Ministry of Agriculture of the Russian Federation
Federal State Budgetary Educational Institution
of Higher Education
"St. Petersburg State University of Veterinary Medicine"

APPROVED BY
Vice-Rector for Educational
Work and Youth Policy
_____ Sukhinin A.A.
April 10, 2026

Department of microbiology, virology and immunology

EDUCATIONAL WORK PROGRAM

for the discipline
«VETERINARY MICROBIOLOGY AND MYCOLOGY»
The level of higher education
SPECIALIST COURSE

Specialty 36.05.01 Veterinary Medicine
Profile: «General clinical veterinary medicine»
Full-time education
Education starts in 2026

Reviewed and adopted
at the meeting of the Department
on March 2, 2026
Protocol No. 8
Head of the Department
of Microbiology, Virology and Immunology
Doctor of Biological Sciences, Professor
_____ A.A. Sukhinin

Saint Petersburg
2026

1. AIMS AND OBJECTIVES OF THE DISCIPLINE "Veterinary Microbiology and Mycology"

The main goal in the training of a veterinarian in the discipline "Veterinary Microbiology and Mycology" is to form a scientific worldview among students about the diversity of biological objects, microbiological techniques and methods for diagnosing infectious animal diseases, designing recombinant bacteria - vaccine strains and producers of biologically active substances, creating new types of diagnosticians, vaccines and serums, and also to give students theoretical and practical knowledge on general and private veterinary microbiology and mycology.

The objectives of the course "Veterinary Microbiology and Mycology" include:

1. The study of objects of veterinary microbiology, their morphology, physiology, ecology, evolution.
2. Acquisition of practical skills to study the structure of bacteria and microscopic fungi, the genetics of microorganisms, tinctorial, cultural, biochemical, pathogenic properties, and antigenic structure.
3. The study of pathogens of infectious diseases of animals.
4. The study of methods of modern microbiology, its capabilities, achievements and development prospects.
5. Acquisition of skills using classical and genotypic methods of laboratory diagnostics of infectious animal diseases.
6. The study of the basics of sanitary microbiology.
7. Study of the basics of the infectious process and pathogenicity factors of micro-organisms.
8. The study of the basics of immunology and factors of the immune response of the animal body to pathogens of infectious diseases.
9. Familiarization with the technology of production of diagnostics and promising ways to improve them using the achievements of molecular biology, immunology, genetic and cellular engineering.
10. The study of promising and environmentally friendly technological processes based on the use of microorganisms.

2.THE LIST OF THE PLANNED RESULTS OF THE DISCIPLINE (MODULE), CORRELATED WITH THE PLANNED RESULTS OF THE REALISED EDUCATIONAL PROGRAM

As a result of mastering the discipline, the student prepares for the following types of activities, in accordance with the educational standard of the FSE on 05.36.01 "Veterinary Medicine".

The field of professional activity:

13 Agriculture

Types of tasks of professional activity:

- Medical;
- Expert control;
- Scientific and educational.

2.1. The student's competencies formed (acquired) as a result of mastering the discipline

The education of the discipline should form the following competencies:

a) General professional competencies (GPC):

GPC-2. Be able to interpret and evaluate in his professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism.

GPC-2 $_{ID-1.}$ To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the body animals.

GPC-2 $_{ID-2}$. Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products; assess the impact of anthropogenic factors on the animal body and economic factors.

GPC-2 $_{ID-3}$. To have an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects; a sense of responsibility for their profession.

GPC-4. Be able to use methods of solving problems using modern equipment in the development of new technologies in his professional activity and use modern professional methodology to conduct experimental research and interpret their results.

GPC-4 $_{ID-1}$. To know the technical capabilities of modern specialized equipment, methods of solving problems of professional activity.

GPC-4 $_{ID-2.}$ Be able to apply modern technologies and research methods in professional activities, interpret the results obtained.

GPC-4 $_{ID-3}$. Have the skills to work with specialized equipment to implement the tasks set during research and development of new technologies.

GPC-6. Be able to analyze, identify and assess the danger of the risk of the occurrence and spread of diseases.

GPC-6 $_{ID-1}$. To know the existing programs for the prevention and control of zoonoses, contagious diseases, emergent or newly emerging infections, the use of animal identification systems, tracing and control by the relevant veterinary services.

GPC-6 $_{ID-2}$. Be able to assess the risk of animal diseases, including the import of animals and animal products and other measures of veterinary services, to control prohibited substances in the body of animals, animal products and feed.

GPK-6 $_{ID-3}$. Have the skills to carry out identification procedures, select and implement measures that can be used to reduce the level of risk.

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

Discipline **B1.O.20 "Veterinary Microbiology and Mycology"** is a mandatory discipline of Block 1 of the federal state educational standard of higher education in the specialty 36.05.01 "Veterinary Medicine" Profile: «General clinical veterinary medicine»

It is mastered in 3.4 semesters - full-time education.

Knowledge of veterinary microbiology and mycology is based on the principles of materialistic methodology, knowledge of organic, inorganic, analytical and physicocolloid chemistry, physics with the basics of biophysics, molecular biology, genetics, physiology and anatomy of animals.

Disciplines for which the discipline "Veterinary Microbiology and Mycology" is a precursor:

1. Clinical diagnosis.
2. Immunology.
3. Pathological anatomy and forensic veterinary examination.
4. General and private surgery.
5. Obstetrics and gynecology.
6. Veterinary and sanitary examination.
7. Epizootology and infectious diseases.
8. Virology and biotechnology

4. THE SCOPE OF DISCIPLINE AND TYPES OF ACADEMIC WORK

4.1. The scope of the discipline for full-time education

Type of educational work	**Hours**	**Semesters**	
		3	**4**
Classroom classes (total)	**118**	**50**	**68**
Including:			
Lectures, including interactive forms	50	16	34
Practical (PP), including interactive forms, among which are:	68	34	34
practical training (PP)	16	8	8
Self-study	**170**	**94**	**76**
Control		**-**	+
Type of intermediate and final certification (credit, exam)		Credit	Exam
Total labor intensity hours/credits	**288/8**	**144/4**	**144/4**

5. THE CONTENT OF THE DISCIPLINE AND TYPES OF CLASSES

5.1. The content of the discipline for full-time education

№	The Title	Achieved competences	Semester	Types of academic work, including students' self-study and labor intensity (in hours)			
				L	PP	PT	SS
1	**The history of the development of microbiology. Systematics of microorganisms. Morphology and structure of bacteria.**	**GPC-4.** Is able to use methods to solve problems, using modern equipment for the development of new technologies in professional activity and use modern professional methodology to conduct experimental research and interpret the results. **GPC-4 ID-1.** To know the technical capabilities of modern specialized equipment, methods of solving problems of professional activity. **GPC-4 ID-2.** Be able to apply modern technologies and research methods in professional activities, interpret the results obtained. **GPC-4 ID-3.** To possess skills of: the work with specialized equipment for implementation of the set tasks for research and the development of new technologies, digital ones, as well.	3	2	2	-	8
2	**Tinctorial properties of microorganisms. The chemical composition of microorganisms. Biochemical properties. Nutrition and respiration of microorganisms.**	**GPC-4.** Is able to use methods to solve problems, using modern equipment for the development of new technologies in professional activity and use modern professional methodology to conduct experimental research and interpret the results. **GPC-4 ID-1.** To know the technical capabilities of modern specialized equipment, methods of solving problems of professional activity.	3	2	6	-	12

		GPC-4 $_{ID-2.}$ Be able to apply modern technologies and research methods in professional activities, interpret the results obtained. **GPC-4** $_{ID-3}$**.** To possess skills of: the work with specialized equipment for implementation of the set tasks for research and the development of new technologies, digital ones, as well.					
3	**Growth and reproduction of microorganisms. Cultural properties of microorganisms. Antigenic properties of microorganisms. Genetics of microorganisms**	**GPC-2.** Is able to interpret and evaluate in professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological status of the animal body. **GPC-2** $_{ID-1}$ To know: ecology factors of the environment, its classification and the nature of relationships with living organisms; basic ecological concepts; interspecific relations of animals and plants, terms and bio ecology laws, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2** $_{ID-2}$ To be able to: use environmental factors and environmental laws in agricultural manufacture; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental assessment of agricultural facilities and the production of agricultural products; assess the impact on the animal body, anthropogenic and economic factors **GPC-2** $_{ID-3}$ To possess skills of: the knowledge of the origin	3	2	4	-	20

		of living organisms, the levels of organization of living matter, favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the environment, the laws of the development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, with the use of digital technologies as well.					
4	**The influence of environmental factors on microorganisms. Ecology of microorganisms.**	**GPC-2.** Is able to interpret and evaluate in professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological status of the animal body. **GPC-2** $_{ID-1}$ To know: ecology factors of the environment, its classification and the nature of relationships with living organisms; basic ecological concepts; interspecific relations of animals and plants, terms and bio ecology laws, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2** $_{ID-2}$ To be able to: use environmental factors and environmental laws in agricultural manufacture; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental assessment of agricultural facilities and the production of agricultural products; assess the impact on the animal body, anthropogenic and economic factors	3	2	2	-	6

		GPC-2 $_{\text{ID-3}}$ To possess skills of: the knowledge of the origin of living organisms, the levels of organization of living matter, favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the environment, the laws of the development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, with the use of digital technologies as well. **GPC-6.** Is able to analyze, identify and assess the risk danger of the occurrence and spread of the disease. **GPC-6** $_{\text{ID-1}}$ To know: existing programs for the prevention and control of zoonosis, contagious diseases, emergent or newly emerging infections, the use of animal identification systems, trace and control by the relevant veterinary services. **GPC-6** $_{\text{ID-2}}$ To be able to: assess the risk of animal diseases, including the import of animals and animal products and other measures of veterinary services, the control of prohibited substances in the body of animals, animal products and feed **GPC-6** $_{\text{ID-3}}$ To possess skills to: conduct identification procedures, select and implement measures that can be used to reduce the risk level**.**					
5	**The microflora of the animal body.**	**GPC-2.** Is able to interpret and evaluate in professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological status of the animal body. **GPC-2** $_{\text{ID-1}}$ To know: ecology factors of the environment, its	3	2	2	-	8

		classification and the nature of relationships with living organisms; basic ecological concepts; interspecific relations of animals and plants, terms and bio ecology laws, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2** $_{\text{ID-2}}$ To be able to: use environmental factors and environmental laws in agricultural manufacture; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental assessment of agricultural facilities and the production of agricultural products; assess the impact on the animal body, anthropogenic and economic factors **GPC-2** $_{\text{ID-3}}$ To possess skills of: the knowledge of the origin of living organisms, the levels of organization of living matter, favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the environment, the laws of the development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, with the use of digital technologies as well.						
6	**Infection and infectious disease.**	**GPC-4.** Is able to use methods to solve problems, using modern equipment for the development of new technologies in professional activity and use modern professional methodology to conduct experimental research and interpret the results.	3	2	2	-	8

		GPC-4 $_{\text{ID-1}}$**.** To know the technical capabilities of modern specialized equipment, methods of solving problems of professional activity. **GPC-4** $_{\text{ID-2.}}$ Be able to apply modern technologies and research methods in professional activities, interpret the results obtained. **GPC-4** $_{\text{ID-3}}$**.** To possess skills of: the work with specialized equipment for implementation of the set tasks for research and the development of new technologies, digital ones, as well.					
7	**Pathogenicity and virulence of microorganisms**	**GPC-2.** Is able to interpret and evaluate in professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological status of the animal body. **GPC-2** $_{\text{ID-1}}$ To know: ecology factors of the environment, its classification and the nature of relationships with living organisms; basic ecological concepts; interspecific relations of animals and plants, terms and bio ecology laws, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2** $_{\text{ID-2}}$ To be able to: use environmental factors and environmental laws in agricultural manufacture; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental assessment of agricultural facilities and the	3	2	2	-	8

		production of agricultural products; assess the impact on the animal body, anthropogenic and economic factors **GPC-2** $_{ID-3}$ To possess skills of: the knowledge of the origin of living organisms, the levels of organization of living matter, favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the environment, the laws of the development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, with the use of digital technologies as well. **GPC-6.** Is able to analyze, identify and assess the risk danger of the occurrence and spread of the disease. **GPC-6** $_{ID-1}$ To know: existing programs for the prevention and control of zoonosis, contagious diseases, emergent or newly emerging infections, the use of animal identification systems, trace and control by the relevant veterinary services. **GPC-6** $_{ID-2}$ To be able to: assess the risk of animal diseases, including the import of animals and animal products and other measures of veterinary services, the control of prohibited substances in the body of animals, animal products and feed **GPC-6** $_{ID-3}$ To possess skills to: conduct identification procedures, select and implement measures that can be used to reduce the risk level**.**					
8	**Immunity and the immune system. Specific and non-specific factors of immunity. Antibodies and antigens.**	**GPC-2.** Is able to interpret and evaluate in professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological status of the animal	3	-	4	-	8

		body. **GPC-2** $_{\textbf{ID-1}}$ To know: ecology factors of the environment, its classification and the nature of relationships with living organisms; basic ecological concepts; interspecific relations of animals and plants, terms and bio ecology laws, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2** $_{\textbf{ID-2}}$ To be able to: use environmental factors and environmental laws in agricultural manufacture; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental assessment of agricultural facilities and the production of agricultural products; assess the impact on the animal body, anthropogenic and economic factors **GPC-2** $_{\textbf{ID-3}}$ To possess skills of: the knowledge of the origin of living organisms, the levels of organization of living matter, favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the environment, the laws of the development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, with the use of digital technologies as well.					

9	**Methods of diagnosis of infectious diseases. Characteristics of serological reactions. Biologics.**	**GPC-4.** Is able to use methods to solve problems, using modern equipment for the development of new technologies in professional activity and use modern professional methodology to conduct experimental research and interpret the results. **GPC-4 ID-1.** To know the technical capabilities of modern specialized equipment, methods of solving problems of professional activity. **GPC-4 ID-2.** Be able to apply modern technologies and research methods in professional activities, interpret the results obtained. **GPC-4 ID-3.** To possess skills of: the work with specialized equipment for implementation of the set tasks for research and the development of new technologies, digital ones, as well.	3	2	2	8	16
	Total for 3 semesters			**16**	**26**	**8**	**94**
10	**Gram–positive cocci are pathogens of staphylococcosis and streptococcal infections. Gram-positive rods of the correct shape, which do not form spores.**	**GPC-6.** Is able to analyze, identify and assess the risk danger of the occurrence and spread of the disease. **GPC-6 ID-1** To know: existing programs for the prevention and control of zoonosis, contagious diseases, emergent or newly emerging infections, the use of animal identification systems, trace and control by the relevant veterinary services. **GPC-6 ID-2** To be able to: assess the risk of animal diseases, including the import of animals and animal products and other measures of veterinary services, the control of prohibited substances in the body of animals, animal products and feed **GPC-6 ID-3** To possess skills to: conduct identification procedures, select and implement measures that can be used	4	4	4	-	8

		to reduce the risk level**.**					
11	**Gram-positive rods of irregular shape, non-spore-forming, aerobic, acid-resistant**	**GPC-6.** Is able to analyze, identify and assess the risk danger of the occurrence and spread of the disease. **GPC-6** $_{ID-1}$ To know: existing programs for the prevention and control of zoonosis, contagious diseases, emergent or newly emerging infections, the use of animal identification systems, trace and control by the relevant veterinary services. **GPC-6** $_{ID-2}$ To be able to: assess the risk of animal diseases, including the import of animals and animal products and other measures of veterinary services, the control of prohibited substances in the body of animals, animal products and feed **GPC-6** $_{ID-3}$ To possess skills to: conduct identification procedures, select and implement measures that can be used to reduce the risk level**.**	4	2	4	-	8
12	**Spore-forming gram-positive rods. Anaerobic gram-negative rods that do not form spores.**	**GPC-4.** Is able to use methods to solve problems, using modern equipment for the development of new technologies in professional activity and use modern professional methodology to conduct experimental research and interpret the results. **GPC-4** $_{ID-1}$**.** To know the technical capabilities of modern specialized equipment, methods of solving problems of professional activity. **GPC-4** $_{ID-2.}$ Be able to apply modern technologies and research methods in professional activities, interpret the results obtained. **GPC-4** $_{ID-3}$**.** To possess skills of: the work with specialized equipment for implementation of the set tasks for research	4	4	4	-	8

		and the development of new technologies, digital ones, as well.					
13	**Gram–negative facultative anaerobic rods.**	**GPC-6.** Is able to analyze, identify and assess the risk danger of the occurrence and spread of the disease. **GPC-6 ID-1** To know: existing programs for the prevention and control of zoonosis, contagious diseases, emergent or newly emerging infections, the use of animal identification systems, trace and control by the relevant veterinary services. **GPC-6 ID-2** To be able to: assess the risk of animal diseases, including the import of animals and animal products and other measures of veterinary services, the control of prohibited substances in the body of animals, animal products and feed **GPC-6 ID-3** To possess skills to: conduct identification procedures, select and implement measures that can be used to reduce the risk level**.**	4	4	2	4	8
14	**Gram-negative aerobic microorganisms with an unclear systematic position.**	**GPC-4.** Is able to use methods to solve problems, using modern equipment for the development of new technologies in professional activity and use modern professional methodology to conduct experimental research and interpret the results. **GPC-4 ID-1.** To know the technical capabilities of modern specialized equipment, methods of solving problems of professional activity. **GPC-4 ID-2.** Be able to apply modern technologies and research methods in professional activities, interpret the results obtained. **GPC-4 ID-3.** To possess skills of: the work with specialized	4	4	2	-	8

		equipment for implementation of the set tasks for research and the development of new technologies, digital ones, as well.					
15	**Aerobic, non-fermenting, Gram-negative rods are Gram-negative convoluted microorganisms.**	**GPC-6.** Is able to analyze, identify and assess the risk danger of the occurrence and spread of the disease. **GPC-6 $_{ID-1}$** To know: existing programs for the prevention and control of zoonosis, contagious diseases, emergent or newly emerging infections, the use of animal identification systems, trace and control by the relevant veterinary services. **GPC-6 $_{ID-2}$** To be able to: assess the risk of animal diseases, including the import of animals and animal products and other measures of veterinary services, the control of prohibited substances in the body of animals, animal products and feed **GPC-6 $_{ID-3}$** To possess skills to: conduct identification procedures, select and implement measures that can be used to reduce the risk level**.**	4	4	-		8
16	**Gram-negative bacteria, obligate intracellular parasites.**	**GPC-2.** Is able to interpret and evaluate in professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological status of the animal body. **GPC-2 $_{ID-1}$** To know: ecology factors of the environment, its classification and the nature of relationships with living organisms; basic ecological concepts; interspecific relations of animals and plants, terms and bio ecology laws, parasites and hosts; ecological features of some types of pathogenic	4	4	2	-	4

		microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2** $_{ID-2}$ To be able to: use environmental factors and environmental laws in agricultural manufacture; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental assessment of agricultural facilities and the production of agricultural products; assess the impact on the animal body, anthropogenic and economic factors **GPC-2** $_{ID-3}$ To possess skills of: the knowledge of the origin of living organisms, the levels of organization of living matter, favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the environment, the laws of the development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, with the use of digital technologies as well.					
17	**Morphology of microscopic fungi. Microscopic fungi are pathogens of mycoses and mycotoxicoses.**	**GPC-4.** Is able to use methods to solve problems, using modern equipment for the development of new technologies in professional activity and use modern professional methodology to conduct experimental research and interpret the results. **GPC-4** $_{ID-1}$**.** To know the technical capabilities of modern specialized equipment, methods of solving problems of professional activity.	4	4	2	4	12

		GPC-4 $_{ID-2.}$ Be able to apply modern technologies and research methods in professional activities, interpret the results obtained. **GPC-4** $_{ID-3}$**.** To possess skills of: the work with specialized equipment for implementation of the set tasks for research and the development of new technologies, digital ones, as well.					
18	**Microbiological examination of water, air, soil, manure. Microbiological examination of raw materials of animal origin. Microbiological examination of food and animal feed.**	**GPC-2.** Is able to interpret and evaluate in professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological status of the animal body. **GPC-2** $_{ID-1}$ To know: ecology factors of the environment, its classification and the nature of relationships with living organisms; basic ecological concepts; interspecific relations of animals and plants, terms and bio ecology laws, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2** $_{ID-2}$ To be able to: use environmental factors and environmental laws in agricultural manufacture; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental assessment of agricultural facilities and the production of agricultural products; assess the impact on the animal body, anthropogenic and economic factors **GPC-2** $_{ID-3}$ To possess skills of: the knowledge of the origin	4	4	2	-	12

		of living organisms, the levels of organization of living matter, favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the environment, the laws of the development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, with the use of digital technologies as well. **GPC-6.** Is able to analyze, identify and assess the risk danger of the occurrence and spread of the disease. **GPC-6** $_{ID-1}$ To know: existing programs for the prevention and control of zoonosis, contagious diseases, emergent or newly emerging infections, the use of animal identification systems, trace and control by the relevant veterinary services. **GPC-6** $_{ID-2}$ To be able to: assess the risk of animal diseases, including the import of animals and animal products and other measures of veterinary services, the control of prohibited substances in the body of animals, animal products and feed **GPC-6** $_{ID-3}$ To possess skills to: conduct identification procedures, select and implement measures that can be used to reduce the risk level**.**					
	Total for 4 semesters			**34**	**26**	**8**	**76**

6. THE LIST OF EDUCATIONAL AND METHODOLOGICAL SUPPORT FOR STUDENTS' SELF WORK ON THE DISCIPLINE "VETERINARY MCROBIOLOGY AND MYCOLOGY"

6.1. GUIDELINES FOR INDEPENDENT WORK

1. Practical training in veterinary microbiology and mycology : textbook / I. V. Savina, M. V. Sycheva, O. L. Kartashova [et al. ORENBURG STATE AGRARIAN UNIVERSITY; FEDERAL STATE BUDGETARY INSTITUTION OF SCIENCE INSTITUTE OF CELLULAR AND INTRACELLULAR SYMBIOSIS OF THE URAL BRANCH OF THE RUSSIAN ACADEMY OF SCIENCES. Orenburg : Orenburg State Agrarian University, 2019. 316 p. ISBN 978-5-6043058-5-0. EDN OHKSNV. (date of access: March 2nd, 2026). — Access mode: for authorization. users

6.2. LITERATURE FOR INDEPENDENT

6.2. Literature for independent work

1. Workshop on general veterinary microbiology and mycology / A. A. Sukhinin, L. I. Smirnova, I. V. Belkina [et al.]; A.A. Sukhinin, L.I. Smirnova, I.V. Belkina, E.I. Prikhodko, S.A. Makavchik, V.O. Vinokhodov. – Saint Petersburg : Saint Petersburg State University of Veterinary Medicine, 2023. 111 p. – EDN EXAMRN. (date of access: March 2nd, 2026). — Access mode: for authorization. Users

2. Evgenevskaya, E. P. Independent work of students in veterinary microbiology and mycology / E. P. Evgenevskaya, S. N. Kretova // Education. Innovation. Quality : materials of the VI International Scientific and Methodological Conference, Kursk, May 22-23, 2014. Kursk: Kursk State Agricultural Academy named after Professor I.I. Ivanov, 2014. pp. 226-228. EDN UKRFON. (date of access: March 2nd, 2026). — Access mode: for authorization. Users

7. THE LIST OF BASIC AND ADDITIONAL LITERATURE NECESSARY FOR MASTERING THE DISCIPLINE

a) basic literature:

1. Veterinary microbiology and immunology : a textbook for students of institutions of higher education specializing in Veterinary medicine / A. A. Verbitsky, V. N. Alyoshkevich, A. P. Medvedev [et al.]. – Minsk : IVC of the Ministry of Finance, 2019. – 525 p. – ISBN 978-985-7224-45-6. – EDN TTGFFC. (date of access: March 2, 2026). — Access mode: for authorization.

(b) Additional literature

1. Kislenko, V. N. Veterinary microbiology and immunology : textbook. for university students studying in the specialty 111201 "Veterinary Medicine" / V. N. Kislenko; V. N. Kislenko, N. M. Kolychev. Moscow : KolosS Publ., 2007. ISBN 978-5-9532-0405-7. EDN QKXXCP.

2. Immunology : Translated from English / Royteven, Brostoff Jonathan, Mail David. - M. : Mir, 2000. - 592 p. : ill. - ISBN 5-03-003305-X.2 copies **.**

8.THE LIST OF RESOURCES OF THE INFORMATION AND TELECOMMUNICATION NETWORK "INTERNET" NECESSARY FOR EDUCATION OF THE DISCIPLINE

1. https://meduniver.com – Medical Information Site.
2. Meduniver.com – Medical Information Site

Electronic library systems:

1. ELS "SPBGUVM"
2. ELS "Lan Publishing House"
3. Legal reference system "ConsultantPlus"
4. University information system "RUSSIA"
5. Full-text database POLPRED.COM
6. Scientific electronic Library ELIBRARY.RU

7. Russian Scientific Network
8. Database of international scientific citation indexes Web of Science
9. Scopus database of International Science Citation Indexes
10. Full-text interdisciplinary database on agricultural and environmental sciences ProQuest AGRICULTURAL AND ENVIRONMENTAL SCIENCE DATABASE
11. Electronic books of the publishing house "Prospekt Nauki" http://prospektnauki.ru/ebooks/
12. Collection "Agriculture. Veterinary medicine" publishing house "Quadro" ELS "Elibris" publishing house "Quadro" .

9. METHODOLOGICAL GUIDELINES FOR STUDENTS ON EDUCATION OF THE DISCIPLINE

Methodological recommendations for students are a set of recommendations and explanations that allow them organize the process of studying this discipline optimally.

The content of methodological recommendations, as a rule, may include:

• Tips on planning and organizing the time needed to study the discipline. Description of the sequence of actions of the student, or the "scenario of studying the discipline".

Morning time is the most effective for academic work (from 8-14 hours), followed by afternoon time (from 16-19 hours) and evening time (from 20-24 hours). The most difficult material is recommended to be studied at the beginning of each time interval after rest. After 1.5 hours of work, a break is required (10-15 minutes), after 4 hours of work, the break should be 1 hour. Part of the scientific organization of labor is the master of the technique of mental labor. Normally, a student should devote about 10 hours a day to studying (6 hours at university, 4 hours at home).

The methodology of work when taking notes of oral presentations differs significantly from the methodology of work when taking notes of written sources.

By taking notes of written sources, the student has the opportunity to read again the desired passage of the text, reflect on it, highlight the main thoughts of the author, briefly formulate them, and then write them down. If necessary, he can also note his attitude to this point of view. Listening to the lecture, the student should transist most of the complexity of the above–mentioned works for another time, trying to use every minute to record the lecture, and not to comprehend it - there is no time left for this. Therefore, when taking notes of a lecture, it is recommended, to leave separate fields on each page for subsequent entries in addition to the summary.

After recording a lecture or making a summary of it, you should not leave work on the lecture material before preparing for the test. It is necessary to do as early as possible the work that accompanies takimg notes of written sources, the last could not be done during the recording of the lecture - read your notes, deciphering individual abbreviations, analyze the text, establish logical connections between its elements, in some cases show them graphically, highlight the main thoughts, mark issues, requiring additional processing, in particular, the teacher's consultations.

When working on the text of the lecture, the student should pay special attention to the problematic issues, raised by the teacher, during the lecture, as well as to his assignments and recommendations.

For each lecture, practical lesson and laboratory work, classification cod, topic, list of issues under consideration, volume in hours and links to recommended literature are provided. For classes conducted in interactive forms, its organizational form should be indicated: computer simulation, business or role-playing game, analysis of a specific situation, etc.

• Recommendations for preparing for practical classes

Practical (seminar) classes are an important part of the professional training of students. The main purpose of conducting practical (seminar) classes is to form students' analytical, creative thinking through the acquisition of practical skills. Practical classes are also conducted in order to deepen and consolidate the knowledge gained in lectures and in the process of independent work on normative documents, educational and scientific literature. For student, it is necessary, to study or repeat theoretical material on a given topic when preparing for a practical lesson for students.

When preparing for a practical lesson, the student is recommended to follow the following algorithm;

1) get acquainted with the plan of the upcoming lesson;

2) study the literature sources that have been recommended and familiarize yourself with the introductory notes to the relevant sections.

Methodological guidelines for practical (seminar) classes in the discipline, along with the work program and schedule of the educational process, refer to methodological documents that determine the level of organization and quality of the educational process.

The content of practical (seminar) classes is recorded in the working curricula of the disciplines in the sections "List of topics of practical (seminar) classes".

The most important component of any form of practical training are tasks. The basis of the task is an example that is understood from the standpoint of the theory developed in the lecture. As a rule, the main attention is paid to the formation of specific skills, which determines the content of students' activities - problem solving, laboratory work, clarification of categories and concepts of science, which are a prerequisite for correct thinking and speech.

Practical (seminar) classes perform the following tasks:

- stimulate regular study of recommended literature, as well as attentive attitude to the lecture course;
- consolidate the knowledge gained in the process of lecture training and independent work on literature;
- expand the scope of professionally significant knowledge, skills, and abilities;
- allow you to verify the correctness of previously acquired knowledge;
- initiate skills of independent self-thinking, oral presentation;
- contribute to the free use of terminology;
-provide the teacher with the opportunity to systematically monitor the level of independent work of students.

Methodological guidelines for practical (seminar) classes on the discipline should be focused on modern business conditions, current regulatory documents, advanced technologies, the latest achievements of science, technology and practice, modern ideas about certain phenomena, the studied reality.

• Recommendations for working with literature.

Working with literature is an important stage of the student's self-work on mastering the subject, contributing not only to the consolidation of knowledge, but also to the expansion of horizons, mental abilities, memory, the ability to think, express and confirm personal hypotheses and ideas. In addition, the skills of research work necessary for further professional activityare developed.

When starting to study the literature on the topic, it is necessary to make notes, extracts, notes. It is mandatory to take notes of the works of theorists, which allow us to comprehend the theoretical basis of the study. For the rest, you can limit yourself to summary from the studied sources. All summaries and quotations must have the exact "return address" (author, title of the work, year of publication, page, etc.). It is advisable to write an abbreviated title of the question to which the extract or quotation refers. In addition, it is necessary to learn how to immediately compile a file of special literature and publications of sources, both proposed by the teacher and identified independently, as well as refer to bibliographic reference books, chronicles of journal articles, book chronicles, abstract journals. At the same time, publications of sources (articles,

book titles, etc.) should be written on separate cards, which must be filled in according to the rules of bibliographic description (surname, initials of the author, title of the work. Place of publication, publisher, year of publication, number of pages, and for journal articles – the name of the journal, year of publication, page numbers). On each card, it is advisable to record the thought of the author of the book or a fact from this book on only one specific issue. If the work, even in the same paragraph or phrase, contains more judgments or facts on another issue, then they should be written out on a separate card. The presentation should be concise, accurate, without subjective assessments. On the back of the card, you can make your own notes about this book or article, its content, structure, on which sources it is written, etc.

• Explanations about working with control and test materials for the course, recommendations for completing homework.

Testing is a conrol that allows you to determine whether the actual behavior of the program corresponds to the expected one by performing a specially selected set of tests. A test is the fulfillment of certain conditions and actions necessary to verify the operation of the function under test or part of it. Each question in the discipline must be answered correctly by choosing one option.

10. EDUCATIONAL SOCIAL WORK

As part of the implementation of the discipline, educational work is carried out to form a modern scientific worldview and a system of basic values, the formation and development of spiritual and moral, civil and patriotic values, a system of aesthetic and ethical knowledge and values, attitudes of tolerant consciousness in society, the formation of students' need for work as the first vital necessity, the highest value and the main way to achieve success in life, to realize the social significance of your future profession.

11. THE LIST OF INFORMATION TECHNOLOGIES USED IN THE IMPLEMENTATION OF THE EDUCATIONAL PROCESS

11.1 Information technologies

For the educational process of the discipline is previewed the use of information technologies:

- **practical classes using multimedia;**
- **interactive technologies (dialogues, collective discussion on various topics for realization a particular educational and professional task);**
- **interaction with students via e - mail;**
- **community work in the electronic information and educational environment of St. Petersburg State University: https://spbguvm.ru/academy/eios/**

11.2. Software

The list of licensed and free- distributed software, including national programs

№ п/п	Technical and computer programs recommended by sections and topics of the program	License
1	MS PowerPoint	67580828
2	LibreOffice	free software
3	OS Alt Education	AAO.0022.00
4	ABIS “ MARK-SQL”	02102014155
5	MS Windows 10	67580828

6	System Consult Plus	503/КЛ
7	Android OS	free software

12. THE MATERIAL AND TECHNICAL BASE NECESSARY FOR THE IMPLEMENTATION OF THE DISCIPLINE EDUCATIONAL PROCESS.

The title of the discipline (module), practice in accordance with the curriculum	**The title of special rooms and rooms for self-work**	**Equipment of special rooms and rooms for self-work**
B1.O.20 "Veterinary microbiology and mycology"	412 (196084, St. Petersburg, Chernihiv str., 5) Classroom for seminar-type classes, group and individual consultations, routine monitoring and intermediate certification.	*Specialized furniture: tables, chairs, blackboard, illustrative material in the form of computer presentations, posters, demonstration material on topics. Technical training facilities: laptop, projector. Laboratory tables, scales, centrifuge, homogenizer, Ph meter, magnetic stirrer, electric dry–air thermostat, laminar box, flask heater, portable UV lamp, fluorescent microscope, medical laboratory metal cabinet, dry-air sterilizer, microscopes, slide and cover glasses, alcohol burners, loop tank, tweezers, coloring solutions, immersion oil rinsing bowls with bridges, containers with desalting agents, a homogenizer, a thermostat.*
	422 (196084, St. Petersburg, Chernihiv str., 5) Classroom for seminar-type classes, group and individual consultations, routine monitoring and intermediate certification.	*Specialized furniture: tables, chairs, blackboard, illustrative material in the form of computer presentations, posters, demonstration material on topics. Technical training tools: laptop, projector, screen. Laboratory tables, medical laboratory metal cabinet, portable UV lamp, slide and cover glasses, alcohol burners, loop tank, tweezers, coloring solutions, immersion oil, rinsing bowls with bridges, containers with desalves, bottles for washing smears.Krotov apparatus, desiccator, microanaerostat, tripods, test tubes with phys. with a solution. A device for filtering through ceramic candles, ceramic bacterial candles, microscopes, table lighting lamps, electric extension cord, bacteriological bath,*
	423 (196084, St. Petersburg, Chernihiv str., 5) Classroom for seminar-type classes, group and individual consultations, routine monitoring and intermediate certification.	*Specialized furniture: tables, chairs, blackboard, illustrative material in the form of computer presentations, posters, demonstration material on topics. Technical training facilities: laptop, projector. Laboratory tables, medical laboratory metal cabinet, dry-air sterilizer, microscopes, Koch apparatus, water bath, thermostat slide and cover glasses, alcohol burners, loop tank, tweezers, coloring solutions, immersion oil rinses with bridges, containers with desalves, homogenizer, thermostat.*

	424 (196084, St. Petersburg, Chernihiv str., 5) Classroom for seminar-type classes, group and individual consultations, routine monitoring and intermediate certification.	*Specialized furniture: tables, chairs, blackboard, illustrative material in the form of computer presentations, posters, demonstration material on topics. Technical training facilities: laptop, projector.* *Laboratory tables, medical laboratory metal cabinet, dry-air sterilizer, microscopes, Koch apparatus, water bath, thermostat slide and cover glasses, alcohol burners, loop tank, tweezers, coloring solutions, immersion oil rinses with bridges, containers with desalves, homogenizer, thermostat.*
	425 (196084, St. Petersburg, Chernihiv str., 5) Classroom for seminar-type classes, group and individual consultations, routine monitoring and intermediate certification.	*Specialized furniture: tables, chairs, blackboard, illustrative material in the form of computer presentations, posters, demonstration material on topics. Technical training facilities: laptop, projector.* *Laboratory tables, medical laboratory metal cabinet, dry-air sterilizer, microscopes, Koch apparatus, water bath, thermostat slide and cover glasses, alcohol burners, loop tank, tweezers, coloring solutions, immersion oil rinses with bridges, containers with desalves, homogenizer, thermostat.*
	417 room for equipment storage and preventive maintenance.	*Laboratory tables, chairs, medical laboratory metal cabinet, iron cabinet (safe), household refrigerator, thermostat TS-80, microscopes, centrifuge, laboratory cabinets.*
	421 rooms for equipment storage and preventive maintenance.	*Composite cabinet, writing tables -2, executive table, chairs, household refrigerator, laboratory table, medical glass cabinet.*
	206 Large reading room (196084, St. Petersburg, Chernihiv str., house 5) Room for independent work	*Specialized furniture: tables, chairs* *Technical means of education: computers connected to the Internet and access to an electronic information and educational environment*
	214 Small reading room (196084, St. Petersburg, Chernihiv str., house 5) Room for independent work	*Specialized furniture: tables, chairs* *Technical means of education: computers connected to the Internet and access to an electronic information and educational environment*
	324 Information Technology Department (196084, St. Petersburg, Chernihiv str., house 5) Room for storage and preventive maintenance of educational equipment	*Specialized furniture: tables, chairs* *Technical means of education: computers connected to the Internet and access to an electronic information and educational environment*
B1.O.20 "Veterinary microbiology and mycology»	Box No. 3 Carpentry workshop (196084, St. Petersburg, Chernihiv str., house 5) A room for storage and preventive maintenance of educational equipment	*Specialized furniture: tables, chairs* *Technical means of education: computers connected to the Internet and access to an electronic information and educational environment*

Developers:
Associate Professor of the Department of of microbiology, virology and immunology, PhD

	storage and preventive maintenance of educational equipment	*environment*
B1.O.20 "Veterinary microbiology and mycology»	Box No. 3 Carpentry workshop (196084, St. Petersburg, Chernihiv str., house 5) A room for storage and preventive maintenance of educational equipment	*Specialized furniture: tables, chairs* *Technical means of education: computers connected to the Internet and access to an electronic information and educational environment*

Developers:
Associate Professor of the Department of of microbiology, virology and immunology, PhD

M.S.Borisova

Annex 1

Ministry of Agriculture of the Russian Federation
Federal State Budgetary Educational Institution
of higher education
"Saint Petersburg State University of Veterinary Medicine"

Department of Microbiology, Virology and Immunology

FUND OF ASSESMENT TOOLS
for the discipline
"VETERINARY MICROBIOLOGY AND MYCOLOGY"

Level of higher education
SPECIALIST COURSE

Specialty 05.36.01 Veterinary medicine
Full-time education.
Profile: «General clinical veterinary medicine»

Education starts year is 2026

Saint-Petersburg
2026

1. PASSPORT OF THE FUND OF ASSESMENT TOOLS

№	Acquired competence (identification)	Supervised sections (topics) of the discipline	Evaluation tool
1.	**GPC-2.** Be able to interpret and evaluate in his professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism. GPC-2 $_{ID-1.}$ To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the body animals. GPC-2 $_{ID-2}$. Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products; assess the impact of anthropogenic factors on the animal body and economic factors. GPC-2 $_{ID-3}$. To have an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects; a sense of responsibility for their profession.	Section 1. Bacterioscopy	Colloquium, tests, abstract
		Section 2. The actual bacteriological method	Colloquium, tests, abstract
3.		Section 3. Bioassay	Colloquium, tests, abstract

	GPC-4. Be able to use methods of solving problems using modern equipment in the development of new technologies in his professional activity and use modern professional methodology to conduct experimental research and interpret their results. GPC-4 $_{ID-1}$. To know the technical capabilities of modern specialized equipment, methods of solving problems of professional activity. GPC-4 $_{ID-2.}$ Be able to apply modern technologies and research methods in professional activities, interpret the results obtained. GPC-4 $_{ID-3}$. Have the skills to work with specialized equipment to implement the tasks set during research and development of new technologies. **GPC-6.** Be able to analyze, identify and assess the danger of the risk of the occurrence and spread of diseases. GPC-6 $_{ID-1}$. To know the existing programs for the prevention and control of zoonoses, contagious diseases, emergent or newly emerging infections, the use of animal identification systems, tracing and control by the relevant veterinary services. GPC-6 $_{ID-2}$. Be able to assess the risk of animal diseases, including the import of animals and animal products and other measures of veterinary services, to control prohibited substances in the body of animals, animal products and feed. GPK-6 $_{ID-3}$. Have the skills to carry out identification procedures, select and implement measures that can be used to reduce the level of risk.		
4.	**GPC-2.** Be able to interpret and evaluate in his professional activity the influence of natural, socio-economic, genetic and economic factors on	Section 4. Serology	Colloquium, tests

5.	the physiological state of the animal organism. GPC-2 $_{ID-1.}$ To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the body animals. GPC-2 $_{ID-2.}$ Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products; assess the impact of anthropogenic factors on the animal body and economic factors. GPC-2 $_{ID-3.}$ To have an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects; a sense of responsibility for their profession. **GPC-4.** Be able to use methods of solving problems using modern equipment in the development of new technologies in his professional activity and use modern professional methodology to conduct experimental research and interpret their results. GPC-4 $_{ID-1.}$ To know the technical capabilities of modern specialized equipment, methods of solving problems of professional activity. GPC-4 $_{ID-2.}$ Be able to apply modern	Section 5. Sanitary and microbiological assessment of environmental objects	Colloquium, tests

	technologies and research methods in professional activities, interpret the results obtained. GPC-4 $_{ID-3}$. Have the skills to work with specialized equipment to implement the tasks set during research and development of new technologies. **GPC-6.** Be able to analyze, identify and assess the danger of the risk of the occurrence and spread of diseases. GPC-6 $_{ID-1}$. To know the existing programs for the prevention and control of zoonoses, contagious diseases, emergent or newly emerging infections, the use of animal identification systems, tracing and control by the relevant veterinary services. GPC-6 $_{ID-2}$. Be able to assess the risk of animal diseases, including the import of animals and animal products and other measures of veterinary services, to control prohibited substances in the body of animals, animal products and feed. GPK-6 $_{ID-3}$. Have the skills to carry out identification procedures, select and implement measures that can be used to reduce the level of risk.		
6.	**GPC-2.** Be able to interpret and evaluate in his professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism. GPC-2 $_{ID-1.}$ To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the body animals. GPC-2 $_{ID-2}$. Be able to use environmental factors and environmental laws in agricultural	Section 6. Pathogens of purulent-septic processes	Colloquium, tests, abstract
7.		Section 7. Pathogens of foodborne infections	Colloquium, tests
8.		Section 8. Pathogens of clostridiosis	Colloquium, tests
9.		Section 9. Fungi - pathogens of mycoses	Colloquium, tests

	production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products; assess the impact of anthropogenic factors on the animal body and economic factors. GPC-2 $_{ID-3}$. To have an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects; a sense of responsibility for their profession. **GPC-4.** Be able to use methods of solving problems using modern equipment in the development of new technologies in his professional activity and use modern professional methodology to conduct experimental research and interpret their results. GPC-4 $_{ID-1}$. To know the technical capabilities of modern specialized equipment, methods of solving problems of professional activity. GPC-4 $_{ID-2.}$ Be able to apply modern technologies and research methods in professional activities, interpret the results obtained. GPC-4 $_{ID-3}$. Have the skills to work with specialized equipment to implement the tasks set during research and development of new technologies. **GPC-6.** Be able to analyze, identify and assess the danger of the risk of the occurrence and spread of diseases. GPC-6 $_{ID-1}$. To know the existing programs for the prevention and control of zoonoses, contagious diseases, emergent or newly emerging		

	infections, the use of animal identification systems, tracing and control by the relevant veterinary services. GPC-6 $_{ID-2}$. Be able to assess the risk of animal diseases, including the import of animals and animal products and other measures of veterinary services, to control prohibited substances in the body of animals, animal products and feed. GPK-6 $_{ID-3}$. Have the skills to carry out identification procedures, select and implement measures that can be used to reduce the level of risk.		

List of assessment tools

№	Name of the evaluation tool	Brief description of the assesment tool	Presentation of the assessment tool in the fund
1.	Colloquium	A means of control is organized as a conversation between the teacher and the student on topics related to the discipline, and designed to clarify the amount of knowledge that students have on a certain module, topic, problem, etc. May be conducted in written form.	Questions on topics/modules of the discipline presented in relation to the competencies provided by the work program of the discipline
2.	Test	A system of standardized tasks, which allows to automate the assessment of students knowledge and skills	A fund of test assignments
3.	Report	A product of a student's self work, which is presented as a public speech presenting the results of doing a research on a specific educational, practical, educational or scientific topic. May be done in PowerPoint presentation format	Topics of reports

2. **INDICATORS AND CRITERIA FOR ASSESSING COMPETENCIES AT VARIOUS STAGES OF ITS FORMATION, DESCRIPTION OF ASSESSMENT SCALES**

Planned results of competency acquaired	The level of development				Assesment tool
	Unsatisfactory	Satisfactory	Good	Exellent	
GPC-2. Be able to interpret and evaluate in his professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism.					
GPC-2 $_{ID-1.}$ To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the body animals.	The level of knowledge is below the minimum requirements, gross errors have occurred	The minimum acceptable level of knowledge, many minor errors have been made	The level of knowledge corresponds to the training program, several minor errors have been made	The level of knowledge corresponds to the training program, no errors have been made	Colloquium, tests, abstract, credit, exam
GPC-2 $_{ID-2.}$ Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring	Basic skills were not demonstrated in solving standard tasks, and gross errors occurred	Basic skills have been demonstrated, typical problems have been solved with minor errors, all	All the basic skills have been demonstrated, all the main tasks have been solved with	All basic skills have been demonstrated, all main tasks have been solved with some minor flaws, all tasks	Colloquium, tests, abstract, credit, exam

methods in the environmental examination of agricultural facilities and the production of agricultural products; assess the impact of anthropogenic factors on the animal body and economic factors.		tasks have been completed, but not in full	minor errors, all the tasks have been completed in full, but some with flaws	have been completed in full	
GPC-2 $_{ID-3}$. To have an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects; a sense of responsibility for their profession.	When solving standard problems basic skills were not demonstrated, gross errors occurred	There is a minimum set of skills to solve standard tasks with some shortcomings	When solving standard problems basic skills were not demonstrated with some flaws	Skills were demonstrated in solving n o n - s t a n d a r d tasks without errors and flaws	Colloquium, tests, abstract, credit, exam
GPC-4. Be able to use methods of solving problems using modern equipment in the development of new technologies in his professional activity and use modern professional methodology to conduct experimental research and interpret their results.					
GPC-4 $_{ID-1}$. To know the technical capabilities of modern specialized equipment, methods of solving problems of professional activity.	The level of knowledge is below the minimum requirements, gross errors have	The minimum acceptable level of knowledge, many minor errors have been made	The level of knowledge corresponds to the training program, several minor errors	The level of knowledge corresponds to the training program, no errors have been made	Colloquium, tests, abstract, credit, exam

	occurred		have been made		
GPC-4 $_{ID-2.}$ Be able to apply modern technologies and research methods in professional activities, interpret the results obtained.	Basic skills were not demonstrated in solving standard tasks, and gross errors occurred	Basic skills have been demonstrated, typical problems have been solved with minor errors, all tasks have been completed, but not in full	All the basic skills have been demonstrated, all the main tasks have been solved with minor errors, all the tasks have been completed in full, but some with flaws	All basic skills have been demonstrated, all main tasks have been solved with some minor flaws, all tasks have been completed in full	Colloquium, tests, abstract, credit, exam
GPC-4 $_{ID-3}$. Have the skills to work with specialized equipment to implement the tasks set during research and development of new technologies.	When solving standard problems basic skills were not demonstrated, gross errors occurred	There is a minimum set of skills to solve standard tasks with some shortcomings	When solving standard problems basic skills were not demonstrated with some flaws	Skills were demonstrated in solving non-standard tasks without errors and flaws	Colloquium, tests, abstract, credit, exam
GPC-6. Be able to analyze, identify and assess the danger of the risk of the occurrence and spread of diseases.					

GPC-6 $_{ID-1}$. To know the existing programs for the prevention and control of zoonoses, contagious diseases, emergent or newly emerging infections, the use of animal identification systems, tracing and control by the relevant veterinary services.	Basic skills were not demonstrated in solving standard tasks, and gross errors occurred	Basic skills have been demonstrated, typical problems have been solved with minor errors, all tasks have been completed, but not in full	All the basic skills have been demonstrated, all the main tasks have been solved with minor errors, all the tasks have been completed in full, but some with flaws	All basic skills have been demonstrated, all main tasks have been solved with some minor flaws, all tasks have been completed in full	Colloquium, tests, abstract, credit, exam
GPC-6 $_{ID-2}$. Be able to assess the risk of animal diseases, including the import of animals and animal products and other measures of veterinary services, to control prohibited substances in the body of animals, animal products and feed.	The level of knowledge is below the minimum requirements, gross errors have occurred	The minimum acceptable level of knowledge, many minor errors have been made	The level of knowledge corresponds to the training program, several minor errors have been made	The level of knowledge corresponds to the training program, no errors have been made	Colloquium, tests, abstract, credit, exam
GPK-6 $_{ID-3}$. Have the skills to carry out identification procedures, select and implement measures that can be used to reduce the level of risk.	When solving standard problems basic skills were not demonstrated, gross errors	There is a minimum set of skills to solve standard tasks with some	When solving standard problems basic skills were not demonstrated	Skills were demonstrated in solving non-standard tasks without	Colloquium, tests, abstract, credit, exam

	occurred	shortcomings	with some flaws	errors and flaws	

3. A LIST OF CONTROL TASKS AND OTHER MATERIALS, NECESSARY FOR THE ASSESSMENT OF KNOWLEDGE, SKILLS AND WORK EXPERIENCE

3.1. Typical tasks for the current control of academic progress

3.1.1 Questions for knowledge survey (writing variant)

GPC-2. is able to interpret and evaluate the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal body in its professional activity.

GPC-2 $_{ID-1.}$ To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of certain types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body.

Closed-type assignments

Tasks of a combined type with the choice of one correct answer from the suggested options

Task 1. Read the text, choose the correct answer and write down the arguments justifying the choice of the answer.

The differential diagnostic component of the Endo environment?

1) bovine bile

2)lactose

3)BCH

4)Glucose

is necessary for...

Key: 2) It is necessary to determine the saccharolytic properties of lactose-positive bacteria.

Task 2. Read the text, choose the correct answer and write down the arguments justifying the choice of the answer.

Indole can be detected using indicator paper soaked in...?

1)Lead acetate

2)oxalic acid

3) litmus test

4) calcium chloride

with a positive result is observed...

The key: 2) with a positive result, reddening of the paper is observed

Task 3. Read the text, choose the correct answer and write down the arguments justifying the choice of the answer.

The elective component of the housing and communal services environment?

1)egg yolk

2)NaCl 10%

3)pepton

4) agar-agar

Key: 2) It is necessary for the growth of Staffylococcus

Task 4. Read the text, choose the correct answer and write down the arguments justifying the choice of the answer.

Can hydrogen sulfide be detected using indicator paper soaked in ?

1)Lead acetate

2)oxalic acid

3) litmus test

with a positive result, calcium chloride is observed...

The key is: 1) with a positive result, blackening of the paper is observed

Task 5. Read the text, choose the correct answer and write

down the arguments justifying the choice of the answer.

The differentiating component of the Ploskireva environment?

1)The indicator is neutral red

2)lactose

3)Diamond green

4) MPA

Key: 3) allows you to differentiate between lactose-positive and lactose-negative microorganisms.

ASSIGNMENT TO ESTABLISH COMPLIANCE

Task 6. Establish a correspondence between the microorganisms and their location in the smear

Microorganisms	Location in the smear
1. Streptococcus	a. 4 cells each
2. Sarcines	b. In pairs
3. Staphylococcus	c. In the form of a bunch of grapes
4. Diplococci	d. In packages of 8 cells
5. Tetracoccus	e. In the form of chains

Key: 1-e; 2-d; 3-c; 4-b; 5-a.

Task 7. Establish a correspondence between the nutrient medium and the microorganisms growing on it

The nutrient medium	Microorganisms
1. Yolk-salt agar	a. Clostridia
2. Kitta-Tarotia medium	b. E. coli
3. Endo's medium	c. Mycobacteria

4. Petraniani's medium	d. Staphylococcus
5. Saburo's medium	e. yeasts

Key: 1-d; 2-a; 3-b;4-c;5-e

Task 8. Establish the correspondence between the sterilization methods and the material being processed

Sterilization method	Material
1.Autoclaving	a. blood serum
2. Pasteurization	b. meat-peptone agar
3. Filtration through bacterial filters.	c. milk

Key: 1-B; 2-C; 3-A.

Task 9. Establish a correspondence between pathogens and virulence factors

Virulence factors	Microorganisms
1.Bacillus anthracis	A. enterotoxins
2.Staphylococcus aureus	B.cord factor

3.Salmonella enterica	G. Capsule
4.Mycobacterium tuberculosis	D. Plasmocoagulase

Key:1-G; 2-D; 3-A; 4-B.

Task 10. Establish a correspondence between the nutrient medium and its purpose

Nutrient medium	Purpose of the appointment
1. Kessler's Medium	A. transport environment
2. Meat-peptone agar	B. for unpretentious microorganisms
3. Endo's environment	C. for the accumulation of E. coli group bacteria
4. Petraniani	D. medium for cultivation of mycobacteria
5.Ames medium	E.for identification of enterobacteria

Key: 1-C; 2-B; 3-D; 4-D; 5-A.

GPC-2 $_{ID-2}$. Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in

animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products; assess the impact of anthropogenic factors on the animal body and economic factors.

THE TASK OF ESTABLISHING THE SEQUENCE

Task 11. Establish the correct sequence of stages of isolation of pure anaerobic culture:

A. Enrichment on Kitta–Tarotsi medium.

B. Isolation of pure culture.

B. Study of cultural and biochemical properties of isolated pure anaerobic culture.

G. Obtaining isolated colonies on Zeissler blood sugar agar

D. Recording the results and identification of the pathogen

1	2	3	4	5

Key 1-A; 2-D; 3-B; 4-C; 5-D.

Task 12. Set the correct sequence of steps for painting the Gram smear:

A. Applying fuchsin Pfeiffer

B. Application of gentian

violet B. Treatment with iodized alcohol

G. Treatment with Lugol solution

1	2	3	4

Key: 1-B; 2-D; 3-C; 4-A.

Task 13. Establish the correct sequence of microscopy techniques with immersion oil

A.Turn on the microscope illuminator, turn the revolver with the lenses so that the immersion lens is located directly above the drug.

B.Looking into the eyepiece, the macro screw very slowly lifts the lens until the image appears. At the same time, it is necessary to ensure that the lens does not come out of the oil drop.

C.A drop of immersion oil is applied to the stained preparation, the preparation is placed on a microscope slide, fixed with clips

D.Under visual inspection, the immersion lens is carefully immersed in a drop of oil from the side by rotating the macro screw.

E)The final focusing of the drug is carried out with a micro-screw, rotating it only within one revolution.

1	2	3	4	5

Key: 1-C; 2-A; 3-D; 4- B; 5-E.

Task 14. Set the correct sequence of stages of painting the strokes on the cupsula using the Rebiger method

A)They are microscoped with immersion oil. Micro-picture: bacteria - purple, capsules – pink

B)Non-fixed smears are stained (and simultaneously fixed) with formalized gentian violet for 15-20 seconds.

C)After staining, the smears are quickly washed with water and dried.

1	2	3

Key: 1-B; 2-C; 3-A.

GPC-2 $_{ID-3}$. To have an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects; a sense of responsibility for their profession.

Task 15. Establish the correct sequence of stages for the diagnosis of dermatomycosis

A)Luminescent examination of the affected skin areas is performed by irradiation with a Wood lamp
B)After treatment with alkali, the preparation "crushed drop" is prepared – the crusts and hairs are transferred to a drop of liquid onto a slide and microscoped.
C)Microscopy of the crushed drop preparation reveals the characteristic structures of the fungus, which makes it possible to diagnose dermatomycosis.
D)If there is a salad-green glow characteristic of Mycrosporum fungi, the diagnosis is considered established.
E)In the absence of luminescence, for effective microscopy, the patmaterial is filled with a 20% alkali solution and kept for 20-30 minutes at t 37 ° C.

1	2	3	4	5

Key: 1-A; 2-E; 3-D; 4-B; 5-C

OPEN-TYPE ASSIGNMENTS

Task 16.
Saprophytes are…
The key: microorganisms that decompose organic compounds of plant and animal origin.

Task 17.
In the process of sterilization, destruction occurs:
Key: all microorganisms (vegetative forms and spores) present both on the surface and inside the sterilization facility.

Task 18.
Antibiotics are…
Key: specific waste products of bacteria, fungi, plants, and animals that are active against certain groups of microorganisms and can delay their growth (bacteriostatic action) or completely suppress their vital activity (bactericidal action).

Task 19.
The pathogenic properties of the microorganism are determined by…
The key: its ability to cause death (disease)an infected animal.

Task 20.
The serological complement binding reaction is based on…
The key is the binding of complement to the resulting antigen and antibody complex.

GPC-4. Be able to use methods of solving problems using modern equipment in the development of new technologies in his professional activity and use modern professional methodology to conduct experimental research and interpret their results.
GPC-4 $_{ID-1}$. To know the technical capabilities of modern specialized equipment, methods of solving problems of professional activity.

Closed-type assignments

Tasks of a combined type with the choice of one correct answer from the suggested options

Task 1. Read the text and choose the correct answer
Which microbial cell antigen is indicated by the letter "H"?
1. Capsular;
2.Flagellated;
3.Somatic
4.Vi-antigen.
5.Adhesive
Key: 2.

Task 2. Read the text and choose the correct answer
When conducting a bacterioscopic examination method, it is possible to identify the microorganism before:
1.Vida;
2. The genus;
3.Strains;
4. Serovariants.
5.Serogroups
Key: 2.

Task 3. Read the text and choose the correct answer
What products can be used to evaluate the proteolytic activity of a microorganism?
1.Indole;
2.Catalase;
3.Cytochrome oxidase;
4.Fermentation of lactose
5.Lecinic activity
Key: 1.

Task 4. Read the text and choose the correct answer
Which enzyme of the microorganism breaks down urea?
1.Urease;
2.Catalase;
3.Lipase;
4.Transferase
5.Hyaluronidase
Key:1.

Task 5. Read the text and choose the correct answer.
What is the cell shape of leptospira?
1. Rod-shaped;
2. Convoluted;
3.Spherical;
4.Lanceolate
5.Ovoid
Key: 2.

GPC-4 $_{ID-2.}$ Be able to apply modern technologies and research methods in professional activities, interpret the results obtained.

A closed type assignment to establish compliance

Task 6. Establish the correspondence between the form of the microorganism and its description

Form of the microorganism	Description
1)Actinomycetes	A) rods that do not form spores
2) Clostridia	B) spore-forming rods larger than the diameter of the anaerobic cell
3) Bacteria	C) Convoluted microorganisms
4) Leptospira	D) rods having branching forms
5)Streptococci	E) spherical microorganisms in the form of a chain

Key: 1- D; 2-B; 3-A; 4-C; 5-D

Task 7. Establish a correspondence between the microorganism and the disease it causes

Microorganisms	Diseases
1. E. coli	a. Ornithosis

2. Koch's wand	b. Abscess
3. Pasteurella	c. Hemorrhagic septicemia
4. Staphylococcus	d. Tuberculosis
5. Chlamydia	e. Colibacteriosis

Key: 1-D; 2-D; 3-C; 4-B; 5-A.

Task 8. Establish a correspondence between the enzymes of microorganisms and their function

Enzymes of microorganisms	Diseases
1. Catalase	A. converts soluble fibrinogen into fibrin, causing blood plasma clotting.
2. Coagulase	b. participates in cellular antioxidant protection by decomposing hydrogen peroxide, thereby preventing the formation of hydroxyl radicals
3.Hyaluronidase	c. catalyzes the breakdown of urea to carbon

	dioxide and ammonia.
4. Lecithinase	d. destroys the intercellular substance of connective tissue
5. Urease	e. acts on phospholipids of membranes of various cells.

Key:1B2A3E4D5C

Task 9. Establish the correspondence between the coloring method and its application

Coloring	Method Application
1.Trujillo coloring	A. Capsule detection
2. Kozlovsky coloring	B. Detection of acid-, alcohol-, alkali-resistant microorganisms
3. Coloring by Mikhin	C.Detection of brucella
4.Tsil-Nielsen staining	D. Spore detection

1-D; 2-C; 3-A; 4-B

Task 10. Establish a correspondence between the type of microorganism and the family to which it belongs.

Type of microorganism	Family
1.Escherichia coli	A. Staphylococcoceae
2.Staphylococcus aureus	B. Enterobacteriaceae
3.Bacillus anthracis	C. Leptospiraceae
4.Leptospira interrogans	D. Bacillaceae

1-B; 2-A; 3-D; 4-C.

THE TASK OF ESTABLISHING THE SEQUENCE

GPC-4 $_{ID-3.}$ Have the skills to work with specialized equipment to achieve their goals in research and development of new technologies, including digital ones.

Task 11. Set the correct sequence of preparation steps for microscopy:
A. dry the smear in the air;
B. fix the smear in the flame of the alcohol lamp;
C. prepare clean and non-greasy glass;
D. apply the material to the slide, spread over the surface
E. paint the smear using the appropriate method

1	2	3	4	5

Key: 1-C; 2-D; 3-A; 4-B; 5-E

Task 12. Establish the correct sequence of stages of the development of the infectious process:
A. the prodromal period
B. the incubation period
B. the outcome of the disease
G. the height of the disease
Key: 1-B; 2-A; 3-D; 4-C.

Task 13. Set the correct sequence of steps for sowing the material per MPA in Petri dishes with a spatula:
A) apply the tank material to the surface of the medium. with a loop or a Pasteur pipette
B) put the Petri dish upside down in the thermostat for a day +37 ° C
D) burn a spatula in the flame of an alcohol lamp, cool it on the inside of a petri dish
C) spread the material over the entire surface of the medium with a spatula

1	2	3	4

Key: A); D); C); B).

Task 14. Establish the correct sequence of stages for studying bacterial motility using the "hanging drop" method:
A) apply a drop of bacterial culture to the cover glass
B) find a drop at low magnification
C) to study the mobility of bacteria at high magnification
D) cover the cover glass with a slide with a hole

1	2	3	4

Key: A); D); B); C).

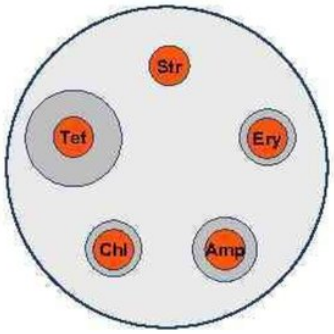
Task 15. Set the correct sequence of stages for painting the Zil-Nielsen brushstroke
A) Discoloration of the smear with a 5% sulfuric acid solution to a faint pink hue
B) Staining the smear with carbolic fuchsin for 5 minutes when heated until vapors appear
C) Finishing with methylene blue Lsfflcpa 3-5 min
D) Rinsing with water

1	2	3	4

Key: B); A); D); C)

OPEN-TYPE ASSIGNMENTS

Task 16. Evaluate which of the antibiotics was the culture under study highly sensitive to?



The key is Tetracycline, as the growth retardation zone of microorganisms is pronounced.

Task 17. Which of the tubes contains the minimum suppressive concentration of the antibiotic (MPC), what is the dosage?

The key is in test tube No. 2, as this is the last test tube in a row in which the growth of microorganisms is not visualized.

Task 18 The serological research method is...
the key: a diagnostic method based on the interaction of an antibody with a specific antigen.

Task 19 Polymerase chain reaction is...
the key: a diagnostic method that detects a fragment of DNA or RNA of the pathogen.

Task 20 How is the diagnosis of an infectious disease made?
Key: the diagnosis of an infectious disease is made comprehensively on the basis of epizootological, clinical, and pathoanatomical data, with some diseases an allergy test is performed, based on the data obtained, a preliminary diagnosis is made, and confirmed in the laboratory.

GPC-6. Be able to analyze, identify and assess the danger of the risk of the occurrence and spread of diseases.
GPC-6 $_{ID-1.}$ To know the existing programs for the prevention and control of zoonoses, contagious diseases, emergent or newly emerging infections, the use of animal identification systems, tracing and control by the relevant veterinary services.

Task 1.
The main function of bacterial spores?
1)Provides adhesion;

2)protection from adverse environmental factors;
3)participates in the transfer of genetic material;
4)formation of enzymes
5)serve for reproduction
Key: 2)

Task 2.
What function do the pili villi perform?
1) provide adhesion;
2) protect against adverse environmental factors;
3) adsorb bacteriophages;
4) provide colonization
5) serve for reproduction
Key: 1)

Task 3.
What properties of bacteria are studied by light microscopy?
1)sugar-lytic
2)serological
3)morphological
4)proteolytic properties
5)redox
Key: 3)

Task 4.
Is dark-field microscopy used in the study of...?
1)colored preparations;
2)native unpainted drugs;
3)when taking a photo;
4)during the examination of pathological material
5)when examining histopremes
Key: b)

Task 5.
Pathogenicity factors determining antiphagocytic activity include:
a) plasmocoagulase;
b) capsule;
c) hyaluronidase;
d) fibrinolysin;
e) adhesives.
Key: b)

GPC-6 $_{ID-2}$. Be able to assess the risk of animal diseases, including the import of animals and animal products and other measures of veterinary services, to control prohibited substances in the body of animals, animal products and feed.

ASSIGNMENT TO ESTABLISH COMPLIANCE

Task 6. Establish a correspondence between the location of flagella on the cell surface and the characteristics of the corresponding bacteria

Location of flagella	Characteristic of bacteria
1. One flagellum at one end of the cell	A. Lofotrichi
2. One flagellum or bundle of flagella at opposite ends	B. Peritrichi cell
3.Over the entire surface of the cell	C. Amphitrichia
4. A bundle of flagella at one end of the cell	D. Monotricha

Key: 1-D; 2-C; 3-B; 4-A.

Task 7. Establish a correspondence between the shape and characteristics of microorganisms

Form of microorganisms	Characteristic of microorganisms

1. Bacilli	A. Globular microorganisms
2. Clostridia	B. Rods forming spores smaller than the size of a vegetative cell
3. Bacilli	C. bacteria that form spores larger than the size of a vegetative cell
4. Cocci	D.rods that do not form spores

Key: 1-B; 2-C; 3-D; 4-A.

Task 8. Establish a correspondence between the type of microbial cell antigen and its localization

Microbial cell antigen	Localization in the cell

1.O-antigen	A. Capsule antigen
2.K-antigen	B. Cell wall antigen
3.H-antigen	C. Flagella antigen

Key: 1-B; 2-A; 3-B.

Task 9. Establish a correspondence between the type of breathing and the ratio to oxygen

Type of respiration	Relation to oxygen
1.Optional anaerobe	A.It grows only in the presence of O2
2. Obligate aerobic	B. Growth both in the presence of O2 and without it

3. Obligate anaerobic	C.It grows in oxygen-free conditions
4. Microaerophilus	D. Requires a low concentration of CO2

Key: 1-B; 2-A; 3-C; 4-G.

Task 10. Establish a correspondence between the concept in microbiology and its definition

Concept	Definition
1. Pathogenicity	A. This is the degree of pathogenicity.
2. Virulence	B. Is the ability of a microorganism to cause an infectious process.
3. Biofilm	C. A culture of prokaryotes containing

	microorganisms of the same species obtained from a single cell.
4. Pure culture	D. is a microbial community characterized by cells that are attached to a surface or to each other, enclosed in an extracellular polymer matrix.

Key: 1-B; 2-A; 3-D; 4-C; 5-D.

Task 11. Establish the correct sequence of sterilization steps for simple nutrient media:

a) pour the BCH into vials

b) close the vials with paper caps, mark the date of manufacture

c) sterilize in an autoclave at a temperature of +121 ° C for 20 minutes

d) cook (cook) the BCH

1	2	3	4

Key: d) ; a) ; b); c)

Task 12. Set the correct sequence of smear coloring steps to identify the Burry-Gins capsule:

1) Apply a drop of black ink to the middle of the slide and mix it with a tank.loops with microbial culture

2)Stain the smear with carbolic fuchsin in a dilution of 1:3

3) The mixture is distributed over the glass with the edge of another slide, dried in air and fixed in the flame of the burner.

4)Carefully rinse with water, dry, microscopically.

1	2	3	4

Key: 1); 3); 2); 4).

Task 13. Establish the correct sequence of serological typing of Salmonella bacteria

1)Based on the results of RA with monoreceptor sera, a final conclusion is made about the type and serotype (serovar) of the pathogen.

2)Staging of RA with live culture and group diagnostic serums

3)Setting up an agglutination reaction (RA) on glass to confirm that the isolated culture belongs to the genus Salmonella

4)With two positive results with monoreceptor "O" sera, RA is diagnosed with monoreceptor "H" sera.

5) If the result of RA is positive with one of the group sera, the reaction is repeated with monoreceptor "O" sera characteristic of this serogroup.

1	2	3	4

The key: 3); 2); 5); 4); 1).

GPC-6 $_{ID-3}$.Possess the skills to carry out identification procedures, select and implement measures that can be used to reduce the level of risk.

Task 14. Establish the correct sequence of steps of the bacteriological method of laboratory diagnostics:

1)Material from a sick animal;

2) Determine the species of the pathogen;

3) Determine the sensitivity of the pathogen to antibiotics;

4) Isolate a pure culture of the pathogen, study the cultural and biochemical properties

5)To conduct a microscopic examination of the pathomaterial to study the morphology of the pathogen

1	2	3	4	5

Key: 1); 5); 4); 2); 3)

Task 15. Establish the correct sequence of steps for obtaining a pure aerobic culture by modifying the Drigalsky method

1) Apply the test material in parallel strokes using a tank to the surface of the medium of the first sector. loops

2) After cultivation, the isolated colony characteristic of the pathogen should be transplanted onto a sterile nutrient medium

3)Place the Petri dish upside down in the thermostat for 24 hours and cultivate at a temperature of +37 ° C.

4)Conduct a sterile tank. use a loop to sow the first sector, then apply the material to the surface of the second sector and similarly to the surface of the third

5)Divide a Petri dish with a dense agar medium into three glass sectors

1	2	3	4	5

The key: 5); 1); 4); 3); 2)

Open-type assignments

Task 16. What is the purpose of a biological research method (bioassay)?

Answer: A bioassay is performed to assess the pathogenicity and virulence of infectious disease pathogens, as well as to detect toxins in the test material.

Task 17. What is the essence of any serological reaction? For what purpose are they conducted?

Answer: the essence of the serological reaction is the specific interaction of the antigen with the antibody, which forms an antigen+antibody complex. They are performed to detect antibodies or antigens.

Task 18. What will a positive result look like for an allergic diagnosis of tuberculosis?

Answer: A positive allergy test for tuberculosis looks like a diffuse swelling, of a testy consistency, with no clear boundaries. This is accompanied by hyperemia and soreness of the skin. Animals are considered to react to tuberculin when the skin fold thickens by 3 mm or more.

Task 19. How to characterize the type of respiration in facultative anaerobes? What will the growth of such bacteria look like in meat-peptone broth?

Answer: Facultative anaerobes can grow both in the presence of oxygen and without it. Growth in meat-peptone broth is characterized by uniform turbidity of the medium.

Task 20. What temperatures are preferable for the growth of psychrophilic microorganisms?

Answer: Psychrophilic or cold-loving microorganisms prefer to grow at temperatures from 0-10°C.

4. METHODOLOGICAL MATERIALS DEFINING THE PROCEDURES FOR ASSESSING KNOWLEDGE, SKILLS AND ABILITIES AND WORK EXPERIENCE CHARACTERIZING THE STAGES OF COMPETENCE FORMATION

4.1. Criteria for evaluating students' knowledge during the knowledge survey (written survey)

Mark "**excellent"** - the student clearly expresses his point of view on the issues under consideration, giving appropriate examples.

Mark "**good**" - the student admits some errors in the answer

The mark «**satisfactory**" - the student discovers gaps in knowledge of the basic educational and normative material.

The mark "**unsatisfactory**" - the student discovers significant gaps in knowledge of the basic provisions of the discipline, the inability to obtain the correct solution to a specific practical problem with the help of a teacher.

4.2. Criteria for evaluating students' knowledge during testing

The test result is evaluated on a percentage rating scale. Each student is offered a set of test tasks of 25 questions:

The mark "**excellent**" is 25-22 correct answers.

The mark "**good**" is 21-18 correct answers.

The mark "**satisfactory**" is 17-13 correct answers.

The mark "**unsatisfactory**" is less than 13 correct answers

4.3. Criteria for evaluating students' knowledge in the preparation of reports

The mark "**excellent**" - the problem is identified and its relevance is justified; an analysis of various points of view on the problem under consideration is made and one's own position is logically stated; conclusions are formulated, the topic is fully disclosed, the volume is maintained; the requirements for external design are met, the basic requirements for the report are fulfilled.

The mark "**good**" - mistakes have been made. In particular, there are inaccuracies in the presentation of the material; there is no logical consistency in judgments; the volume of the report is not maintained; there are omissions in the design, there are significant deviations from the requirements for the presentation of materials.

The mark "**satisfactory**" - the topic is only partially covered; factual errors were made in the content of the report; there are no conclusions, the topic of the report is not disclosed.

The mark "**unsatisfactory**" - there is a significant misunderstanding of the problem or the report is not submitted.

4.4.Criteria for evaluating students' knowledge when checking control papers

The mark "**excellent**" - the problem is identified and its relevance is justified; an analysis of various points of view on the problem under consideration is made and one's own position is logically stated; conclusions are formulated, the topic is fully disclosed, the volume is maintained; the requirements for external design are met, the basic requirements for the abstract are fulfilled

The mark is "**good**" - mistakes have been made. In particular, there are inaccuracies in the presentation of the material; there is no logical consistency in judgments; the volume of the abstract is not maintained; there are omissions in the design, there are significant deviations from the requirements for abstracting.

The mark "**satisfactory**" - the topic is only partially covered; factual errors were made in the content of the abstract; there are no conclusions, the topic of the abstract is not disclosed

The mark "**unsatisfactory**" - there is a significant misunderstanding of the problem or the abstract is not presented at all.

4.5. Criteria of knowledge during the test

The mark "**accepted** " must correspond to the parameters of any of the positive ratings ("excellent", "good", "satisfactory").

The mark "**not accepted** " rating should correspond to the parameters of the "unsatisfactory" rating.

The mark "excellent" – all types of educational work provided for in the curriculum have been completed. The student demonstrates the compliance of knowledge, skills, and abilities with the indicators given in the tables, operates with acquired knowledge, skills, and applies them in situations of increased complexity. At the same time, inaccuracies, difficulties in analytical operations, transfer of knowledge and skills to new, non-standard situations may be allowed.

The mark "good" – all types of educational work provided for in the curriculum have been completed. The student demonstrates the compliance of knowledge, skills, and abilities with the indicators given in the tables, operates with acquired knowledge, skills, and applies them in standard situations. At the same time, minor errors, inaccuracies, difficulties in analytical operations, transfer of knowledge and skills to new, non-standard situations may be made.

Mark "satisfactory" – one or more types of educational work provided for in the curriculum have not been completed. The student demonstrates incomplete compliance of knowledge, skills, and abilities with the indicators given in the tables, significant errors are made, a partial lack of knowledge, skills, and skills is manifested in a number of indicators, the student experiences significant difficulties in operating with knowledge and skills when transferring them to new situations. –

The mark «unsatisfactory" – the types of educational work provided for in the curriculum have not been completed. demonstrates incomplete compliance of knowledge, skills, and abilities given in the tables of indicators, significant errors are made, a lack of knowledge, skills, and skills is manifested for a large number of indicators, the student experiences significant difficulties in operating knowledge and skills when transferring them to new situations

4.6. Criteria of knowledge during the examination

The mark "excellent" – all types of educational work provided for in the curriculum have been completed. The student demonstrates the compliance of knowledge, skills, and abilities with the indicators given in the tables, operates with acquired knowledge, skills, and applies them in various situations of increased complexity. At the same time, inaccuracies, difficulties in analytical operations, transfer of knowledge and skills to new, non-standard situations may be allowed. –

The mark "good" – all types of educational work provided for in the curriculum have been completed. The student demonstrates the compliance of knowledge, skills, and abilities with the indicators given in the tables, operates with acquired knowledge, skills, and applies them in standard situations. At the same time, minor errors, inaccuracies, difficulties in analytical operations, transfer of knowledge and skills to new, non-standard situations can be made.

Mark "satisfactory" – one or more types of educational work provided for in the curriculum have not been completed. The student demonstrates incomplete compliance of knowledge, skills, and abilities with the indicators given in the tables, significant errors are made, a partial lack of knowledge, skills, and skills are manifested in a number of indicators, the student experiences significant difficulties in operating with knowledge and skills when transferring them to new situations.

The mark "unsatisfactory" – the types of educational work provided for in the curriculum have not been completed. demonstrate incomplete compliance of knowledge, skills, and abilities given in the tables of indicators, significant errors are made, a lack of knowledge, skills, and skills are manifested for a large number of indicators, the student experiences significant difficulties in operating with knowledge and skills when transferring them to new situations.

5. ACCESSIBILITY AND QUALITY OF EDUCATION FOR DISABLED PEOPLE

If necessary, persons with disabilities and persons with disabilities are given additional, time to prepare an answer for the test.
When conducting the procedure for evaluating the learning outcomes of disabled people and persons with disabilities, their own technical means can be used.

The procedure for evaluating the learning outcomes of disabled people and persons with disabilities in the discipline provides for the provision of information in forms adapted to the limitations of their health and perception of information:

For people with visual impairments:	– in printed form in enlarged font; – in the form of an electronic document.
For people with hearing impairments:	– in printed form; – in the form of an electronic document.
For people with disorders of the musculoskeletal system:	– in printed form, the device; – in the form of an electronic document.

When conducting the procedure for evaluating the learning outcomes of disabled people and persons with disabilities in the discipline, it ensures that the following additional requirements are met, depending on the individual characteristics of the students:

a) instructions on the procedure for conducting the assessment procedure are provided in an accessible form (orally, in writing);

b) an accessible form of assignment of assessment tools (in printed form, in printed form in enlarged font, in the form of an electronic document, assignments are read out by the teacher);

c) an accessible form of providing answers to tasks (written on paper, a set of answers on a computer, orally).

If necessary, for students with disabilities and the disabled, the procedure for evaluating the results of training in the discipline can be carried out in several stages.

The procedure for evaluating the learning outcomes of disabled people and persons with disabilities is allowed using distant learning technologies.

Program abstract of the discipline B1.O.20 "Veterinary microbiology and mycology"
specialty 36.05.01 Veterinary Medicine
Profile: «General clinical veterinary medicine»

The purpose of mastering the discipline: to form a scientific worldview among students about the diversity of biological objects, microbiological techniques and methods for diagnosing infectious animal diseases, creating new types of diagnostics, vaccines and serums, as well as to give students theoretical and practical knowledge of general and private veterinary microbiology and mycology.

The place of the discipline in the curriculum: Discipline B1.O.20 "Veterinary microbiology and mycology" is a mandatory part of the federal state educational standard of higher education in the specialty 36.05.01 "Veterinary Medicine" Profile: «General clinical veterinary medicine».

Veterinary medicine, mastered in 3-4 semesters – full–time education.

Requirements for the results of mastering the discipline: The study of the discipline should form the following competencies:

a) General professional competencies of graduates (GPC)

GPC-2. Is able to interpret and evaluate in professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological status of the animal body.

GPC-2 $_{ID-1}$ To know: ecology factors of the environment, its classification and the nature of relationships with living organisms; basic ecological concepts; interspecific relations of animals and plants, terms and bio ecology laws, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body.

GPC-2 $_{ID-2}$ To be able to: use environmental factors and environmental laws in agricultural manufacture; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental assessment of agricultural facilities and the production of agricultural products; assess the impact on the animal body, anthropogenic and economic factors

GPC-2 $_{ID-3}$ To possess skills of: the knowledge of the origin of living organisms, the levels of organization of living matter, favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the environment, the laws of the development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, with the use of digital technologies as well.

GPC-4. Is able to use methods to solve problems, using modern equipment for the development of new technologies in professional activity and use modern professional methodology to conduct experimental research and interpret the results.

GPC-4 $_{ID-1.}$ To know the technical capabilities of modern specialized equipment, methods of solving problems of professional activity.

GPC-4 $_{ID-2.}$ Be able to apply modern technologies and research methods in professional activities, interpret the results obtained.

GPC-4 $_{ID-3.}$ To possess skills of: the work with specialized equipment for implementation of the set tasks for research and the development of new technologies, digital ones, as well.

GPC-6. Is able to analyze, identify and assess the risk danger of the occurrence and spread of the disease.

GPC-6 $_{ID-1}$ To know: existing programs for the prevention and control of zoonosis, contagious diseases, emergent or newly emerging infections, the use of animal identification systems, trace and control by the relevant veterinary services.

GPC-6 $_{ID-2}$ To be able to: assess the risk of animal diseases, including the import of animals and animal products and other measures of veterinary services, the control of prohibited substances in the body of animals, animal products and feed.

GPC-6 $_{ID-3}$ To possess skills to: conduct identification procedures, select and implement measures that can be used to reduce the risk level.Summary of the discipline:

To achieve this goal, it is necessary to solve the following tasks:

a) students should have an idea about the structure of microorganisms, their chemical composition, and cultural and biochemical properties. Know the genetics of microorganisms. Imagine how their nutrition and respiration and reproduction are carried out. Know the antigenic properties of microorganisms;

b) a special task is to familiarize students with modern methods and methods of diagnosing infectious diseases. Characterization of serological reactions and biologics.

As a result of mastering the discipline, the student must:

To know the history and tasks of microbiology, systematics, structure and reproduction of bacteria, genetics of microorganisms, the relationship of microorganisms to environmental factors, the relationship of microorganisms to each other, metabolism of microorganisms, the transformation of compounds of carbon, phosphorus, sulfur, iron and other elements by microorganisms;

To be able to prepare preparations of microorganisms; to distinguish the main forms of bacteria, to prepare artificial nutrient media for growing microorganisms, to carry out quantitative accounting of microorganisms in various environments.

Possess: methods of diagnosis for infectious diseases

The total labor intensity of the discipline is: 8 credits (288 hours).

Final control of the discipline: full–time - essay, credit and exam.