
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
Total for the thematic module 1.	36	6	6	6		18
Module 2. Genetics and ecology of microorganisms						
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
Total for the thematic module 2.	36	6	6	6		18
Module 3. Bacterial causative agents of animals: bacilli, clostridia, cocci, enterobacteria.						
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
Total for the thematic module 3.	48	8	8	8		24
Module 4. Bacterial pathogens of animals: listeria, pasteurilla, yersinia, leptospira, mycoplasma, chlamydia, rickettsia.						
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
Total for the thematic module 4.	60	10	10	10		30
Total hours	180	30	30	30		90

4. Themes of seminars

There are not planned

5. Themes of practical studies

#	Name of theme	Hours
Module 1. Morphology, taxonomy and physiology of microorganisms		
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
Module 2. Genetics and ecology of microorganisms		
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
Total hours		30

6. Themes of laboratory studies

#	Name of theme	Hours
Module 3. Bacterial causative agents of animals: bacilli, clostridia, cocci, enterobacteria.		
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
Module 4. Bacterial pathogens of animals: listeria, pasteurilla, yersinia, leptospira, mycoplasma, chlamydia, rickettsia.		
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
Total hours		30


7. Themes of self- work

#	Name of theme	Hours
Module 1. Morphology, taxonomy and physiology of microorganisms		
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
Module 2. Genetics and ecology of microorganisms		
4	Bacteria as possible agents of bacteriological weapons	6
5	Sanitary-indicative microorganisms	6
6	Immunoprophylaxis and immunotherapy of infectious diseases	6
Module 3. Bacterial causative agents of animals: bacilli, clostridia, cocci, enterobacteria.		
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
Module 4. Bacterial pathogens of animals: listeria, pasteurilla, yersinia, leptospira, mycoplasma, chlamydia, rickettsia.		
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
Total hours		90

8. Test questions

1. Spore in bacillus may be located:	
1	terminally
2	subterminally
3	chaotic
4	in center

2. Nucleus of prokaryotes has:	
1	own shell
2	closed loop form
3	spore
4	capsule

3. What form of bacteria are on the figure:	
1. cocci	
2. vibrio	
3. spirochetes	
4. sticks	

4. To isolate a «pure culture» of bacteria we use.... method:	
1	decimal dilutions
2	agar diffusion
3	by Drygalskyi
4	by Shukevich

5. Who first suggested the bacteria to grow in culture media?	
1	Koch
2	Pasteur
3	Mechnikov
4	Vinogradsky

6. The causative agent of anthrax is...	
<i>(in the form of answers enter the correct answer in Latin)</i>	

7. Listeria have the form of:	
1	cocci-like
2	very small sticks up to 1 micron

3	0.5-2 microns in length sticks
4	filamentary

8. What the special culture media for selection of staphylococci?	
1	culture media with NaCl 8-10%
2	NB
3	NA
4	Endo medium

9. The factors of pathogenicity of streptococcus:	
1	produce hemotoksyn, coagulase
2	produce enterotoxin
3	some of them have a capsule
4	suppress phagocytosis due to aggressins

10. Morphological features of Echerichia coli:	
1	stick of about 3 mcm length, with rounded edges.
2	stick of about 30 mcm length, with rounded edges.
3	some serotypes have a capsule
4	spore form

9. Methods of teaching

- verbal (narrative, explanation);
- visual (demonstration, illustration);
- practical (laboratory method, practical work, exercise, observation).

10. Forms of control

- periodic monitoring (ranking with thematic modules);
- summative assessment (exam).

11. 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" (order of entry into force of 03.03.2021 № 7).

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): $R_{DIS} = R_{EW} + R_{SER}$

12. Methodical maintenance

1. Біфідобактерії та молочнокислі мікроорганізми. Методи виявлення та ідентифікації / Козловська Г. В. К.: ФОП «Нагорна І.Л.», 2010. 43 с.
2. Збудник кишкового ієрсиніозу. Методи лабораторної діагностики / Козловська Г.В. К.: ФОП Нагорна, 2011. 35 с.
3. Ієрсиніозна токсикоінфекція (методичні рекомендації з діагностики та профілактики) / Скибіцький В. Г., Мельничук С. Д., Козловська Г. В. та ін. К.: ЗАТ «Нічлава», 2015. 29 с.
4. Індикація *Citrobacter* spp. у біологічному матеріалі, харчових продуктах, кормах та об'єктах довкілля: науково-практичні рекомендації / Тімченко О. В., Козловська Г. В., Бердник В. П., Кіт А. А. Харків: СтильИздат. 2018. 24 с.
5. Маласезіоз у тварин. Методичні рекомендації з діагностики, терапії і профілактики / Скибіцький В. Г., Туяхов М. Ф., Козловська Г. В., Мельник М. В., Ібатулліна Ф. Ж., Герасимова О. А., Козловська А. В. К.: НУБіП України, 2019. 16 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.

13. Recommended Literature

1. Veterinary Microbiology / D. Scott McVey, Melissa Kennedy, M.M. Chengappa / Wiley-Blackwell; 3rd Edition, 2013. 648 p.
2. Clinical Veterinary Microbiology / Bryan Markey, Finola Leonard, Marie Archambault, Ann Cullinane / Wiley-Blackwell; 2 edition, 2011. 928 p.
3. 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.
4. Ветеринарна мікробіологія: навчальний посібник / Бортнічук В. А., Скибіцький В. Г., Ібатулліна Ф. Ж. 2-ге вид. переробл. і доп. Вінниця: Нова Книга, 2007. 240 с.

14. Information Resources

1. 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>