

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:
ca953a0120d891083f939673078ef1a989da418a

**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

VIROLOGY AND BIOTECHNOLOGY

(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 "Virology and biotechnology" is included in the specialty program "Veterinary Medicine" in the direction of 36.05.01 "Veterinary Medicine" and is studied in the 4th semester of the 2nd year. The discipline is implemented by the V. S. Kiktenko Department of Microbiology. The discipline consists of 4 sections and 27 topics and is aimed at studying general and private virology, and acquiring knowledge on the prevention, treatment and diagnosis of viral diseases of animals using the achievements of biotechnology.

The purpose of mastering the discipline is to help students master theoretical questions about the diversity of the world of viruses, 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 "Virology and Biotechnology" is aimed at developing the following competencies (parts of competencies) in students:

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.

3. PLACE OF THE DISCIPLINE IN THE STRUCTURE OF THE MAIN HIGHER EDUCATION PROGRAM

The discipline "Virology and Biotechnology" 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 "Virology and Biotechnology".

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 activities	Inorganic and Analytical Chemistry; Organic Chemistry; Biological Physics; Fundamentals of military training.	Veterinary radiobiology; Training practice;

Code	Name of the competence	Previous disciplines/modules, practices*	Subsequent disciplines/modules, practices *
	Conditions life support for natural environment assurance sustainable development of society, including in the event of threat and occurrence of emergencies and military conflicts	of Life safety; Veterinary Microbiology and mycology conservation; Training Practice;	

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

4. SCOPE OF THE DISCIPLINE AND TYPES OF ACADEMIC WORK

The total labor intensity of the discipline "Virology and Biotechnology" is "3" 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)
			4
<i>Contact work, ac.h.</i>	68		68
Lectures (Lec)	17		17
Laboratory work (Lab)	51		51
Practical/seminar classes (PC)	0		0
<i>Independent work of students, ac.h.</i>	22		22
<i>Control (exam/credit with assessment), ak. h.</i>	18		18
General labor	Total ak.h.	108	108
	credits	3	3

5. 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 virology.	1.1	The discovery of viruses and the history of their study.	The nature and origin of viruses. Their differences from other infectious agents. The role of viruses in the infectious pathology of animals and humans. Economic damage caused to animal husbandry by human viral diseases. Classification of viruses.	Lab, Lec
		1.2	Structure and chemical composition of viruses.	Forms of viruses ' existence in nature. Principles of virion organization. Shape and size of virions. Types of symmetry and their conditionality. Types of viral genomes. Structural proteins. The ability of virions to self-assemble. Virion lipids and carbohydrates, their origin and significance.	Lab, Lec
		1.3	Reproduction and variability of viruses.	Forms of interaction of viruses with the cell. Reproduction of DNA-genomic viruses, Reproduction of RNA-genomic viruses. Mechanisms of virus variability.	Lab, Lec
		1.4	Virus cultivation.	Cultivation of viruses in the body of naturally susceptible and laboratory animals, on chicken embryos, cell culture. The use of these biological systems in laboratory diagnostics of viral diseases.	Lab, Lec
		1.5	Pathogenesis of viral diseases of animals.	Pathways of virus entry into the animal body and barriers on these pathways. Primary localization and circulation of the virus. Tropism of viruses and its conditionality. The mechanism of damaging action of viruses on cells. Latent, chronic persistent, slow viral and prion infections. Oncogenic viruses.	Lab, Lec
		1.6	Principles of diagnostics of viral diseases of animals.	Preliminary diagnosis based on clinical symptoms, pathoanatomical changes, and epizootological data. Final diagnosis based on the indication and identification of viruses in the body of sick animals. Evidence for the etiological role of isolated viruses. Features of diagnostics of viral diseases of animals.	Lab, Lec
		1.7	Molecular and genetic methods in the diagnosis of viral infections.	Basics of polymerase chain reaction. Molecular hybridization. Biochips.	Lab, Lec
Section 2	Features	2.1	Factors of non-specific and	Factors of non-specific antiviral protection	Lab, Lec

Section number	Name of the discipline section	Title		Topic content	Type of academic work *
	antiviral immunity.		specific antiviral protection of animals.	animals. Factors of specific cellular and humoral antiviral immunity. Interaction of cellular and humoral links in the formation of antiviral immunity. Immunosuppressive effect of viruses. Viruses as inducers of autoimmune disorders.	
		2.2	Immunoprophylaxis of viral infections in animals.	Classification of immunobiological preparations. Methods of production, characteristics, distinctive features, advantages and disadvantages. Reverse genetics method.	Lab, Lec
		2.3	Serological reactions in virology.	General principle of serological reactions and their differences from each other. RN, RNGA, RTGA, RGAd, CFT, RIF, RDP, ELISA.	Lab, Lec
Section 3	Private virology	3.1	Poxvirus family.	Characteristics of viruses, classification, main diseases (avian smallpox, cattle, pigs, sheep and goats, nodular dermatitis of cattle, monkey smallpox, rabbit myxomatosis), methods of laboratory diagnostics, specific prevention.	Lab, Lec
		3.2	The aspharvirus family.	African swine fever virus.	Lab, Lec
		3.3	Herpesvirus family.	Characteristics of viruses, classification, main diseases (viruses of Aujeska, Marek's diseases, infectious rhinotracheitis of cattle, infectious rhinotracheitis of cats), methods of laboratory diagnostics, specific prevention.	Lab, Lec
		3.4	The adenovirus family.	Characteristics of viruses, classification, main diseases (avian adenoviruses, adenovirus infections of cattle, horses, dogs, pigs, sheep and goats), methods of laboratory diagnostics, specific prevention.	Lab, Lec
		3.5	Family of parvoviruses.	Parvovirus infections in pigs, dogs, and cats.	Lab, Lec
		3.6	Picornavirus family.	Characteristics of viruses, classification, main diseases (FMD, Teschen's disease), methods of laboratory diagnostics, specific prevention.	Lab, Lec
		3.7	Calicivirus family.	Rabbit hemorrhagic disease. calicivirus infection in cats.	Lab, Lec
		3.8	Flavirus family.	Characteristics of viruses, classification, main diseases (classical swine fever), methods of laboratory diagnostics, specific prevention.	Lab, Lec
		3.9	Orthomyxovirus family.	Influenza A viruses, main characteristics, genetic and antigenic variability. Avian flu. Methods of laboratory diagnostics, specific prevention.	Lab, Lec

Section number	Name of the discipline section	Name		Topic content	Type of academic work*
		3.10	Paramyxovirus family.	Characteristics of viruses, classification, major diseases (Newcastle disease, bovine parainfluenza, bovine respiratory syncytial infection, bovine plague, carnivorous plague), methods of laboratory diagnostics, specific prevention.	Lab, Lec
		3.11	Family of reoviruses..	Characteristics of viruses, classification, main diseases (rotavirus diarrhea of calves, Bluetongue), methods of laboratory diagnostics, specific prevention.	Lab, Lec
		3.12	The birnavirus family.	The Gumboro virus.	Lab, Lec
		3.13	Family of retroviruses.	Characteristics of viruses, classification, main diseases (bovine leukemia virus, feline leukemia virus, feline immunodeficiency virus), methods of laboratory diagnostics, specific prevention.	Lab, Lec
		3.14	Family of coronaviruses	Characteristics of viruses, classification, main diseases (coronavirus infections of birds, pigs, cattle, dogs and cats), methods of laboratory diagnostics, specific prevention.	Lab, Lec
		3.15	Prions and infections caused by them.	Spongiform encephalopathy of cattle scrapie, transmissible encephalopathy of minks.	Lab, Lec
		3.16	Viral infections of exotic, zoo and wild animals.	Viral infections of exotic, zoo, and wild animals, including reptiles and amphibians. Their role in human disease.	Lab, Lec
Section 4	Biotechnology	4.1	Biotechnology of production of immunobiological preparations.	Live and inactivated antiviral vaccines. Basic principles of obtaining and controlling live vaccines. Principles of preparation and control of inactivated antiviral vaccines. Subunit vaccines and genetically engineered vaccines. Advantages and disadvantages of different types of antiviral vaccines. Their practical application.	Lab, Lec

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

6. 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.	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 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, Multimedia Epson EB-X05 multimedia projector, HP 6715s TL-60 laptop, PCYA-10 ovoscope, Biomed-5 and BiOptik microscopes "BiOptik", dry-air thermostat, TSvL-160 dry-air laboratory thermostat,

		refrigerator Indesit SD 167. Subjects required 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!**

7. EDUCATIONAL, METHODOLOGICAL AND INFORMATIONAL SUPPORT OF THE DISCIPLINE

Main literature:

1. Gosmanov R. G., Kolychev N. M., Pleshakova V. I. Veterinary virology: textbook for universities. - 9th ed., ster. Saint-Petersburg: Lan, 2026. - 500 p. - ISBN 978-5-507-51177-8. - Text: electronic // Lan: electronic library system. - URL: <https://e.lanbook.com/book/506984>

2. Virology and biotechnology. R. V. Belousova, E. I. Yarygina, I. V. Tretyakova [et al.]-5th ed., ster. Saint-Petersburg: Lan, 2023. - 220 p. - ISBN 978-5-507-47230-7. - Text: electronic // Lan: electronic library system. - URL: <https://e.lanbook.com/book/351851>

3. Virology. Practicum: a textbook for universities. I. V. Tretyakova, M. S. Kalmykova, E. I. Yarygina, V. M. Kalmykov. - 5th ed., ster. Saint-Petersburg: Lan, 2025. - 132 p. - ISBN 978-5-507-54267-3. - Text: electronic // Lan: electronic library system. — URL: <https://e.lanbook.com/book/507004>.

Additional literature:

1. Gosmanov R. G., Kolychev N. M., Pleshakova V. I. Veterinary virology. St.Petersburg, Lan Publishing House, 2021.

2. Tretyakova I. V., Kalmykova M. S., Yarygina E. I., Kalmykov V. M. Virology. Practicum. Kalmykova

3. M. S., Kalmykov M. V., Belousova R. V. Fundamentals of polymerase chain reaction with different detection formats: a textbook for universities. - 4th ed., ster. Saint-Petersburg: Lan, 2025. - 80 p. - ISBN 978-5-507-52896-7. - Text: electronic // Lan: electronic library system. - URL: <https://e.lanbook.com/book/462281>.

4. Kalmykova, M. S. Serological reactions in virology: a textbook / M. S. Kalmykova, E. I. Yarygina, O. A. Minkova. - Moscow: MGAVMiB named after K. I. Scriabin, 2025. - 84 p. - ISBN 978-5-86341-568-0. - Text: electronic // Lan: electronic library system. — URL: <https://e.lanbook.com/book/515654>.

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

<http://lib.rudn.ru/MegaPro/Web-EBS> "University Library online"

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

"Student's consultantwww.studentlibrary.ru

" www.studentlibrary.ru-EBS "Troitsky Bridge"

2. Databases

- electronic Fund of legal and normative-technical documentation

<http://docs.cntd.ru/>

- search engine Yandex <https://www.yandex.ru/>

- search engine Google <https://www.google.ru/>

- bibliographic database SCOPUS

<http://www.elsevierscience.ru/products/scopus/>

Educational-methodical materials for independent work of students in the development of the discipline/module:*

1. Course of lectures on the discipline "Virology and biotechnology".

* - 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