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.
May 6, 2024

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
Full-time education
Education starts in 2024

Reviewed and adopted
at the meeting of the Department
May 2, 2024.
Protocol No.15
Head of the Department
Doctor of Biological Sciences, Professor
_____ A.A. Sukhinin

Saint Petersburg
2024

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" (specialty level).

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 (PT)	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 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.					
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 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** 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.						
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 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.					
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 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	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** 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.					

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

6.1. GUIDELINES FOR INDEPENDENT WORK

1. Microbiology : a textbook / R.G. Gosmanov, A.K. Galiullin, A.H. Volkov, A.I. Ibragimova. — 3rd ed., ster. — St. Petersburg : Lan, 2019. — 496 p. — ISBN 978-5-8114-1180-1. — Text : electronic // Electronic library system "Lan" : [website]. — URL: https://e.lanbook.com/book/112044 (date of access: April, 27, 2024). — Access mode: for authorization. Users

6.2. LITERATURE FOR INDEPENDENT

1.Shapiro, Ya.S. Microbiology : a textbook / Ya.S. Shapiro. — 2nd ed., ispr. — St. Petersburg : Lan, 2020. — 308 p. — ISBN 978-5-8114-3889-1. — Text : electronic // Electronic library system "Lan" : [website]. — URL: https://e.lanbook.com/book/116381 (date of access: April, 27, 2024). — Access mode: for authorization. users.

2..Pleshakova, V.I. Microbiology : a textbook / V.I. Pleshakova, N.A. Leshcheva, T.I. Lorengel. — Omsk :Omsk State University, 2019. — 75 p. — ISBN 978-5-89764-826-9. — Text : electronic // Electronic library system "Lan" : [website]. — URL: https://e.lanbook.com/book/126624 (date of access: April, 27, 2024). — Access mode: for authorization. users

3.. Microbiology : a textbook / V. A. Solovyov, O. N. Malysheva, S. V. Nikolaev, I. A. Kazartsev. — St. Petersburg :SPbGLTU, 2017. — 72 p. — ISBN 978-5-9239-0938-8. — Text : electronic // Lan : electronic library system. — URL: https://e.lanbook.com/book/92883 (date of access: April, 27, 2024). — Access mode: for authorization users.

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

a) main literature:

1.Gosmanov, R.G. Mycology and mycotoxicology : monograph / R.G. Gosmanov, A.K. Galiullin, F.M. Nurgaliev. — St. Petersburg : Lan, 2019. — 168 p. — ISBN 978-5-8114-3820-4. — Text : electronic // Electronic library system "Lan" : [website]. — URL: https://e.lanbook.com/book/116372 (date of access: April, 27, 2024). — Access mode: for authorization. users.

2.Gosmanov, R.G. Fundamentals of the doctrine of infection and antimicrobial immunity / R.G. Gosmanov, N.M. Kolychev, A.A. Novitsky. — 2nd ed., ispr. — St. Petersburg : Lan, 2017. — 280 p. — ISBN 978-5-8114-2377-4. — Text : electronic // Electronic-the Lan library system : [website]. — URL: https://e.lanbook.com/book/89928 (date of access: April, 27, 2024). — Access mode: for authorization. users.

3.Kolychev, N.M. Veterinary microbiology and mycology : textbook / N.M. Kolychev, R.G. Gosmanov. — 3rd ed., ster. — St. Petersburg : Lan, 2019. — 624 p. — Text : electronic // Electronic library system "Lan" : [website]. — URL: https://e.lanbook.com/book/125742 (date of access: April, 27, 2024). — Access mode: for authorization. users.

b) additional literature

1. A short dictionary of microbiological, virological, immunological and epizootological terms : dictionary / R. G. Gosmanov, N. M. Kolychev, A. A. Novitsky, R. H. Ravilov. — St. Petersburg : Lan, 2017. — 304 p. — ISBN 978-5-8114-2413-9. — Text : electronic // Lan : electronic library system. — URL: https://e.lanbook.com/book/89929 (date of access: April, 27, 2024). — Access mode: for authorization. users..

2.Gosmanov, R.G. Fundamentals of the doctrine of infection and antimicrobial immunity / R.G. Gosmanov, N.M. Kolychev, A.A. Novitsky. — 2nd ed., ispr. — St. Petersburg : Lan, 2017. — 280 p. — ISBN 978-5-8114-2377-4. — Text : electronic // Electronic-the Lan library system : [website]. — URL: https://e.lanbook.com/book/89928 (date of access: April, 27, 2024). — Access mode: for authorization. users.

3. Immunology : Translated from English / Roit Ivan, 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 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**
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	*Specialized furniture: tables, chairs* *Technical means of education: computers connected to the Internet and access to an electronic information and educational*

	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 microbiology, virology and immunology

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 36.05.01 Veterinary medicine
Full-time education

Education starts in 2024

Saint Petersburg
2024

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	Section 4. Serology	Colloquium, tests

5.	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	Section 5. Sanitary and microbiological assessment of environmental objects	Colloquium, tests

	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.		
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.	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

	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.		

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 non-standard 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. 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.

1. Identification and quantitative accounting of microorganisms of natural substrates.

2. Isolation of pure cultures of microorganisms.

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.

3. The main morphological features of microorganisms.

4. Types of mycobacteria and methods of their staining.

5. The device of the bacteriological laboratory.

6. Principles of classification, systematics and nomenclature of bacteria. Definition

of concepts: species, strain, biovar.

7. The cell wall of gram-positive bacteria: ultrastructure, chemical composition,

functions and morphogenesis.

8. The cell wall of gram-negative bacteria: ultrastructure, chemical composition, functions and morphogenesis.

9. The cell wall of acid-resistant bacteria: ultrastructure, chemical composition, functions and morphogenesis.

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.

10. Capsule and capsule-like shells of bacteria: ultrastructure, chemical composition, functions and morphogenesis.

11. Flagella and cilia of bacteria: ultrastructure, chemical composition, functions and

morphogenesis.

12. Bacterial spores: ultrastructure, chemical composition, functions and morphogenesis.

13. Bacteria having a convoluted shape (spirochaetes, spirilli, vibrions): ultrastructure, morphology, physiology, methods of study.

14. Mushrooms: cell structure, basic structural components, physiology, cultivation and identification methods.

15. Cultivation of bacteria. Methods of isolation of pure bacterial cultures and their identification.

16. Bacterial viruses (phages): structure, reproduction. Virulent and moderate phages. The use of phages in veterinary medicine.

17. Air as a factor in the spread of pathogenic microorganisms. Indicators of microbial air pollution and microbiological methods for assessing the sanitary and bacteriological state of indoor air.

18. Soil as a habitat for pathogenic microorganisms. Indicators of bacterial contamination of the soil. Pathogenic species that persist in the soil for a long time.

19. Water as a habitat for pathogenic microorganisms. Methods and indicators for assessing bacterial contamination of water. Pathogenic species that persist in water for a long time.

Questions for competence assessment:

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.

20. Sporulation in microbes. Methods of coloring disputes according to Muller, Peshkov and Trujillo.

21. Rules for taking and forwarding pat.the material.

22. Capsule formation in microbes. Rules for the manufacture and coloring of smears on the

capsule. Capsule coloring methods according to Olt, Mikhin and Romanovsky-Giemsa.

23. Sterilization and disinfection: definition of concepts, methods, application, significance for medicine. Asepsis and antiseptics.

24. Antiseptics: main groups, mechanisms and spectrum of action, mechanisms of microbial resistance.

25. Antimicrobial drugs – antibiotics, antiseptics, disinfectants: definitions of concepts, differences, scope of application. Fundamentals of the selectivity of the action of antibiotics.

26. Methods for determining the sensitivity of microorganisms to antibiotics. Ways to overcome drug resistance.

27. Beta-lactam antibiotics: properties of drugs, classification, mechanisms of microbial resistance. Beta-lactamases.

28. Penicillins: properties of drugs, mechanisms of microbial resistance. Methicillin is a resistant bacteria.

29. Cephalosporins: properties of drugs, mechanisms of microbial resistance.

30. Aminoglycosides: properties of drugs, mechanisms of microbial resistance.

31. Macrolides, azalides, lincosamides: properties of drugs, mechanisms of microbial resistance.

32. Quinolones: properties of drugs, mechanisms of microbial resistance.

33.Nitrofurans, nitroimidazoles: properties of drugs, application, mechanisms of microbial resistance.

34. Glycopeptides, cycloserine, fosfomycin, bacitracin: properties of drugs, mechanisms of microbial resistance.

35. Tetracyclines, chloramphenicol: properties of drugs, mechanisms of microbial resistance.

GPC-4 ID-2. Be able to apply modern technologies and research methods in professional activities, interpret the results obtained.
36. The scheme of diagnosis of infectious diseases.

37. The concept of bipolarity in microbes. Methods of painting bipolars

38. Dyes used in bacteriological practice. Principles of preparation of alcohol, alcohol-water and aqueous solutions of paints.

39. The principle and method of brucella coloring.

40. Rules for the preparation of smears from patmaterial and from cultures.

41. Simple and complex methods of staining microbes. Gram coloring.

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

42. The essence of the fluorochromation method.
43. Methods for determining the mobility of microbes. Morphology of mobile microorganisms.
44. Sterilization. Types of sterilization.

Questions for competence assessment:

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.

45. Methods of obtaining pure aerobic culture.

46. Classification of nutrient media by purpose.

47. Methods of obtaining pure anaerobic culture.

48. On what media and how are the proteolytic activity of microbes studied?

49. Methods for creating anaerobic conditions.

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.
50. On what media and how are the saccharolytic activity of microbes studied?

51. Which nutrient media are used for the cultivation of anaerobic microbes.

52. What is a colony? By what characteristics are colonies studied?

53.What kind of nutrient medium is used to cultivate the causative agent of tuberculosis? Describe its recipe.

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.
54. What is virulence? Units and method for determining virulence.
55. Entrance gates and pathways of pathogens in the body. Bacteremia, septicemia, toxinemia, virology: definition of concepts, examples.
56. Forms of infection – acute and chronic: definition of concepts, mechanisms, examples.
57. Secondary infection, mixed infection: definition of concepts, mechanisms, examples.
58. Forms of infection – latent and carrier: definition of concepts, mechanisms, examples.
59. Reinfection, superinfection, relapse: definition of concepts, mechanisms, examples.

3.1.2 Test-questions

The competence being formed:

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.

1) What is the property of microorganisms of the genus Proteus?

1. mobile
2. Only crops grown at 20 °C are mobile
3. they are mobile only in a young culture (within 12-18 hours);
4. motionless;

2) What is observed with the growth of proteus culture on meat-peptone broth?

1. weak turbidity of the medium, sediment in the form of a "pigtail";
2. no turbidity, granular loose sediment;
3. intense turbidity, a thin film on the surface of the medium, the release of a fetid putrid odor;
4. intense turbidity, light gray film on the surface of the medium, gradual staining of the medium in a greenish (sometimes red, brown) color;

3) What is observed with the growth of proteus culture by meat-peptone agar?

1. the formation of a thin veil-like bacterial film over the entire surface of the medium;
2. formation of small, transparent, round dewy colonies;
3. formation of large, gray, flat colonies with a matte surface, uneven edges; colonies, as a rule, become pigmented, the medium turns green;
4. formation of round, shiny, convex colonies, often pigmented (white, yellow, golden);

4) What smell is released during the growth of proteus culture?

1. "strawberry soap" or "jasmine"
2. putrid
3. fruity
4. burnt horn;

5) What is the growth capacity of proteus? What is his growth feature?

1 growth when transplanted to a physiological (0.9%) sodium chloride solution
2. growth in the presence of a 40% bile solution
3. growth at a temperature of 4 ° C (in the refrigerator)
4. growth over the entire surface of the mowed agar, when seeded in a condensing liquid on this medium;

6) How can the surface of the nutrient medium be treated to limit the active growth of the proteus?

1.0.5% hydrochloric acid solution
2.0,9% sodium chloride solution
3.96% ethyl alcohol
1. 2% KOH solution

7) What is the important biochemical property of proteus for identification?

1. the ability to break down urea, phenylalanine, the absence of mannitol cleavage
2. the ability to produce pyocyanin, which can be detected by conducting a test with chloroform
3. the ability to ferment lactose
4. the ability to exhibit lecithovetillase activity on the Chistovich medium;

8) Who is infected when studying the degree of pathogenicity of proteus?

1.rabbit, intradermally
2. kittens, orally
3.golden hamsters, subcutaneously
4. white mice, subcutaneously

9) What is the Latin name of the causative agent of Pseudomonas aeruginosa infection?

1. Pseudomonas fluorescens
2.Pseudomonas mallei
3.Pseudomonas aeruginosa
4.Aeromonas hydrophila

10) What is Pseudomonas aeruginosa?

1. Polymorphic gram-negative rods; randomly located in the smear,
2. small gram-positive rods located singly in the smear
3 gram-positive cocci located in the smear in heaps, "clusters";
4 gram-positive cocci located in the smear in chains;

11) What are the characteristics of microorganisms of this genus?

1. mobile
2. Only crops grown at 20 °C are mobile
3. Motionless
4. they are mobile only in a young culture (within 12-18 hours);

12) What is observed with the growth of Pseudomonas aeruginosa culture on BCH?

1. weak turbidity of the medium, sediment in the form of a "pigtail";
2. no turbidity, granular loose sediment;
3. intense turbidity, a film on the surface of the medium, the release of a fetid putrid odor;
4. intense turbidity, light gray film on the surface of the medium, gradual staining of the medium in a greenish (sometimes red, brown) color;

13) What is observed with the growth of Pseudomonas aeruginosa culture by MPA?

1. the formation of a thin veil-like bacterial film over the entire surface of the medium;
2. formation of small, transparent, round dewy colonies;
3. formation of medium and large, gray, flat colonies with a matte surface, uneven edges; colonies and the environment are colored green;
4. formation of round, shiny, convex colonies, often pigmented (white, yellow, golden);

14) What smell is released during the growth of Pseudomonas aeruginosa culture?

1. "strawberry soap" or "jasmine"
2. putrid
3. fruity
4. burnt horn;

15) What is important for the diagnosis of the cultural property of Pseudomonas aeruginosa, what is the peculiarity of its growth?

1. growth when transplanted to a physiological (0.9%) sodium chloride solution
2. growth in the presence of 40% bile solution
3. at a temperature of 4 ° C (in the refrigerator)
4. over the entire surface of the beveled container, when sowing in condensation water in this medium;

16) What is the biochemical property of Pseudomonas aeruginosa important for identification?

1. the ability to break down urea, phenylalanine;

2. the ability to produce pyocyanin, which can be detected by conducting a test with chloroform;
3. the ability to ferment lactose;
4. the ability to show lecithovetillase activity on the medium of Chistovich medium
17) Who is infected when studying the degree of pathogenicity of Pseudomonas aeruginosa?
1. rabbit, intradermally
2. kittens, orally
3. golden hamsters, subcutaneously
4. white mice, subcutaneously, flushed with meat-peptone agar
18) What is used for serological identification of isolated cultures of Pseudomonas aeruginosa?
1. agglutination reaction on glass with poly- and monovalent serums and live culture;
2. precipitation reaction in capillaries;
3. complement binding reaction;
4. reaction of diffusion precipitation;
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.

19) What is the Latin name of one of the species of pathogens from the genus Proteus?
1. Pseudomonas aeruginosa
2. Providensia alcaligenes
3. Proteus myxofaciens
4. Proteus vulgaris
20) Who is Proteus?
1. Polymorphic gram-negative rods; arranged randomly in a smear, singly, sometimes forming long filaments;
2. small gram-positive rods located singly in the smear;
3. Gram-positive cocci located in the smear in heaps, "clusters";
4. Gram-negative cocci, located singly, randomly in the smear
21) What feature do microorganisms of the genus Proteus have?
1.mobile
2. Only crops grown at 20 °C are mobile
3. they are mobile only in a young culture (within 12-18 hours);
4.motionless
22) What is observed with the growth of proteus culture on meat-peptone broath ?
1. weak turbidity of the medium, sediment in the form of a "pigtail";
2. no turbidity, granular loose sediment;
3. intense turbidity, a thin film on the surface of the medium, the release of a fetid putrid odor;
4. intense turbidity, light gray film on the surface of the medium, gradual staining of the medium in a greenish (sometimes red, brown) color;
23) What is observed with the growth of proteus culture by meat-peptone agar?
1.formation of a thin veil-like bacterial film over the entire surface of the medium;
2. formation of small, transparent, round dewy colonies;
3. formation of large, gray, flat colonies with a matte surface, uneven edges; colonies, as a rule, become pigmented, the medium turns green;

4. formation of round, shiny, convex colonies, often pigmented (white, yellow, golden);

24) What smell is released during the growth of proteus culture?

1. "strawberry soap" or "jasmine"
2. putrid
3. fruity
4. burnt horn;

25) How does proteus grow on a nutrient medium, and what are the features of its growth?

1. when transplanted to a physiological (0.9%) sodium chloride solution
2. in the presence of a 40% solution of bile
3. at a temperature of 4 C (in the refrigerator)
4. over the entire surface of the mowed agar, when sowing in a condensing liquid on this medium;

26) What limits the active growth of proteus on dense nutrient media?

1. 0.5% hydrochloric acid solution
2. 0,9% sodium chloride solution
3. 96% ethyl alcohol
4. 2% KOH solution

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.

27) What biochemical property is important for the identification of proteus?

1.the ability to break down urea, phenylalanine, no cleavage of mannitol
2. the ability to produce pyocyanin, which can be detected by conducting a test with chloroform
3. the ability to ferment lactose
4. the ability to exhibit lecithovetillase activity on the Chistovich medium (ZHSA);

28) Which biomodels are infected when studying the degree of pathogenicity of proteus?

1.rabbit, intradermally
2.kittens, orally
3.golden hamsters, subcutaneously
4.white mice, subcutaneously

29) What is Pseudomonas aeruginosa?

1. polymorphic gram-negative rods; arranged randomly in a smear, singly
2. small gram-positive rods located singly in the smear;
3. Gram-positive cocci located in the smear in heaps, "clusters";
4. Gram-positive cocci located in the smear in chains;

30) What is used to differentiate Mycobacterium tuberculosis from other mycobacteria?

1. the release of hydrogen sulfide;
2. Glucose fermentation;
3. Price's microculture method;
4. Ciel-Nielsen coloring.

31) What are the causative agents of tuberculosis?

1. form spores;
2. prone to polymorphism;

3. devoid of peptidoglycan;
4. form endospores

32) Specify which nutrient media are used for the cultivation of Mycobacterium tuberculosis?

1. yolk-salt agar;
2. meat-peptone agar;
3. Endo agar;
4. The Levinstein–Jensen agar

33) Which pathogens have the highest level of resistance in the environment?

1. tularemia;
2. brucellosis;
3. anthrax;
4. The plague.

34) Which pathogens are characterized by sporulation?

1. anthrax;
2. the plague;
3. Tularemia;
4. brucellosis

35) Who is the reservoir of the causative agent of the plague in nature?

1. gophers;
2. fleas;
3. groundhogs;
4. Rats.

36) What is typical for Bacillus anthracis?

1. the presence of a capsule;
2. sporulation;
3. Mobility;
4. Exotoxin production;

37) What is the main method of laboratory diagnosis of anthrax?

1. serodiagnostics;
2. Bacterioscopic;
3. Bacteriological;
4. allergodiagnostics;

38) On which laboratory animals is the biopsy performed?

1. white mice;
2. guinea pigs;
3. hamsters;
4. Rabbits.

39) What is used for the serodiagnosis of anthrax?

1. indirect hemagglutination reaction;
2. latex agglutination reaction;
3. Vidal's reaction;
4. The precipitation reaction according to Ascoli.

40) What clinical forms of Bacillus anthracis can cause?

1. skin;
2. bubonic;
3. intestinal;
4. septic;

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.

1) Which kingdom do bacteria belong to?

1. Plants
2. animals
3. Prokaryotes
4. Eukaryotes

2) Which group do pathogenic fungi belong to?

1. prions
2. Precellular
3. Prokaryotes
4. Eukaryotes

3) Who has studied the cellular theory of immunity:

1. Mochutkovsky
2. Mechnikov
3. Minx
4. P.Ehrlich

4) What is the name of the collection of individuals originating from one cell:

1.culture
2. clone
3.strain
4. viruses

5) The causative agents of staphylococcosis are most often microorganisms of what kind?

1. Staphylococcus epidermidis
2. Staphylococcus haemoliticus
3. Staphylococcus gallinarum
4. Staphylococcus aureus

6) What is the characteristic location of staphylococci in the smear?

1. in the form of long chains
2. singly, randomly
3. in the form of clusters resembling a bunch of grapes
4. in pairs

7) How do staphylococci stain Gram?

1. positively (purple)
2. negative (in red)
3. it is bad (with difficulty), therefore it is recommended to stain the Cilius-Nilsson smears
4. it is bad (with difficulty), therefore it is recommended to paint the strokes according to Romanovsky-Gimza

8) What is the characteristic cultural property of staphylococci?

1. growth only on special media with the addition of glucose and blood or blood serum;
2. growth in the presence of a brilliant green solution;
3. growth in the presence of a 10% sodium chloride solution;
4. growth during re-sowing in saline solution (0.9% sodium chloride solution) at 20oC;

9) What is the most common method of sterilization of nutrient media?

1. dry-burning;
2. Autoclaving;
3. Filtering;
4. Boiling.

10) What are the main methods of disinfection?

1. Autoclaving;
2. tindalization;
3. boiling;
4. flambering;

11) Which microorganisms are indicators of faecal contamination in the study of surface water sources?

1. E.coli;
2. Streptococcus faecalis;
3. Citrobacter freundii;
4. Staphylococcus aureus.

12) Which microorganism is characterized by lactose fermentation?

1. E. coli;
2. Sh. flexneri;
3. S. typhi;
4. S. typhimurium.

13) What enzyme does enterobacteria have?

1. catalase;
2. Cytochrome oxidase;
3. Oxidase

14) How are representatives of enterobacteria stained by Gram?

1. positive;
2. negative;
3. variable

15) What pathogenicity factors are characteristic of enterobacteria?

1. endotoxin;
2. fibrinolysin;
3. cytotoxin;
4. enterotoxin

16) What genus does E. coli belong to?

1. Escherichia;
2. Salmonella;
3. Shigella;
4. Yersinia;

17) Which of the following bacteria do not have flagella?

1. salmonella;
2. shigella;
3. Escherichia;
4. Yersinia

18) What is affected by intestinal salmonellosis?

1. small intestine;
2. rectum;
3. the large intestine;
4. the caecum

19) For which microorganisms is bismuth sulfite an electively differential nutrient medium?

1. Escherichia;
2. salmonella;
3. shigell;
4. Vibrio cholerae

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

20) What is called bacteremia?

1. the phase of pathogenesis of infectious diseases, during which bacteria enter the blood;
2. the phase of pathogenesis of infectious diseases, during which viruses enter the blood;
3. generalized disease, during which the pathogen is located and multiplies in the blood).

21) What is called sepsis?

1. the phase of pathogenesis of infectious diseases, during which bacteria enter the blood;
2. the phase of pathogenesis of infectious diseases, during which viruses enter the blood;
3. generalized disease, during which the pathogen is located and multiplies in the blood.

22) What is lecithinase?

1. destruction of hyaluronic acid;
2. blood clotting disorder;
3. destruction of lecithin;
4. Dissolution of fibrin.

23) What causes fibrinolysin?

1. destruction of hyaluronic acid;
2. blood clotting disorder;
3. destruction of lecithin;
4. dissolution of fibrin

24) What causes plasmocoagulase?

1. destruction of hyaluronic acid;
2. blood clotting disorder;
3. destruction of lecithin;
4. Dissolution of fibrin.

25) Which family do staphylococci belong to?

1. Bacteroidaceae;
2. Neisseriaceae;
3. Pseudomonadaceae;
4. Micrococcaceae;

26) What are the pathogenicity factors of staphylococci?

1. the presence of a microcapsule;
2. the presence of disputes;
3. the presence of coagulase;
4. the presence of catalase

27) Who are staphylococci by type of respiration?

1. Aerobic;
2. Anaerobes;
3. microaerophiles;
4. Optional anaerobes.

28) What media are used for the primary isolation of staphylococci?

1. Levenstein-Jensen medium;
2. Endo environment;
3. Simple nutrient agar;
4.Chistivich agar.

29) What is the main method of laboratory diagnosis of staphylococcal infections?

1. bacterioscopic;
2. bacteriological;
3. serodiagnostics;
4. allergodiagnostics

30) What nutrient media are used for growing anaerobes?

1. Kitta-Tarozzi medium;
2. Kliegler's Environment;
3. Wednesday Wilson-Blair;
4. Zeissler's environment.

31) Specify which microorganisms are characterized by the presence of spores exceeding the diameter of the cell?

1. Bacillus anthracis;
2. P. aeruginosa;
3. Clostridium perfringens;
4. Bacillus subtilis.

32) Specify which microorganisms are characterized by the presence of spores that do not exceed the diameter of the cell?

1. Bacillus anthracis;
2.P. aeruginosa;
3. Clostridium perfringens;
4. Bacillus subtilis.

33) What causes the pathogenesis of tetanus?

1. the action of exotoxin;
2. by the action of endotoxin;
3. the invasiveness of the pathogen.

34) What is used for specific botulism therapy?

1. Anti-botulinum antitoxic serum;
2. Anti-botulinum antimicrobial serum;
3. botulinum toxoid;
4. Botulinum bacteriophage.

35) What is typical for C.perfringens?

1. lack of mobility;
2. the presence of hemolysis;
3. no dilution of gelatin;
4. the presence of peritrichia

36) What can be used to grow anaerobes?

1. The Fortner method;
2. anaerostat;
3. The Veillon-Venial method;
4. The Ehrlich method.

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

37) Where can a biological test be used?

1. for the diagnosis of tetanus;
2. for the diagnosis of gas gangrene;
3. for the diagnosis of botulism;
4. for the diagnosis of erysipelas.

38) What is characteristic of C.tetani?

1. the presence of a capsule;
2. they are peritrichs;
3. terminal location of the spores;
4. Indole formation.

39) How do mycobacteria grow?

1. Fast on any nutrient media;
2. Slowly on any nutrient media;
3. Quickly on special media for mycobacteria;
4. Slowly on special media for mycobacteria.

40) What kind of paint can be used to identify the causative agent of tuberculosis?

1. according to Ziel-Nielsen;
2. according to Burry-Gins;
3. by Clothes;
4. according to Neisser.

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.

1) What is the ability of pathogenic enterococci (group D streptococci)?

1. coagulate rabbit blood plasma;
2. to produce the pigment pyocyanin;
3. to give the phenomenon of "swarming" when sowing mown agar in condensation water;
4. reduce (discolor) methylene blue when seeded in "methylene milk";

2) What is observed with the growth of staphylococci in a liquid nutrient medium?

1. slight turbidity, sediment in the form of a "pigtail";
2. absence of turbidity, sediment in the form of small grains;
3. diffuse turbidity, mucous sediment, white film, greenish staining of the medium;
4. intense turbidity, abundant loose flake-like sediment, sometimes a wall ring;

3) What is observed with the growth of staphylococci in a dense medium?

1. small, translucent, round colonies, similar to dewdrops;
2. A veil-like thin film covering the entire surface of the medium;
3. round, convex, shiny, smooth colonies, often colored yellow, white,golden;
4. medium-sized flat matte colonies with uneven edges growing into agar;

4) On what medium does the ability of pathogenic staphylococci to cause leucitovitellase activity manifest itself?

1. milk-salt agar (Petrovich);
2. Chistovich's yolk-salt agar;
3. blood agar;
4. Chapman's agar (with crystal violet);

5) What do pathogenic strains of staphylococci form on blood agar?

1. form an alpha-hemolysis zone;
2. form a beta-hemolysis zone;
3. form a double hemolysis zone;
4. do not give hemolysis;

6) What is the ability of pathogenic staphylococci?

1. Coagulate rabbit blood plasma;
2. to produce the pigment pyocyanin;
3. to give the phenomenon of "swarming" when sowing mown agar in condensation water;
4. reduce (discolor) methylene blue when seeded in "methylene milk";

7) What is observed when 0.2 ml of a 2 billion suspension of staphylococcus culture is injected into a rabbit intradermally with a positive bioassay?

1. death of the animal;
2. formation of abscesses at the injection site;
3. the formation of extensive edema;
4. formation of infiltration and necrosis

8) The causative agents of cow mastitis are most often streptococci of what kind?

1. Streptococcus pyogenes
2.Streptococcus agalactiae
3.Streptococcus pneumoniae
4.Streptococcus equi

9) The characteristic location of streptococci - pathogens of horse soap - in smears?

1. in the form of long chains
2. singly, randomly3. in the form of clusters resembling a bunch of grapes
4. in pairs or in short chains

10) How do streptococci stain Gram?

1. positively (purple)
2. negative (in red)
3. it is bad (with difficulty), therefore it is recommended to stain the Cilius-Nilsson smears
4. it is bad (with difficulty), therefore it is recommended to paint the strokes according to Romanovsky-Gimza

11) In smears from the patmaterial, what kind of streptococci are surrounded by a capsule and arranged singly or in pairs?

1. Streptococcus pyogenes
2.Streptococcus agalactiae
3.Streptococcus pneumoniae
4.Streptococcus equi

12) What is observed with the growth of pyogenic microbes in a liquid nutrient medium?

1. slight turbidity, sediment in the form of a "pigtail";
2. absence of turbidity, sediment in the form of small grains;

3. diffuse turbidity, mucous sediment, white film, greenish staining of the medium;
4. intense turbidity, abundant loose flake-like sediment, sometimes a wall ring;

13) What is formed when streptococci grow in a dense medium?
1. small, translucent, round colonies similar to dew droplets;
2. A veil-like thin film covering the entire surface of the medium;
3. round, convex, shiny colonies, often colored yellow, white, golden
4. medium-sized flat matte colonies with uneven edges growing into agar;

14) What does the CAMP test reveal in the process of identifying streptococci?
1. lecithovitellase activity;
2. catalase activity;
3. the ability to form the pigment pyocyanin;
4. latent hemolytic activity;

15) What do beta-hemolytic streptococci form on blood agar?
1. form a transparent colorless hemolysis zone;
2. form a greenish or brown hemolysis zone
3. form a double hemolysis zone;
4. do not give hemolysis;

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.

16) Which of the listed microorganisms forms spores in an oxygen environment?

1. borrelia

2. vibrio

3. bacilli

4. streptococci

17) What is the form of staphylococci?

1. Sticks
2. twisted
3. round

18) Which bacteria have the shape of a chain?
1. staphylococci
2. meningococci
3. spirochetes
4. streptococci

19) Which bacteria have the shape of a bunch of grapes?
1. E. coli
2. Staphylococcus
3. Vibrio cholerae
4. Meningococcus

20) How are nutrient media sterilized?
1. By liquid steam in the Koch apparatus
2. dry heat
3. by the action of low temperature

4. low pasteurization

21) What are the names of microorganisms that reproduce at temperatures from - 10 ° C to + 10 ° C?

1. lysophiles
2. thermophiles
3. psychrophiles
4. airbags

22) What is the name of the system of measures ensuring complete sterility?

1. pasteurization
2. asepsis
3. Drying
4. Disinfection

23) What kind of energy is used for disinfection of premises?

1. electric
2. Ultraviolet rays
3. Ultrasonic
4. teplova

24) What is sterilized by dry heat?

1. Rubber objects
2. metal objects
3. Medicinal substances
4. dressing material

25) What is sterilized by boiling sterilized?

1. saline solution
2. rubber objects
3. dressing material
4. cotton wool

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.

26) What are zoonotic infections?

1. the flu
2. cholera
3. the plague
4. typhoid fever

27) Which of the above are zoonotic infections?

1. dysentery
2. typhoid fever
3. rabies
4. malaria

28) What are the toxins of bacteria?

1. exotoxins
2. fibrinolysin
3. virulence
4. anatoxin

29) What do pathogenic microbes have?

1. specificity of action
2. solubility
3. Resistant to high temperature
4. adaptation to drying

30) What are the cellular factors of nonspecific protection of the body?

1. Lysozyme
2. complement
3. antigens
4. macrophages

31) What kind of environment changes with the growth of microorganisms?

1. indicator
2. Differential
3. elective
4. preservative

32) What kind of environment is favorable for a particular type of microorganisms?

1. Indicator
2. elective
3. Differential

33) Which microorganisms reproduce without oxygen access?

1. obligate aerobes
2. Optional anaerobes
3. Obligate anaerobes
4. Optional aerobatics

34) What is the growth of microorganisms?

1. an increase in the number of individuals
2. increasing the size of microorganisms
3. the appearance of new properties in microorganisms
4. changes in biochemical properties

35) What are nutrient media in composition?

1. complex;
2. Elective;
3. Simple;
4. liquid;

36) What refers to complex nutrient media?

1. meat-peptone agar
2. glycerin medium
3. meat-peptone broth
4. blood agar

37) What kind of medium is used for the storage and transportation of microorganisms?

1. indicator
2. elective
3. Differential
4. preservative

38) How is the serological group of streptococci determined by Lensfield?

1. Using the microagglutination reaction
2. Using the precipitation reaction in capillaries
3. reaction of complement binding
4. Lysis reaction

39) What is the Latin name of Pseudomonas aeruginosa?

1. Pseudomonas aeruginosa
2.Providensia alcaligenes
3. Proteus myxofaciens
4. Proteus vulgaris

40) How to characterize a microorganism, proteus?

1. Polymorphic gram-negative rods; arranged randomly in a smear, singly, sometimes forming long filaments;
2. small gram-positive rods located singly in the smear;
3. Gram-positive cocci located in the smear in heaps, "clusters";
4. Gram-negative cocci, located singly, randomly in the smear;

3.1.3 Topics for preparation of reports

The competence being formed:

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.

1. The nature, morphology and basic properties of bacteriophages. The mechanism of their action on the bacterial cell. Application in the diagnosis, therapy and prevention of diseases.
2. The role of nonspecific resistance factors in antimicrobial protection of the body.
3. Characteristics of the causative agent of soap. Differentiating it from pyogenic streptococcus. Biologics, their manufacture and application (antimycotic antivirus), the mechanism of its action.
4. Characteristics of the causative agent of diplococcal infection. Laboratory diagnostics
5. The main morphological and cultural-biochemical properties of the causative agent of pseudotuberculosis and paratuberculosis. Laboratory diagnostics.
6. Characteristics of pathogens of malignant edema.

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.

7. The use of bacterial preparations for the prevention and therapy of dysbiosis.
8. Features of microbiological processes in various types of fermentation.
9. Serological diagnosis of infectious diseases.
10. Principles and methods of rapid diagnosis of infectious diseases.

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.

11. Cultural properties of bacteria. Characteristics of colonies. Methods of studying cultural properties.

12. Enzymatic properties of bacteria. Methods of study.
13. "Free topic" (selected in consultation with the teacher).

The competence being formed:

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.

1. The history of the development of microbiology. Microbiologists who have made the greatest contribution to the development of science.
2. Antagonism among microbes and its practical significance.
3. Antibiotics. The history of discovery and their significance in the lives of people and animals.
4. Allergies, types of allergies and forms of their manifestation.
5. Vaccines, the principle of preparation, practical application, features of the immunity they create.
6. Modern methods of laboratory diagnostics of infectious diseases.
GPC-4 ID-2. Be able to apply modern technologies and research methods in professional activities, interpret the results obtained.
7. Rickettsias and diseases caused by them. Diagnosis, treatment and prevention.
8. Chlamydia and the diseases caused by them. Diagnosis, treatment and prevention.
9. The causative agent of mycoplasma infection. Diagnosis, treatment and prevention.
10. Characteristics of mycobacterium tuberculosis. The vaccine from the BCG strain, tuberculin, is the principle of manufacturing these biologics. Diagnosis, treatment and prevention.
11. Characteristics of the causative agent of glanders and self-similar diseases (epizootic and ulcerative lymphangitis). Diagnosis and prevention.
GPC-4 ID-3. Have the skills to work with specialized equipment to implement the tasks set during research and development of new technologies.

12. The causative agent of leptospirosis (properties of the pathogen, diagnosis, antibacterial therapy).
13. Pathogens of brucellosis (properties of pathogens, diagnosis, antibacterial therapy).
14. The causative agent of botulism (properties of the pathogen, diagnosis, therapy)
15. The causative agent of anthrax (properties of the pathogen, diagnosis, antibacterial therapy).
16. The causative agent of tularemia (properties of the pathogen, diagnosis, antibacterial therapy)

The competence being formed:
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.

17. Characteristics of the emcar pathogen. Laboratory diagnostics.
18. Characteristics of the causative agent of tetanus. Tetanus toxoid and antitoxic serum, their preparation and application.
19. Characteristics of the causative agent of campylobacteriosis. Laboratory diagnostics.
20. Characteristics of the causative agent of anthropozoonous plague (Yersinia pestis). Laboratory diagnostics. Differentiation from the causative agent of pseudotuberculosis.
21. Ringworm (trichophytia). Characteristics of the pathogen and laboratory diagnosis of the disease.
22. Characteristics of pathogens and diagnosis of pig hemophilosis.

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.
23. Characteristics of the causative agent of listeriosis. Diagnosis, treatment and prevention.
24. Characteristics of the intestinal bacteria family and their significance in animal pathology (in consultation with the teacher).

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.
25. Vaccination. Properties, preparation and application of live and killed vaccines (examples)
26. Vaccination. Properties, preparation and application of anatoxins, chemical and genetically engineered (recombinant) vaccines (examples).
27. Passive immunization: goals, indications, receipt and use of drugs for passive immunization.

3.2_ Standard tasks for intermediate certification

3.2.1. Questions for the test

The competence being formed:
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.

1.How is the minimum inhibitory dose of an antibiotic calculated when using the serial dilution method?
2. For what purpose is a biological sample used?
3. How are laboratory animals infected?

4.What is virulence, toxicity, toxigenicity and how are they determined?
5. By what indicators and how is the air examined?
6. What is the coli-titer and coli-index? How are they defined?
7. What is the sanitary significance of determining the amount of water, soil, and milk?
8. What pathogenic microbes can be present in the soil, in milk, in feed?
9. Name the sanitary indicators of clean tap water, open water, milk, feed.

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.
10. What is the essence of serological reactions?
11. Tell us how the precipitation reaction is set, taken into account and evaluated (according to Ascoli).
12. What are the types of agglutination reactions? Tell us in detail about each of them.
13. List the components of the reaction of complement binding.
14. What requirements must be followed when setting the reaction?
15. Tell us the essence of the reaction of complement binding .
16. Draw a diagram of the main the reaction of complement binding experience.
17. What are the controls when setting up?

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.

18. Bacterial toxins.
19. Bacterial exotoxins: gene localization, methods of secretion and delivery to target cells, classification.
20. Neurotoxins and enterotoxins of bacteria: mechanisms of action, examples.
21. Bacterial endotoxins: chemical nature, mechanisms of action, examples.

The competence being formed:

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.

1. Purpose and principle of the bacteriological laboratory.
2. Rules of conduct and work in the laboratory.
3. Rules for the collection and transfer of pathological material.
4. Methods of microbiological research.
5. The principle of operation with the immersion system of the microscope.

6. Dyes used in bacteriological practice.
6. The principle of preparation of alcohol, alcohol-water and aqueous solutions of paints.
7. The main morphological features of microorganisms.
8. Tell us about simple and complex methods of painting strokes.
9. Describe the structural features of the cell wall in gram-positive and Gram-negative bacteria.
10. Tell us the technique of the Gram smear staining method and its modification in Blue.
11. What is the essence of the staining of mycobacteria according to Zil-Nilsson?
12. Tell us the technique of painting the brushstroke according to Ciel-Nilsson.
13. What is the essence of the method of fluorochromation of mycobacteria?
14. What is the bipolarity of microorganisms? Name the microbes for which bipolarity is of diagnostic importance.
15. What is the method of staining a smear for bipolarity? Tell us the methodology.
16. What is the essence of differential staining of brucella from the accompanying microflora? Tell us the method of brucella coloring according to Kozlovsky.
17. Methods of in vivo staining of microbes.
18. Morphology of mobile microbes.
19. Determination of mobility by the methods of "crushed" and "hanging" droplets.
20. Methods of in vivo staining of microbes.
21. What is the essence of the bacteriological research method?

GPC-4 ID-2. Be able to apply modern technologies and research methods in professional activities, interpret the results obtained.
22. What is disinfection? How is it used in the laboratory?
23. What is sterilization? What sterilization methods are used in the laboratory?

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

24. Antigen-antibody reaction: mechanism, specificity. Serological reactions and their use in medicine (examples).
25. Allergic reactions (hypersensitivity): definition of the concept, classification, causes, diagnostic methods.
26. Hypersensitivity of the immediate type.

The competence being formed:
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.

27. What is autoclaving, what is it used for?
28. What is the essence of the fractional sterilization method?
26. What are the requirements for nutrient media?
27. How are nutrient media classified?
28. Why and how is the pH of nutrient media determined?
29. How are BCH and MPA prepared, and how are they sterilized?
30. What is the purpose of special nutrient media?
31. For what purpose is the Petraniani medium used, what is its composition?

32. How is the breakdown of sugars by a microbe in colored media taken into account?
33. How to prepare Gis media?
34. What is the composition of the media of Endo, Levin, Ploskirev, Olkenitsky?
35. What elective nutrient media do you know? Due to what selective properties are manifested in such media?
36. What is the basis for the principle of using Kitt-Tarozzi medium, Chistovich yolk-salt agar, bismuth-sulfite agar, Koda, Kessler media?

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.

37. What is a pure culture of microorganisms?
38. What methods do you know of isolating a pure culture of aerobic microbes, what is their essence?
39. What nutrient media are used for the cultivation of anaerobes?
40. How can a pure culture of anaerobes be isolated?
41. How to create anaerobic conditions when growing microbial cultures?
42. What is a microbial colony, how can it be obtained?
43. By what characteristics are microbe colonies studied?

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.

44. How do they sow, replant, and repel microbes on various nutrient media?
45. What properties are determined by the growth of microbes in MPA, MPB?
46. How to determine the proteolytic properties of microbes?
47. On what media and how are the saccharolytic properties determined?
48. How are redox enzymes determined?
49. What is hemolysis and how is it determined?
50. What is the essence and technique of setting up the method of diffusion of antibiotics into agar?

3.2.2. Exam questions

The competence achieved:

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.

1. Characteristics of the causative agents of bradzot, enterotoxemia, anaerobic dysentery. Conducting laboratory diagnostics. Biologics.
2. Characteristics of pathogens in malignant edema (gas gangrene). Laboratory diagnostics. Biologics for treatment and prevention.

3. Characteristics of the causative agent of colibacteriosis. Laboratory diagnosis of the disease. Biologics for treatment and prevention.

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.
4. Laboratory diagnosis of salmonellosis. The main serological types of salmonella. Differentiation of escherichia from salmonella.
5. Characteristics of the causative agent of paratuberculosis and laboratory diagnostics.
6. Laboratory diagnosis of tuberculosis. Types of pathogens and their differentiation. Biologics for tuberculosis.
7. Bacteriological diagnosis of brucellosis. Cultural properties of brucella and methods of differentiation of brucella species.
8. Allergic and serodiagnostics of brucellosis in animals. Biologics for diagnosis and prevention.
9. Characteristics of leptospira. Bacteriological and serological diagnosis of leptospirosis. Biologics.
10. Characteristics of the pathogens of campylobacteriosis (vibriosis). Taking the patmaterial and conducting laboratory diagnostics.
11. Characteristics of pathogens and laboratory diagnostics of dermatomycoses. Specific prevention.
12. Morphology of yeast and molds (structures important for identification). Pathogens of mycotoxicosis.

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.

13. Characteristics of the pathogens of glanders and self-similar diseases (epizootological and ulcerative lymphangoitis, melioidosis) and their differentiation.
14. Characteristics of the causative agents of rickettsiosis. Laboratory diagnostics of diseases caused by them.
15. Characteristics of the pathogens of chlamydia. Laboratory diagnostics of diseases caused by them.
16. Characteristics of mycoplasmosis pathogens. Laboratory diagnostics of diseases caused by them.

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.

1. Microbiology - the history of development, tasks and connection with other sciences. The role of microbes in the national economy and animal pathology (examples).

2. The structure and chemical composition of the microbial cell.
3. Sources and ways of transmission of infectious diseases (examples).
4. The microflora of the animal body and its physiological significance. Antagonism among microbes and its practical significance.
5. Air microflora, quantitative and qualitative determination of air microorganisms.
6. The microflora of water. Sanitary and microbiological examination of water.
7. The essence and process of sporulation. Spore-forming microorganisms (examples). Methods of coloring on the dispute.
8. The spread of microbes in nature. The microflora of the soil. Bacteriological examination of the soil.

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

1. Microflora of feed. Epiphytic microflora. Microbiological processes in feed silage.
2. The microflora of milk. Bacteriological examination of milk. Lactic acid fermentation and its practical significance.
3. The importance of microbes in the circulation of substances in nature.
4. Pathogenicity and virulence in microbes. Pathogenicity factors. Toxins of microbes. Characterization of exo- and endotoxins (examples).
5. The influence of physical, chemical, and biological factors on microorganisms.
6. Antagonism among microbes and its practical significance (examples).
7. Methods for determining the sensitivity of microbes to antibacterial drugs (antibiotics).
8. Characteristics of the main forms of microbes. Reproduction of microbes. The procedure for taking patmaterial in infectious diseases and the sequence of conducting (scheme) bacteriological diagnostics.
9. Sterilization. Methods and equipment for sterilization. Pasteurization.
10. Sources and ways of transmission of infectious diseases (examples).

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

1. Definition of concepts: infection, infectious process, infectious disease. Types of infections.
2. Infectious disease, periods of development of infectious disease, transmission routes.
3. Metabolism (nutrition) of microbes. Classification of microbes by type of nutrition.
4. Respiration in microbes, classification of microbes by type of respiration (examples).
5. Capsule in microbes, capsule detection by microscopy, capsule-forming microbes.
6.Infection, infectious process, infectious disease, types of infections (exo, endogenous, mixed, second, reinfection, superinfection, relapse).
7. Genetics and variability in microbes. Types of variability (dissociation, mutation, transformation, transduction, conjugation). L is the form of the microbe.
8. The concept of immunity. Types of immunity. Sterile and non-sterile immunity.
9. Central and peripheral organs of the immune system. Cells of the immune system and their role in the formation of immunity. The scheme of immunogenesis.
10. Non-specific immune factors and their role in protecting the animal body
11. Phagocytosis and its significance in infectious diseases.

12. Immunoglobulins (antibodies). Characteristics and properties of antibodies. Classes of immunoglobulins.

13. Types of allergies – GNT and HRT and their differences. Allergens and allergic diagnostics of infectious diseases (examples).

14. Antigens and their characteristics, the antigenic structure of the microbial cell.

15. Types of fermentation and their practical significance (examples).

16. The procedure for taking patmaterial in infectious diseases and the sequence of laboratory diagnostics. Bacteriological diagnostic method, the essence and purpose of the method.

17. Methods for obtaining pure anaerobic cultures and media for anaerobic cultivation.

The competence being formed:

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.

1. Methods for obtaining pure aerobic cultures. Characteristics of isolated colonies.
2. Simple, special (elective environments, differential diagnostic environments) (examples). The purpose of their application.
3. Characteristics of the cultural properties of microbes when growing on liquid and dense nutrient media.
4. Nutrient media, classification of media and requirements for nutrient media. Sterilization of media.
5. Differential diagnostic media and their significance in microbiology (examples).

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.

1. Serological method of diagnosis of infectious diseases and its significance. Types of serological reactions.
2. Characteristics of the components, essence, technique of setting and accounting of the RSC. Reaction controls.
3. The agglutination reaction is the essence, purpose and technique of setting and accounting. Varieties of RA staging.
4. Varieties of agglutination reaction. The essence, technique of staging and accounting for the microagglutination reaction (RMA).
5. The essence, purpose and technique of staging, accounting and controls of the Ascoli precipitation reaction (RP).
6. The method of fluorochromation and the method of fluorescent antibodies (MFA) in the diagnosis of bacterial infectious diseases. Essence and technique.
7. The role of the pathogen, macroorganism and environmental conditions in the occurrence and development of the disease.
8. Biological preparations used in veterinary medicine for the treatment, diagnosis and prevention of bacterial diseases (examples).

OPK-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

9. Pathogenic streptococci and diseases caused by them. Bacteriological diagnosis of streptococcosis (morphology, cultural properties, bioassay).
10. Staphylococci and diseases caused by them. Bacteriological diagnosis of staphylococcosis. Differentiation of pathogenic staphylococci from non-pathogenic ones.
11. Laboratory diagnostics of porcine erysipelas. Specific prevention of the disease.
12. Laboratory diagnosis of listeriosis: bacteriological and serological. Specific prevention of the disease.
13. Laboratory diagnosis of pasteurellosis. Characteristics of the pathogen. Biologics.
14. Differential diagnosis of the causative agent of erysipelas and listeriosis.
15. Pyogenic rod-shaped microorganisms. Morphological and cultural properties. Basic differentiating tests.
16. Features of taking the patmaterial and conducting laboratory diagnostics for anthrax.
17. Differential diagnosis of the causative agent of anthrax and emphysematous carbuncle.
18. Characteristics of the causative agent of anthrax and its differentiation from anthracoids (anthrax-like microorganisms).
19. Biologics for the diagnosis, treatment and prevention of anthrax.
20. Pathogenic anaerobes and diseases caused by them. Features of taking patmaterial in anaerobic diseases and conducting backdiagnosis (environments and conditions).
21. Laboratory diagnosis of tetanus. Characteristics of the pathogen, biologics for treatment and prevention.
22. Laboratory diagnostics of botulism. Biologics for treatment and prevention.
23. Bacteriological diagnosis of emcar. Biologics for treatment and prevention.
24. Characteristics of the causative agent of necrobacteriosis. Conducting laboratory diagnostics. Biologics.

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.