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**Federal State Autonomous Educational Institution of Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
NAMED AFTER PATRICE LUMUMBA
RUDN University**

Agricultural and Technological Institute

WORKING PROGRAM OF THE DISCIPLINE

Veterinary microbiology and mycology

**Recommended by the Ministry of Education for the following areas of study /
specialty:**

36.05.01 Veterinary

**Mastering the discipline is carried out within the framework of the implementation
of the main professional Educational Program of Higher Education (EP HE):**

Veterinary Medicine

2025

1. THE PURPOSE OF MASTERING THE DISCIPLINE

The main goal of 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, theoretical foundations for the diagnosis of infectious diseases, principles of immunological research, manufacturing 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 the development of the discipline)

Code	Competence	Indicators of achievement of competence (within the framework of this discipline)
CC-8	Ability 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 emergency situations and military conflicts	CC-8.1. Analyzes factors of harmful impact on life elements of the environment (technical means, technological processes, materials, buildings and structures, natural and social phenomena)
		CC-8.2. Identifies dangerous and harmful factors within the scope
		CC-8.3. Identifies and addresses issues related to workplace safety violations of the task being performed.

3. THE PLACE OF THE DISCIPLINE IN THE STRUCTURE OF THE EPHE

The discipline "**Veterinary microbiology and mycology**" belongs to the mandatory part of the educational relations of block B1 of the EP HE.

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 EP HE, contributing to the achievement of the planned results of the development of the discipline.

Code	Name competencies	Previous disciplines / modules, practices	Subsequent disciplines/modules, practices
UK-8	The ability 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	Biology with the basics of ecology Safety	Internal non-infectious diseases General and private surgery Parasitology and invasive diseases Epizootology and infectious diseases

Lectures (L)		36	18	18	--	-
Laboratory work (LR)		36	18	18	--	-
Practical / seminar classes (S)		-	-	-	-	-
Independent work of students, ak. h.		124	62	62	--	-
Control (exam/test with assessment), ak. h.		20	10	10	--	-
General labor intensity of the discipline	ak. h.	216	108	108	--	-
	zach. units	6	3	3	--	-

5. CONTENT OF THE DISCIPLINE

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

Name of the discipline section	Content of the section (topics)	Type of academic work*
Section 1. Taxonomy, morphology and structure of microorganisms	Topic 1.1. Microbe as a living system. Classification and nomenclature of microorganisms. Morphology and structure of bacteria, viruses, fungi and protozoa	L, LR
	Topic 1.2. Simple and complex methods of staining microbes. Microscopy methods.	LR
Section 2. Physiology of microorganisms	Topic 2.1. Nutrient media. Methods of cultivation of aerobes. Isolation of pure aerobic cultures.	L, LR
	Topic 2.2. Methods of identification of pure microbial cultures. Study of the biochemical properties of microbes.	L, LR
	Topic 2.3. Methods of cultivation of anaerobes. Isolation of pure cultures of anaerobes and their identification	L, LR
Section 3. Influence of environmental factors on microorganisms	Topic 3.1. Influence of physical factors. The concept of sterilization and asepsis. The effect of chemicals. The concept of disinfection and disinsection.	L, LR
	Topic 3.2. The effect of biological factors on microorganisms. Colicins. Bacteriophages. Nature, properties, and structural features. Practical application of bacteriophages in veterinary medicine.	L, LR
	Topic 3.3. Antibiotics. Producers of antibiotics, principles of their production. Mechanism and spectrum of action of antibiotics. Antibiotic resistance of microbes. Methods for determining the sensitivity of bacteria to antibiotics.	L, LR
	Topic 4.1. Microorganisms as symbiotic partners: mutualism, commensalism, parasitism, antagonism.	L

Name of the discipline section	Content of the section (topics)	Type of academic work*
Section 4. Distribution of microorganisms in nature	Topic 4.2. Microflora of soil, water and air. Sanitary and bacteriological study of water and air.	LR
	Topic 4.3. Animal body microflora. Dysbiosis, its causes and methods of correction. Normal microflora and its protective function.	L
Section 5. Teaching about infection	Topic 5.1. Experimental infection and bacteriological studies of animal corpses. Methods of laboratory diagnostics of infectious diseases.	L, LR
Section 6. The doctrine of immunity	Topic 6.1. Definition of the concept of "immunity". The concept of "antigen". Antigens of animal origin and bacterial cells. Basic properties of a complete antigen. Antigenic specificity.	L, LR
	Topic 6.2. Antibodies. The concept of antibodies. Their nature and function. Structure of immunoglobulins of various classes.	L, LR
	Topic 6.3. Phenomena of antigen-antibody interaction. Serological reactions.	L, LR
Section 7. Private bacteriology	Topic 7.1. Pathogenic cocci. Pathogen staphylococci and streptococci.	L, LR
	Topic 7.2. Enterobacteria. Pathogens of colibacteriosis and salmonellosis.	L, LR
	Topic 7.3. Causative agents of swine erysipelas and listeriosis. Distribution in nature and significance in human and animal pathology. Basic biological properties. Pathogenicity spectrum. Sustainability in the external environment. Laboratory diagnostics. Differentiation of erysipelas from listeria.	L, LR
	Topic 7.4. Pathogens of zoonotic infections. Pathogens of plague, tularemia, anthrax and brucellosis.	L, LR
	Topic 7.5. Causative agent of pasteurellosis. 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.	L, LR
	Topic 7.6. 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,	L, LR

Name of the discipline section	Content of the section (topics)	Type of academic work*
	tetanus, botulism, 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 with clostridiosis. Biological preparations.	
	Topic 7.7. 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 PRA and RA for serological diagnosis of leptospirosis. Immunity with leptospirosis. Biological preparations.	L, LR
Section 8. Mycology	Topic 8.1. Pathogens of mycoses (mucor, penicilli, aspergillus, etc.). Distribution in nature, importance in the pathology of farm animals and humans, biological properties of pathogens. Pathogenicity factors, resistance. Selection of research material. Laboratory diagnostics of mold mycoses.	L, LR
	Topic 8.2. 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. Laboratory diagnostics.	L, LR
	Topic 8.3. 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. Biological preparations.	L, LR
	Topic 8.4. 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.	L, LR

6. MATERIAL AND TECHNICAL SUPPORT OF THE DISCIPLINE

Table 6.1. Material and technical support of the discipline

Audience type Classroom	<i>equipment</i>	Specialized educational / laboratory equipment, software and material 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.	Classroom for conducting lecture and seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification. A set of specialized furniture; technical means: a TOSHIBA X200 multimedia projector, an ASUS F9E Core 2 DUO T5750 laptop, Internet access is available. Software: Microsoft products (OS, office suite, including MS Office/ Office 365, Teams, Skype)
Laboratory	is an auditorium for conducting practical classes, individual consultations, ongoing monitoring and intermediate certification, equipped with a set of specialized furniture and equipment.	Laboratories are equipped with specialized laboratory furniture; gas burners, chalk board; technical facilities: Baromet electric screen 3.4 244/96 8 152*203MW, Epson EB-X05 multimedia projector, HP 6715s TL-60 laptop, microscopes "Biomed-5" and "BiOptik", dry-air laboratory thermostat TSvL-160, refrigerator Indesit SD 167. Items required for microbiological research: tools (bacteriological loops and tweezers), laboratory utensils, a set of dyes, nutrient media, cultures of microorganisms.
For students independent work	Audience for independent work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and equipment	laboratory equipped with a with specialized laboratory furniture; chalkboard; microscopes "Biomed-5" and "BiOptik".

7. EDUCATIONAL, METHODOLOGICAL AND INFORMATIONAL SUPPORT OF THE DISCIPLINE

Main literature:

1. Veterinary Microbiology and Immunology PDF 17th Edition by Warren Levinson
<https://disk.yandex.ru/d/wNbenudw4fKeO>

2. Basic Immunology, Functions and Disorders of the Immune System, 5th Edition.pdf
<https://disk.yandex.ru/d/wNbenudw4fKeO>
3. Bauman Microbiology.pdf 2019 <https://disk.yandex.ru/d/wNbenudw4fKeO>
4. Campbell Biology, Tenth Edition - Reece, Urry, Cain et al.pdf 2021
<https://disk.yandex.ru/d/wNbenudw4fKeO>
5. Clinical Microbiology Made Ridiculously Simple.pdf 2018
<https://disk.yandex.ru/d/wNbenudw4fKeO>
6. Eugene W. Nester et al. - Microbiology. 2021.pdf
<https://disk.yandex.ru/d/wNbenudw4fKeO>
7. Gosmanov R. G., Galiullin A. K., Volkov A. Kh., Ibragimova A. I. Microbiology. St. Petersburg, Lan Publishing House, 2017.
http://lib.rudn.ru/MegaPro/UserEntry?Action=Rudn_FindDoc&id=465013&idb=0
8. Gosmanov R. G., Kolychev N. M., Novitsky A. A. Fundamentals of the theory of infection and antimicrobial immunity. St. Petersburg, Lan Publishing House, 2017.
http://lib.rudn.ru/MegaPro/UserEntry?Action=Rudn_FindDoc&id=465046&idb=0
9. Kislenko V. N. Veterinary microbiology and immunology. St. Petersburg, Lan Publishing House, 2016.
http://lib.rudn.ru/MegaPro/UserEntry?Action=Rudn_FindDoc&id=449945&idb=0
10. Gosmanov R. G., Kolychev N. M. Practical work on veterinary microbiology and mycology. St. Petersburg, Lan Publishing House, 2014.
11. Kolychev N. M., Gosmanov R. G. Veterinary microbiology and mycology. St. Petersburg, Lan Publishing House, 2014.
http://lib.rudn.ru/MegaPro/UserEntry?Action=Rudn_FindDoc&id=465191&idb=0

Additional literature:

1. Sarukhanova L. E., Volina E. G., Yashina N. V. General microbiology, virology and applied immunology. Moscow, RUDN Publishing House, 2020.
http://lib.rudn.ru/MegaPro/UserEntry?Action=Rudn_FindDoc&id=491251&idb=0
2. Gosmanov R. G., Kolychev N. M., Novitsky A. A. et al. A short dictionary of microbiological, virological, immunological, and epizootological terms. St. Petersburg, Lan Publishing House, 2017.
http://lib.rudn.ru/MegaPro/UserEntry?Action=Rudn_FindDoc&id=465045&idb=0
3. Gosmanov R. G., Volkov A. Kh., Galiullin A. K., Ibragimova A. I. Sanitary microbiology. St. Petersburg, Lan Publishing House, 2018.
http://lib.rudn.ru/MegaPro/UserEntry?Action=Rudn_FindDoc&id=466528&idb=0

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 Electronic Library System](http://lib.rudn.ru/MegaPro/Web) <http://lib.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
 - EBS "Lan" <http://eZlanbook.com/>
 - EBS "Troitsky Bridge" <http://www.trmost.com/>
2. Databases and search engines:
 - electronic fund of legal and regulatory and technical documentation <http://docs.cntd.ru/>

- Yandex search engine <https://www.yandex.ru/>
- Google search engine <https://www.google.ru/>
- SCOPUS abstract database <http://www.elsevierscience.ru/products/scopus/>

Educational and methodological materials for independent work of students in the development of the discipline/module:*

1. A course of lectures on the discipline "**Veterinary microbiology and mycology**"
2. Laboratory workshop on the discipline "**Veterinary microbiology and mycology**"

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

8. EVALUATION MATERIALS AND A POINT-RATING SYSTEM FOR ASSESSING THE LEVEL OF COMPETENCE FORMATION IN THE DISCIPLINE

Assessment materials and a point-rating system* for assessing the level of competence formation (parts of competencies) based on the results of mastering the discipline "**Veterinary microbiology and mycology**" are presented in the Appendix to this Working Program of the discipline.

* - AM and PRS are formed on the basis of the requirements of the relevant local regulatory act of the RUDN University.

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