

Документ подписан простой электронной подписью  
Информация о владельце:  
ФИО: Ястребов Олег Александрович  
Должность: Ректор  
Дата подписания: 27.05.2026 16:12:37  
Уникальный программный ключ:  
ca953a0120d891083f939673078ef1a989da718a

**Federal State Autonomous Educational Institution of Higher Education  
Patrice Lumumba Peoples ' Friendship University of Russia  
Agricultural and Technological Institute**  
(name of the main educational unit -developer of the program)

## **WORKING PROGRAM OF THE DISCIPLINE**

### **VETERINARY MICROBIOLOGY AND MYCOLOGY**

(name of the discipline / module)

**Recommended by the International Social Science Council for the following areas of study / specialty:**

#### **36.05.01 VETERINARY MEDICINE**

(code and name of the training area/specialty)

**Mastering the discipline is carried out within the framework of the implementation of the main professional educational program of higher education:**

#### **VETERINARY MEDICINE**

(name (profile/specialization) of the program)

## 1. GOAL OF MASTERING THE DISCIPLINE

The discipline "Veterinary microbiology and mycology" is included in the program of the specialty "Veterinary Medicine" in the direction 36.05.01 "Veterinary Medicine" and is studied in the 3rd, 4th semesters of the 2nd year. The discipline is implemented by the V. S. Kiktenko Department of Microbiology. The discipline consists of 4 sections and 18 topics and is aimed at studying general and private microbiology and mycology and acquiring knowledge on the prevention, treatment and diagnosis of animal diseases of bacterial and fungal nature.

The purpose of mastering the discipline is to help students master theoretical questions about the diversity of the world of microorganisms, their role in general biological processes and in animal pathology, the theoretical foundations of the diagnosis of infectious diseases, the principles of immunological research, the manufacture and control of biological products.

## 2. REQUIREMENTS FOR THE RESULTS OF MASTERING THE DISCIPLINE

Mastering the discipline "Veterinary microbiology and mycology" is aimed at developing the following competencies (parts of competencies):

*Table 2.1. List of competencies formed by students during the development of the discipline (results of mastering the discipline)*

Code	Competence	Indicators of achievement of competence (within the framework of this discipline)
CC-8	is able to create and maintain safe living conditions in everyday life and in professional activities to preserve the natural environment, ensure sustainable development of society, including in the event of a threat and occurrence of emergencies and military conflicts	CC-8.1 Analyzes factors of harmful influence on the life of elements environment (technical means, technological processes, materials, buildings and structures, natural and social phenomena); CC-8.2 Identifies dangerous and harmful factors within the scope of the task performed; CC-8.3 Identifies and eliminates problems related to violations of safety at the workplace;

## 1. PLACE OF THE DISCIPLINE IN THE STRUCTURE OF THE MAIN HIGHER EDUCATION PROGRAM

The discipline "Veterinary Microbiology and Mycology" belongs to the mandatory part of block 1 "Disciplines (modules)" of the educational program of higher education.

Within the framework of the higher education program, students also master other disciplines and/or practices that contribute to achieving the planned results of mastering the discipline "Veterinary Microbiology and Mycology".

*Table 3.1. List of components of the Higher Professional Education system that contribute to achieving the planned results of mastering the discipline*

Code	Name of the competence	Previous disciplines/modules, practices*	Subsequent disciplines/modules, practices *
UK-8	is able to create and maintain in everyday life and in professional	practice Inorganic and Analytical Chemistry; Organic Chemistry; Biological Physics;	Veterinary Radiobiology; Educational Practice;

<b>Code</b>	<b>Name of the competence</b>	<b>Previous disciplines/modules, practices*</b>	<b>Subsequent disciplines/modules, practices *</b>
	activities safe living conditions for preserving the natural environment, ensuring sustainable development of society, including in the event of threats and emergencies and military conflicts	Basics of military training. Life safety; Training practice;	

\* - filled in in accordance with the matrix of competencies and system of educational planning of the program of higher education.

### 3. SCOPE OF THE DISCIPLINE AND TYPES OF ACADEMIC WORK

The total labor intensity of the discipline "Veterinary microbiology and mycology" is "7" credits.

*Table 4.1. Types of academic work by periods of development of the educational program of higher education for full-time education.*

Type of academic work	TOTAL, ac. h.		Semester (s)	
			3	4
<i>Contact work, ac.h.</i>	119		68	51
Lectures ( <b>Lec</b> )	34		17	17
Laboratory work ( <b>Lab</b> )	85		51	34
Practical/seminar classes ( <b>PC</b> )	0		0	0
<i>Independent work of students, ac.h.</i>	88		49	39
<i>Control (exam / test with assessment), ak. h.</i>	45		27	18
<b>General labor intensity of the discipline</b>	<b>Total ak.h</b>	252	144	108
	<b>credits</b>	7	4	3

#### 4. CONTENT OF THE DISCIPLINE

Table 5.1. Content of the discipline (module) by type of academic work

Section number	Name of the discipline section	Name	Topic content	Type of academic work*	
Section 1	General microbiology.	1.1	Systematics, morphology and structure of microorganisms.	The concept of taxonomy and classification of microorganisms. Taxonomic categories. Principles of modern classification of bacteria by Bergey. Prokaryotes and eukaryotes. Basic forms and polymorphism of bacteria. Structure of a bacterial cell. Morphology and structure of spirochaetes, actinomycetes, mycoplasmas, rickettsias, and chlamydia.	Lec, Lab
		1.2	Physiology of microorganisms.	Chemical composition of a bacterial cell. Enzymes of microorganisms, their classification. Nutrition of microorganisms. The essence and types of biological oxidation of substrates by microorganisms. Classification of microbes by type of respiration. Growth and reproduction of microorganisms. Culture media for the cultivation of microorganisms and their requirements, classification of culture media. Features of cultivation of strict anaerobes. The concept of cultural, enzymatic and other properties of microbes.	Lec, Lab
		1.3	Influence of environmental factors on microorganisms.	Influence of physical factors. The concept of sterilization and asepsis. The effect of chemicals. The concept of disinfection and antiseptics. The effect of biological factors on microorganisms. Colicins. Bacteriophages. Nature, properties, and structural features. Practical application of bacteriophages in veterinary medicine. Antibiotics. Producers of antibiotics, principles of their production. Mechanism and spectrum of action of antibiotics. Antibiotic resistance of microbes.	Lec, Lab
		1.4	Genetics of microorganisms.	The concept of heredity and variability. Genetic code and information transfer. The concept of genome, genotype, and phenotype. Chromosomal and extra-chromosomal genetic determinants (plasmids). The nature of microbial variability. Phenotypic manifestation of variability (dissociation, modification). Genotypic variability. Spontaneous and induced mutations in bacteria. Recombination variability in bacteria. Chain polymerase reaction	Lec, Lab

Section number	Name of the discipline section	Name		Topic content	Type of academic work*
				(PCR), DNA probes. The importance of the study of microbial variability in the diagnosis and specific prevention of infectious diseases.	
		1.5	Distribution of microorganisms in nature	Microorganisms as symbiotic partners: mutualism, commensalism, parasitism, antagonism. Microflora of soil, water, and air. Microflora of the animal body. Dysbiosis, its causes and methods of correction. Normal microflora and its protective function. Probiotics for veterinary use.	Lec, Lab
Section 2	Infection and immunity	2.1	Fundamentals of infection teaching.	Definition of the term "infection — infectious process". Infectious disease. Stages of development and clinical manifestation of an infectious disease. The concept of sepsis, bacteremia, toxemia, septicopyemia. Microbial storage. The concept of pathogenicity and virulence of microbes. Units of virulence measurement. The main factors of pathogenicity.	Lec, Lab
		2.2	The doctrine of immunity	Definition of the term "immunity". Antigens. The concept of "antigen". Antigens of animal origin and bacterial cells. Antigenic determinants (epitopes) of bacteria. Basic properties of a complete antigen. Antigenic specificity. Haptens and their properties. Antibodies. The concept of antibodies. Their nature and function. Structure of immunoglobulins of various classes. The concept of the active center of antibodies. Primary and secondary immune responses. Phenomena of antigen-antibody interaction. Serological reactions. Allergy. The concept of allergies and their types. Hypersensitivity of immediate and delayed types. Mechanism of development of both types of hypersensitivity. Types and forms of immunity. Biologics. Principles of control for sterility, harmlessness, reactogenicity and activity.	Lec, Lab
Section 3	Private bacteriology	3.1	Pathogenic cocci.	Pathogens of staphylococcosis and streptococcosis. Morphology, cultivation, and biochemical properties. Sustainability in the external environment. Pathogenicity factors. Antigenic structure. Pathogenesis. Microbiological diagnostics. Immunity. Biologics.	Lec, Lab
		3.2	Enterobacteria.	Pathogens of colibacteriosis and salmonellosis.	Lec, Lab
		3.3	Pathogens of swine erysipelas and listeriosis.	Distribution in nature and significance in human and animal pathology. Basic biological properties. Spectrum	Lec, Lab

Section number	Name of the discipline section	Name	Topic content	Type of academic work *
			pathogenicity. Sustainability in the external environment. Laboratory diagnostics. Differentiation of Erysipelas from listeria.	
		3.4 Pathogens of zoonotic infections.	Pathogens of plague, tularemia, anthrax and brucellosis. Morphology, cultivation, and biochemical properties. Sustainability in the external environment. Pathogenicity factors. Antigenic structure. Pathogenesis. Microbiological diagnostics. Immunity. Biologics.	Lec, Lab
		3.5 Causative agent of pasteurellosis.	Pasteurell-bearing and the significance of this phenomenon in animal pathology. Morphological, tinctorial and other biological properties of the pathogen. Susceptibility of agricultural and laboratory animals and birds. Resistance of pasteurella to physical and chemical factors. Laboratory diagnostics of pasteurellosis. Biologics.	Lec, Lab
		3.6 Pathogenic anaerobes.	General characteristics of biological properties. Significance in animal and human pathology. Sustainability in the external environment. Pathogenicity range and toxins. Selection of pathological material and laboratory diagnostics of emphysematous carbuncle, malignant edema, tetanus, botulism, bradzet, anaerobic dysentery of lambs, sheep enterotoxemia. Application of the neutralization reaction to identify and determine the type of toxins belonging to pathogenic clostridium. Formation of immunity in clostridiosis. Biologics.	Lec, Lab
		3.7 Pathogens of leptospirosis and campylobacteriosis.	Distribution of pathogenic and saprophytic leptospira in nature. Significance in human and animal pathology. Laboratory diagnostics. Differentiation of leptospira. Application of PMA and RA for serological diagnosis of leptospirosis. Immunity in leptospirosis. Biologics.	Lec, Lab
Section 4	Mycology	4.1 Pathogens of mycoses (mucor, penicilli, aspergillus, etc.).	Distribution in nature, significance in the pathology of farm animals and humans, biological properties of pathogens. Pathogenicity factors, resistance. Selection of research material. Laboratory diagnostics of mold mycoses.	Lec, Lab
		4.2 Pathogens of mycoses caused by yeast-like fungi.	Characteristics of pathogens of candidiasis, coccidiomycosis, epizootic lymphangitis, etc. A circle of susceptible animals. Selection of research material.	Lec, Lab

Section number	Name of the discipline section	Name	of the topic Topic content	Type of academic work*
			Laboratory diagnostics.	
		4.3 Pathogens of dermatomycosis.	Animal susceptibility. Morphology of pathogens of trichophytosis and microsporia. Selection of research material. Laboratory diagnostics of dermatomycosis. Criteria for differentiation of pathogens of trichophytosis and microsporia. Biologics.	Lec, Lab
		4.4 Pathogens of mycotoxicosis.	Distribution in nature. Animal susceptibility. Characteristics of the most well-known mycotoxins (afla-and ochratoxins, penicillic acid, trichothecenes, rubratoxins, zearalenone, etc.) and producer fungi. Selection of research material. Laboratory diagnostics of mycotoxicosis.	Lec, Lab

\* - filled in only for **FULL** -TIME training: *Lec-lectures; Lab-laboratory work*

## 5. MATERIAL AND TECHNICAL SUPPORT OF THE DISCIPLINE

Table 6.1. Material and technical support of the discipline

Audience type Classroom	Equipment	Specialized training / laboratory equipment, software and materials for mastering the discipline (if necessary)
Lecture	hall for conducting lecture-type classes, equipped with a set of specialized furniture; a whiteboard (screen) and technical multimedia presentation tools.	Technical means: TOSHIBA X200 multimedia projector, ASUS F9E Core 2 DUO T5750 laptop, Internet connection is available. Software: Microsoft products (OS, office suite, including MS Office/ Office 365, Teams, Skype)
Laboratory	An auditorium for conducting laboratory work, individual consultations, routine monitoring and intermediate certification, equipped with a set of specialized furniture and equipment.	The laboratory is equipped with specialized laboratory furniture; gas burners, chalk board; technical facilities: Baronet electric screen 3.4 244/96 8 152*203MW, Epson EB-X05 multimedia projector, HP 6715s TL-60 laptop, Biomed-5 and BiOptik microscopes, TSvL-160 dry-air laboratory thermostat, Indesit SD 167 refrigerator. Items necessary for microbiological research: instruments (bacteriological loops and tweezers), laboratory utensils, a set of dyes, nutrient media, cultures of microorganisms.
Independent work	An auditorium for independent work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to the EIE.	The laboratory is equipped with specialized laboratory furniture; chalkboard; microscopes "Biomed-5" and "BiOptik".

\* - the audience for independent work of students **must be specified!**

## 6. EDUCATIONAL, METHODOLOGICAL AND INFORMATIONAL SUPPORT OF THE DISCIPLINE

### *Main literature:*

1. Kolychev, N. M. Veterinary microbiology and mycology: textbook for universities / N. M. Kolychev, R. G. Gosmanov. - 6th ed., ster. Saint-Petersburg: Lan, 2025. - 624 p. - ISBN 978-5-507-53411-1. - Text: electronic // Lan: electronic library system. — URL: <https://e.lanbook.com/book/486854>

2. Gosmanov R. G., Ibragimova A. I., Galiullin A. K. Microbiology and immunology: a textbook for universities. - 3rd ed., ster. Saint-Petersburg: Lan, 2025. 240 p. ISBN 978-5-507-50795-5. Text: electronic // Lan: electronic library system. - URL: <https://e.lanbook.com/book/465125>

3. Skorodumov D. I., Rodionova V. B., Kostenko T. S. Praktikum po veterinarnoi mikrobiologii i immunologii [Practical work on veterinary microbiology and immunology]. Saint-Petersburg: Lan, 2023. - 336 p. - ISBN 978-5-507-47839-2. - Text: electronic // Lan: electronic library system. - URL: <https://e.lanbook.com/book/329096>

### *Additional literature:*

1. Sarukhanova L. E., Volina E. G., Yashina N. V. Mikrobiologiya [Microbiology], RUDN Publishing House, 2023.

[https://lib.rudn.ru:443/MegaPro/UserEntry?Action=Link\\_FindDoc&id=509743&idb=0](https://lib.rudn.ru:443/MegaPro/UserEntry?Action=Link_FindDoc&id=509743&idb=0)

2. Sanitary microbiology: a textbook for universities / R. G. Gosmanov, A. Kh. Volkov, A. K. Galiullin, A. I. Ibragimova. - 5th ed., ster. Saint-Petersburg: Lan, 2025. - 252 p. - ISBN 978-5-507-50681-1. - Text: electronic // Lan: electronic library system. - URL: <https://e.lanbook.com/book/456842-Short>

3. Dictionary of microbiological, virological, immunological and epizootological terms / R. G. Gosmanov, N. M. Kolychev, A. A. Novitsky [et al.]. - 2nd ed., ster. Saint-Petersburg: Lan, 2024. - 304 p. - ISBN 978-5-507-47298-7. - Text: electronic // Lan: electronic library system. - URL: <https://e.lanbook.com/book/359039>

### *Resources of the Internet information and telecommunications network:*

1. RUDN University EBS and third-party EBS that university students have access to on the basis of concluded contracts

- RUDN University Electronic Library System – RUDN University EBS

<https://mega.rudn.ru/MegaPro/Web-EBS> "University Library online"

<http://www.biblioclub.ru>- EBS Urite <http://www.biblio-online.ru>-EBS

"Student's consultant

" [www.studentlibrary.ru](http://www.studentlibrary.ru)-Znaniy EBS <https://znanium.ru/>

2. Databases

- Sage <https://journals.sagepub.com/>

- Springer Nature Link <https://link.springer.com/>

- Wiley Journal Database <https://onlinelibrary.wiley.com/>

- Scientometric database Lens.org <https://www.lens.org>

### *Teaching materials for independent work of students in the development of the discipline / module\*:*

- A course of lectures on the discipline "Veterinary microbiology and mycology".

\* - all teaching materials for independent work of students are placed in accordance with the current procedure on the discipline page **in TUIS!**

**DEVELOPER:**

Associate Professor

*Position*

*Signature*

Sachivkina Nadezhda  
Pavlovna

*Name*

**HEAD OF THE DEPARTMENT:**

Associate Professor

*Position*

*Signature*

Podoprigora Irina  
Viktorovna

*Name*

**HEAD OF THE OP HE:**

Professor

*Position*

*Signature*

Vatnikov Yuri  
Anatolyevich

*Name*