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 of microbiology, virology and immunology

EDUCATIONAL WORK PROGRAM

for the discipline

«VIROLOGY»

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
on May 2, 2024.
Protocol No. 15
Head of the Department
Doctor of Biological Sciences, Professor
_____ A.A. Suchinin

Saint Petersburg
2024

1. AIMS AND OBJECTIVES OF THE DISCIPLINE

The purpose of the discipline: - mastery of the theoretical foundations of virology and the acquisition of knowledge and skills in the prevention and treatment of viral diseases in animals.

Objectives of the discipline: study of the biology of viruses and their interaction with the infected organism; formation of the main directions for diagnosing viral diseases of animals; knowledge of modern virological methods of laboratory diagnostics.

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

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

The education of the discipline should form the following competencies:

General professional competencies (GPC):

GPC -1 Is able to determine the biological status, normal clinical signs of organs and systems of the animal body.

GPC-1 ID-1 To know: safety precautions and personal hygiene rules during the examination of animals, methods of its fixation; schemes of clinical examination of an animal and the procedure for examination individual body systems; methodology for diagnosis of the pathological process.

GPC-1 ID-2 To be able to: collect and analyze anamnesis data, conduct laboratory and functional studies, necessary to determine the animal biological status.

GPC-1 ID-3 To possess practical skills: for conducting on its own a clinical examination of an animal, using classical research methods and digital technologies.

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 problems resolution in professional activity.

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

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

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

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

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

GPC-6 ID-3 To possess skills to: conduct identification procedures, select and implement measures that can be used to reduce the risk level.

GPC-7. Is able to understand the principles of modern information technologies and use them to solve professional tasks.

GPC-7 ID-1 To know: modern technical means and information technologies.

GPC-7 ID-2 To be able to: use modern technical means and information technologies, including elements of machine learning and artificial intelligence to solve analytical and research problems.
GPC-7 ID-3 To possess skills to: use modern technical means and information technologies to solve analytical and research problems.

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

The discipline B1.O.21 «VIROLOGY» according to the curriculum is a part formed by participants of educational process of the first block, it is mastered in full-time education in the 5th semester.

When teaching the discipline "Virology", the knowledge and skills acquired by students in mastering the disciplines are used - Cytology, histology and embryology, Biological physics, Inorganic and analytical chemistry, Inorganic chemistry, Analytical chemistry, Organic, Physical and colloid chemistry, Veterinary microbiology and mycology, Computer science and digital technologies. The discipline "Virology" is the basic one on which most subsequent disciplines are built, such as – Pathological physiology of animals, Animal physiology, Clinical diagnostics, Internal non-communicable diseases, Obstetrics and gynecology, Operative surgery with topographic anatomy, General and private surgery, Epizootology and infectious diseases animals, Veterinary radiobiology, Pathological anatomy of animals, Parasitology and invasive diseases of animals, Veterinary and sanitary examination.

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**	**Semester 5**
Classroom classes (total)	68	68
Including:		
Lectures, including interactive forms	34	34
Practical (PP), including interactive forms, among which are:	34	34
practical training (PT)	8	8
Self-study	76	76
Type of intermediate and final certification (credit, exam)	Exam	Exam
Total labor intensity hours	**144**	**144**
Credits	4	4

5. THE CONTENT OF THE DISCIPLINE AND TYPES OF CLASSES

5.1. The content of the discipline (full-time education)

#	The title	Achieved competences	Semester	Types of academic work, including students' self-study and labor intensity (in hours)			
				Lectures	Practical lessons	Practical training	Self-study
1.	Virology and its tasks. History of virology. Characteristics of the basic properties of viruses. Preservation of viruses in nature. Resistance of viruses to physical and chemical factors. Virus inactivation is complete and partial. Genetics and variability of viruses.	**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 problems resolution in professional activity. GPC-4 ID-2 To be able to: apply modern technologies and research methods in professional activities, interpret the results obtained. GPC-4 ID-3 To possess skills of: the work with specialized equipment for implementation of the set tasks for research and the development of new technologies, digital ones, as well. **GPC-7. Is able to understand the principles of modern information technologies and use them to solve professional tasks.** GPC-7 ID-1 To know: modern technical means and information technologies. GPC-7 ID-2 To be able to: use modern technical means and information technologies, including elements of machine learning and artificial intelligence to solve analytical and research problems. GPC-7 ID-3 To possess skills to: use modern technical means and information technologies to solve analytical and research problems.	5	4			6
2.	Morphology, chemical composition and antigenic structure of viruses.	**GPC -1 Is able to determine the biological status, normal clinical signs of organs and systems of the animal body.** GPC-1 ID-1 To know: safety precautions and personal hygiene rules during the examination of animals, methods of its fixation; schemes of clinical examination of an animal and the procedure for examination individual body systems;	5	4			6

	Classification of viruses. Reproduction (multiplication) of viruses. Main stages of reproduction. Types of interaction of viruses with cells. Antiviral immunity and its features.	methodology for diagnosis of the pathological process. GPC-1 ID-2 To be able to: collect and analyze anamnesis data, conduct laboratory and functional studies, necessary to determine the animal biological status. GPC-1 ID-3 To possess practical skills: for conducting on its own a clinical examination of an animal, using classical research methods and digital technologies.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 problems resolution in professional activity.** GPC-4 ID-2 To be able to: apply modern technologies and research methods in professional activities, interpret the results obtained. GPC-4 ID-3 To possess skills of: the work with specialized equipment for implementation of the set tasks for research and the development of new technologies, digital ones, as well. **GPC-7. Is able to understand the principles of modern information technologies and use them to solve professional tasks.** GPC-7 ID-1 To know: modern technical means and information technologies. GPC-7 ID-2 To be able to: use modern technical means and information technologies, including elements of machine learning and artificial intelligence to solve analytical and research problems. GPC-7 ID-3 To possess skills to: use modern technical means and information technologies to solve analytical and research problems.					
3.	Virology laboratory and its equipment. Safety precautions when working with viruses. Methods for purification and concentration of viruses.	**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 problems resolution in professional activity. GPC-4 ID-2 To 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	5	2	2		6

		implementation of the set tasks for research and the development of new technologies, digital ones, as well. **GPC-7. Is able to understand the principles of modern information technologies and use them to solve professional tasks.** GPC-7 ID-1 To know: modern technical means and information technologies. GPC-7 ID-2 To be able to: use modern technical means and information technologies, including elements of machine learning and artificial intelligence to solve analytical and research problems. GPC-7 ID-3 To possess skills to: use modern technical means and information technologies to solve analytical and research problems.					
4.	Rules for taking, sending, storing and preserving virus-containing material. Preparation of Pat. material for laboratory diagnosis of viral diseases. Laboratory diagnostic methods. The order and sequence of virological diagnostics (diagnostic scheme).	**GPC -1 Is able to determine the biological status, normal clinical signs of organs and systems of the animal body.** GPC-1 ID-1 To know: safety precautions and personal hygiene rules during the examination of animals, methods of its fixation; schemes of clinical examination of an animal and the procedure for examination individual body systems; methodology for diagnosis of the pathological process. GPC-1 ID-2 To be able to: collect and analyze anamnesis data, conduct laboratory and functional studies, necessary to determine the animal biological status. GPC-1 ID-3 To possess practical skills: for conducting on its own a clinical examination of an animal, using classical research methods and digital technologies.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 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 problems resolution in professional activity. GPC-4 ID-2 To be able to: apply modern technologies and research methods in professional activities, interpret the results obtained.	5	2	4		6

		GPC-4 ID-3 To possess skills of: the work with specialized equipment for implementation of the set tasks for research and the development of new technologies, digital ones, as well. **GPC-7. Is able to understand the principles of modern information technologies and use them to solve professional tasks.** GPC-7 ID-1 To know: modern technical means and information technologies. GPC-7 ID-2 To be able to: use modern technical means and information technologies, including elements of machine learning and artificial intelligence to solve analytical and research problems. GPC-7 ID-3 To possess skills to: use modern technical means and information technologies to solve analytical and research problems.					
5.	Methods for preparing preparations for microscopy. Conventional microscopy in virology. Electron microscopy. Introduction to the electron microscope and preparation techniques. Luminescence microscopy: fluorochromizatio n methods and fluorescent antibody method.	**GPC -1 Is able to determine the biological status, normal clinical signs of organs and systems of the animal body.** GPC-1 ID-1 To know: safety precautions and personal hygiene rules during the examination of animals, methods of its fixation; schemes of clinical examination of an animal and the procedure for examination individual body systems; methodology for diagnosis of the pathological process. GPC-1 ID-2 To be able to: collect and analyze anamnesis data, conduct laboratory and functional studies, necessary to determine the animal biological status. GPC-1 ID-3 To possess practical skills: for conducting on its own a clinical examination of an animal, using classical research methods and digital technologies.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 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 problems resolution in professional activity. GPC-4 ID-2 To be able to: apply modern technologies and research methods in professional activities, interpret the results obtained.	5	2	2	2	6

		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.					
6.	Methods for isolating viruses in laboratory animals. Methods for isolating (isolating) viruses in chicken embryos (CE). Structure, methods of infection and opening of EC. Collection of virus-containing material. Tissue cultures in virology (CT), types and methods of obtaining CT, infection of tissue cultures with viruses. Setting up and recording RGAd and RZGAd. Determination of the infectious activity of viruses according to Reed and Mench (virus titer).	**GPC -1 Is able to determine the biological status, normal clinical signs of organs and systems of the animal body.** GPC-1 ID-1 To know: safety precautions and personal hygiene rules during the examination of animals, methods of its fixation; schemes of clinical examination of an animal and the procedure for examination individual body systems; methodology for diagnosis of the pathological process. GPC-1 ID-2 To be able to: collect and analyze anamnesis data, conduct laboratory and functional studies, necessary to determine the animal biological status. GPC-1 ID-3 To possess practical skills: for conducting on its own a clinical examination of an animal, using classical research methods and digital technologies.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 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 problems resolution in professional activity. GPC-4 ID-2 To be able to: apply modern technologies and research methods in professional activities, interpret the results obtained. GPC-4 ID-3 To possess skills of: the work with specialized equipment for implementation of the set tasks for research and the development of new technologies, digital ones, as well. **GPC-6 Is able to analyze, identify and assess the risk danger of the occurrence and spread of the disease.** GPC-6 ID-1 To know: existing programs for the prevention and control of zoonosis, contagious diseases, emergent or newly emerging infections, the use of animal identification systems, trace and control by the relevant veterinary services.	5	2	2	2	8

		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.					
7.	Serological reactions in virology. Essence, components, purpose. Establishment and accounting of RGA, RZGA, RNGA, RID, RIEOF, RSK, RN. Practical application for the diagnosis of viral diseases. Modern diagnostic methods in virology: enzyme-linked immunosorbent assay (ELISA) and molecular genetic method (PCR).	**GPC -1 Is able to determine the biological status, normal clinical signs of organs and systems of the animal body.** GPC-1 ID-1 To know: safety precautions and personal hygiene rules during the examination of animals, methods of its fixation; schemes of clinical examination of an animal and the procedure for examination individual body systems; methodology for diagnosis of the pathological process. GPC-1 ID-2 To be able to: collect and analyze anamnesis data, conduct laboratory and functional studies, necessary to determine the animal biological status. GPC-1 ID-3 To possess practical skills: for conducting on its own a clinical examination of an animal, using classical research methods and digital technologies.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 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 problems resolution in professional activity. GPC-4 ID-2 To be able to: apply modern technologies and research methods in professional activities, interpret the results obtained. GPC-4 ID-3 To possess skills of: the work with specialized equipment for implementation of the set tasks for research and the development of new technologies, digital ones, as well. **GPC-7. Is able to understand the principles of modern information technologies and use them to solve professional tasks.** GPC-7 ID-1 To know: modern technical means and information technologies.	5	2	4	4	8

		GPC-7 ID-2 To be able to: use modern technical means and information technologies, including elements of machine learning and artificial intelligence to solve analytical and research problems. GPC-7 ID-3 To possess skills to: use modern technical means and information technologies to solve analytical and research problems.					
8.	Characteristics of viruses: infectious anemia (INAN), equine encephalitis, rinderpest and catarrhal fever viruses. foot and mouth disease, infectious rhinotracheitis (IRT), viral diarrhea, parainfluenza-3, res. sync. inf. Laboratory diagnostics. Biological products.	**GPC -1 Is able to determine the biological status, normal clinical signs of organs and systems of the animal body.** GPC-1 ID-1 To know: safety precautions and personal hygiene rules during the examination of animals, methods of its fixation; schemes of clinical examination of an animal and the procedure for examination individual body systems; methodology for diagnosis of the pathological process. GPC-1 ID-2 To be able to: collect and analyze anamnesis data, conduct laboratory and functional studies, necessary to determine the animal biological status. GPC-1 ID-3 To possess practical skills: for conducting on its own a clinical examination of an animal, using classical research methods and digital technologies.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-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. **GPC-7. Is able to understand the principles of modern information technologies and use them to solve professional tasks.** GPC-7 ID-1 To know: modern technical means and information technologies. GPC-7 ID-2 To be able to: use modern technical means and information	5	6	4		10

		technologies, including elements of machine learning and artificial intelligence to solve analytical and research problems. GPC-7 ID-3 To possess skills to: use modern technical means and information technologies to solve analytical and research problems.					
9.	Characteristics of viruses: leukemia, smallpox, influenza, Marek's disease, avian laryngotracheitis, chicken bronchitis, Newcastle disease, infectious bursal disease, SSIA-76 and avian tenosynovitis. Laboratory diagnostics. Biological products.	**GPC -1 Is able to determine the biological status, normal clinical signs of organs and systems of the animal body.** GPC-1 ID-1 To know: safety precautions and personal hygiene rules during the examination of animals, methods of its fixation; schemes of clinical examination of an animal and the procedure for examination individual body systems; methodology for diagnosis of the pathological process. GPC-1 ID-2 To be able to: collect and analyze anamnesis data, conduct laboratory and functional studies, necessary to determine the animal biological status. GPC-1 ID-3 To possess practical skills: for conducting on its own a clinical examination of an animal, using classical research methods and digital technologies.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-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. **GPC-7. Is able to understand the principles of modern information technologies and use them to solve professional tasks.** GPC-7 ID-1 To know: modern technical means and information technologies. GPC-7 ID-2 To be able to: use modern technical means and information technologies, including elements of machine learning and artificial intelligence to	5	4	4		10

		solve analytical and research problems. GPC-7 ID-3 To possess skills to: use modern technical means and information technologies to solve analytical and research problems.					
10.	Characteristics of viruses: Aujeszky's disease, classical and African swine fever, gastroenteritis and pneumonia of pigs, Teschen b., rabies, plasmacytosis (Aleutian disease), enteritis of minks and dogs, plague and hepatitis of carnivores. Laboratory diagnostics. Biological products.	**GPC -1 Is able to determine the biological status, normal clinical signs of organs and systems of the animal body.** GPC-1 ID-1 To know: safety precautions and personal hygiene rules during the examination of animals, methods of its fixation; schemes of clinical examination of an animal and the procedure for examination individual body systems; methodology for diagnosis of the pathological process. GPC-1 ID-2 To be able to: collect and analyze anamnesis data, conduct laboratory and functional studies, necessary to determine the animal biological status. GPC-1 ID-3 To possess practical skills: for conducting on its own a clinical examination of an animal, using classical research methods and digital technologies.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-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. **GPC-7. Is able to understand the principles of modern information technologies and use them to solve professional tasks.** GPC-7 ID-1 To know: modern technical means and information technologies. GPC-7 ID-2 To be able to: use modern technical means and information technologies, including elements of machine learning and artificial intelligence to	5	6	4		10

		solve analytical and research problems. GPC-7 ID-3 To possess skills to: use modern technical means and information technologies to solve analytical and research problems.					
TOTAL FOR THE SEMESTER:				**34**	**26**	**8**	**76**

6. THE LIST OF EDUCATIONAL AND METHODOLOGICAL SUPPORT FOR STUDENTS' SELF

6.1. Guidelines for independent work

1. Sukhinin A.A. Laboratory diagnosis of viral diseases: Textbook. / St. Petersburg, 2019.–124 p. (302 copies)

2. Ermakov, V.V. Virology and biotechnology (Virusology) [Electronic resource]: methodological instructions / V.V. Ermakov. - Samara: SamSAU, 2019. - 25 s / Access mode: https://e.lanbook.com/book/123533 (date of access: 04/27/2024).

6.2. Literature for independent work

1. Gosmanov R.G. Veterinary virology [Electronic resource]: textbook / R.G. Gosmanov, N.M. Kolychev, V.I. Pleshakova. — 5th ed., erased. — St. Petersburg: Lan, 2018. — 500 p. — ISBN 978-5-8114-1073-6 / Access mode: https://e.lanbook.com/book/105990 (access date: 04/27/2024).

2. Firsov G.M. Virology [Electronic resource]: textbook / Volgograd: Volgograd State Agrarian University, 2016. - 132 s / Access mode: https://e.lanbook.com/book/100790 (access date: 04/27/2024).

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

7.1. Basic literature

1. Baryshnikov, P. I. Laboratory diagnosis of viral animal diseases: textbook / P. I. Baryshnikov, V. V. Razumovskaya. — 2nd ed., rev. — St. Petersburg: Lan, 2021. — 672 p. — ISBN 978-5-8114-1882-4. — Text: electronic // Lan: electronic library system. — URL: https://e.lanbook.com/book/168804 (access date: 04/27/2024). — Access mode: for authorization. users.

2. Belousova R.V., Yarygina E.I., Tretyakova I.V. [and etc.]. Virology and biotechnology: textbook - 3rd ed., erased. - St. Petersburg: Lan, 2018. - 220 p. — ISBN 978-5-8114-2266-1 / Access mode: https://e.lanbook.com/book/103898 (access date: 04/27/2024).

3. Gosmanov, R. G. Veterinary virology: textbook / R. G. Gosmanov, N. M. Kolychev, V. I. Pleshakova. — 3rd ed., revised. and additional - St. Petersburg: Lan, 2010. - 480 p. — ISBN 978-5-8114-1073-6. — Text: electronic // Lan: electronic library system. — URL: https://e.lanbook.com/book/569 (access date: 04/27/2024). — Access mode: for authorization. users.

7.2. Additional literature

1. Private veterinary and sanitary microbiology and virology: textbook / R. G. Gosmanov, R. K. Ravilov, A. K. Galiullin [etc.]. — St. Petersburg: Lan, 2019. — 316 p. — ISBN 978-5-8114-3593-7. — Text: electronic // Lan: electronic library system. — URL: https://e.lanbook.com/book/116373 (access date: 04/27/2024). — Access mode: for authorization. users.

2. Virology and biotechnology: textbook / V. I. Pleshakova, N. M. Kolychev, R. G. Gosmanov, N. A. Lescheva. - Omsk: Omsk State Agrarian University, 2015. - 128 p. — ISBN 978-5-89764-471-1. — Text: electronic // Lan: electronic library system. — URL: https://e.lanbook.com/book/64848 (access date: 04/27/2024). — Access mode: for authorization. users.

3. Virology. Workshop: textbook / I. V. Tretyakova, M. S. Kalmykova, E. I. Yarygina, V. M. Kalmykov. — St. Petersburg: Lan, 2019. — 132 p. — ISBN 978-5-8114-3595-1. — Text: electronic // Lan: electronic library system. — URL: https://e.lanbook.com/book/116379 (access date: 04/27/2024). — Access mode: for authorization. users.

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

To prepare for laboratory classes and perform self-work, students can use the following online resources:

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" https://elibrica.com/

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/KJI
7	Android OS	free software

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

The title of the discipline (module), practice in accordance with the curriculum	The title of special rooms and rooms for self-work	Equipment of special rooms and rooms for self-work
B1.O.21 «VIROLOGY»	412 (196084, St. Petersburg, Chernigovskaya str., 5) Classroom for conducting seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification.	Specialized furniture: tables, chairs, boards, illustrative material in the form of computer presentations, posters, demonstration material on topics. Technical teaching aids: laptop, projector, screen, electrical connector for Internet access. Laboratory tables, medical laboratory metal cabinet, homogenizer, universal pH meter, comparator (Michaelis apparatus), magnetic stirrer, UV lamp, slides and cover glasses, alcohol burners , tank loops, tweezers, dye solutions, immersion oil rinsers with bridges, containers with disinfectant solutions, laboratory mixing device, biothermostat, Krotov apparatus, desiccator, microanaerostat, hot-air sterilizers of two different types, exhaust cabinet, water bath.
	422 (196084, St. Petersburg, Chernigovskaya st., 5) Classroom for conducting seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification.	Specialized furniture: tables, chairs, boards, illustrative material in the form of computer presentations, posters, demonstration material on topics. Technical teaching aids: laptop, projector, screen. Laboratory tables, medical laboratory metal cabinet, portable UVL lamp, slides and cover glasses, alcohol burners, loop tank, tweezers, dye solutions, immersion oil, rinsers with bridges, containers with disinfectant solutions, bottles for washing smears. Krotov apparatus, desiccator, microanaerostat, stands, test tubes with saline. solution. Device for filtration through ceramic candles, ceramic bacterial candles, microscopes, table lamps
	423 (196084, St. Petersburg, Chernigovskaya str., 5) Classroom for conducting seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification.	Specialized furniture: tables, chairs, boards, illustrative material in the form of computer presentations, posters, demonstration material on topics. Technical teaching aids: laptop, projector. Laboratory tables, medical metal laboratory cabinet, dry air sterilizer, microscopes, Koch apparatus, water bath, thermostat, slides and cover glasses, alcohol burners, tank hinges, tweezers, dye solutions, immersion oil rinses

		with bridges, containers with disinfectant solutions, homogenizer, thermostat
B1.O.21 «VIROLOGY»	424 (196084, St. Petersburg, Chernigovskaya str., 5) Classroom for conducting seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification.	Specialized furniture: tables, chairs, boards, illustrative material in the form of computer presentations, posters, demonstration material on topics. Technical teaching aids: laptop, projector. Laboratory tables, medical metal laboratory cabinet, dry air sterilizer, microscopes, Koch apparatus, water bath, thermostat, slides and cover glasses, alcohol burners, tank hinges, tweezers, dye solutions, immersion oil rinses with bridges, containers with disinfectant solutions, homogenizer, thermostat
	425 (196084, St. Petersburg, Chernigovskaya str., 5) Classroom for conducting seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification.	Specialized furniture: tables, chairs, boards, illustrative material in the form of computer presentations, posters, demonstration material on topics. Technical teaching aids: laptop, projector. Laboratory tables, medical metal laboratory cabinet, dry air sterilizer, microscopes, Koch apparatus, water bath, thermostat, slides and cover glasses, alcohol burners, tank hinges, tweezers, dye solutions, immersion oil rinses with bridges, containers with disinfectant solutions, homogenizer, thermostat
	418 (washing room) room for preventive maintenance of equipment.	Household electric stove, electric water heater, laboratory tables, stands for drying test tubes, a stand for drying dishes, a cabinet for storing detergents and disinfectants, metal sterilizers, a trash can.
	419 autoclave	Steam sterilizers VK-75PT – 2 pcs., laboratory table for storing bins and stands.
	206 Large reading room (196084, St. Petersburg, Chernigovskaya str., 5) Room for self-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, Chernigovskaya str., 5) Room for self-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, Chernigovskaya str., 5) Room for storage and preventive maintenance of educational equipment	*Specialized furniture: tables,* chairs, special equipment, materials and spare parts for preventive maintenance of technical training facilities
	Box No. 3 Carpentry workshop (196084, St. Petersburg, Chernigovsaya str., 5) Room for storage and preventive maintenance of educational equipment	*Specialized furniture: tables,* chairs, special equipment, materials and spare parts for preventive maintenance of technical training facilities

Developers:

Associate Professor of the Department of microbiology, virology and immunology, Candidate of Veterinary Sciences

Pankratov S.V.

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

«VIROLOGY»

Specialty 05.36.01 Veterinary medicine
Full-time education.

Education starts in 2024

Saint Petersburg
2024

1. PASSPORT OF THE FUND OF ASSESMENT TOOLS

#	Acquired competence	Assessed modules of a discipline	Assesment tool
1	**GPC -1 Is able to determine the biological status, normal clinical signs of organs and systems of the animal body.** GPC-1 ID-1 To know: safety precautions and personal hygiene rules during the examination of animals, methods of its fixation; schemes of clinical examination of an animal and the procedure for examination individual body systems; methodology for diagnosis of the pathological process. GPC-1 ID-2 To be able to: collect and analyze anamnesis data, conduct laboratory and functional studies, necessary to determine the animal biological status. GPC-1 ID-3 To possess practical skills: for conducting on its own a clinical examination of an animal, using classical research methods and digital technologies. **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 problems resolution in professional activity. GPC-4 ID-2 To be able to: apply modern technologies and research methods in professional activities, interpret the results obtained. GPC-4 ID-3 To possess skills of: the work with specialized equipment for implementation of the set tasks for research and the development of new technologies, digital ones, as well. **GPC-6 Is able to analyze, identify and assess the risk danger of the occurrence and spread of the disease.**	Virology and its tasks. History of virology. Characteristics of the basic properties of viruses. Preservation of viruses in nature. Resistance of viruses to physical and chemical factors. Virus inactivation is complete and partial. Genetics and variability of viruses.	Seminar, Test
2.		Morphology, chemical composition and antigenic structure of viruses. Classification of viruses. Reproduction (multiplication) of viruses. Main stages of reproduction. Types of interaction of viruses with cells.	Seminar, Test
3		Antiviral immunity and its features.	Seminar, Test
4		Virology laboratory and its equipment. Safety precautions when working with viruses. Methods for purification and concentration of viruses.	Seminar, Test
5		Rules for taking, sending, storing and preserving virus-containing material. Preparation of Pat. material for laboratory diagnosis of viral diseases. Laboratory diagnostic methods. The order and sequence of virological diagnostics (diagnostic scheme).	Seminar, Test
6		Methods for preparing preparations for microscopy. Conventional microscopy in virology. Electron microscopy. Introduction to the electron microscope and preparation techniques. Luminescence microscopy:	Seminar, Test

	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. **GPC-7. Is able to understand the principles of modern information technologies and use them to solve professional tasks.** GPC-7 ID-1 To know: modern technical means and information technologies. GPC-7 ID-2 To be able to: use modern technical means and information technologies, including elements of machine learning and artificial intelligence to solve analytical and research problems. GPC-7 ID-3 To possess skills to: use modern technical means and information technologies to solve analytical and research problems.	fluorochromization methods and fluorescent antibody method.	
7		Methods for isolating viruses in laboratory animals. Methods for isolating (isolating) viruses in chicken embryos (CE). Structure, methods of infection and opening of EC. Collection of virus-containing material. Tissue cultures in virology (CT), types and methods of obtaining CT, infection of tissue cultures with viruses. Setting up and recording RGAd and RZGAd. Determination of the infectious activity of viruses according to Reed and Mench (virus titer).	Seminar, Test
8		Serological reactions in virology. Essence, components, purpose. Establishment and accounting of RGA, RZGA, RNGA, RID, RIEOF, RSK, RN. Practical application for the diagnosis of viral diseases. Modern diagnostic methods in virology: enzyme-linked immunosorbent assay (ELISA) and molecular genetic method (PCR).	Seminar, Test
9.		Characteristics of viruses: infectious anemia (INAN), equine encephalitis, rinderpest and catarrhal fever viruses. foot and mouth disease, infectious rhinotracheitis (IRT), viral diarrhea, parainfluenza-3, res. sync. inf. Laboratory diagnostics. Biological products.	Seminar, Test

10.		Characteristics of viruses: leukemia, smallpox, influenza, Marek's disease, avian laryngotracheitis, chicken bronchitis, Newcastle disease, infectious bursal disease, SSIA-76 and avian tenosynovitis. Laboratory diagnostics. Biological products.	

List of assessment tools

№	Name of the assessment tool	Brief description of the assesment tool	Presentation of the assessment tool in the fund
1.	Seminar	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

1. 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 -1 Is able to determine the biological status, normal clinical signs of organs and systems of the animal body.					
GPC-1 ID-1 To know: safety precautions and personal hygiene rules during the examination of animals, methods of its fixation; schemes of clinical examination of an animal and the procedure for examination individual body systems; methodology for diagnosis of the pathological process.	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	Seminar, Test
GPC-1 ID-2 To be able to: collect and analyze anamnesis data, conduct laboratory and functional studies, necessary to determine the animal biological status.	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	Seminar, Test
GPC-1 ID-3 To possess practical skills: for conducting on its own a clinical examination of an animal, using classical research methods and digital technologies.	When solving standard problems basic skills were not demonstrated,	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	Seminar, Test

	gross errors occurred				
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 problems resolution in professional activity.	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	Seminar, Test
GPC-4 ID-2 To 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	Seminar, Test
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.	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	Seminar, Test
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.	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	Seminar, Test
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.	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	Seminar, Test
GPC-6 ID-3 To possess skills to: conduct identification procedures, select and implement measures that can be used to reduce the risk level.	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	Seminar, Test
GPC-7. Is able to understand the principles of modern information technologies and use them to solve professional tasks.					
GPC-7 ID-1 To know: modern technical means and information technologies.	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	Seminar, Test

GPC-7 ID-2 To be able to: use modern technical means and information technologies, including elements of machine learning and artificial intelligence to solve analytical and research problems.	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	Seminar, Test
GPC-7 ID-3 To possess skills to: use modern technical means and information technologies to solve analytical and research problems.	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	Seminar, Test

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 Test-questions

GPC -1 Is able to determine the biological status, normal clinical signs of organs and systems of the animal body.

GPC-1 ID-1 To know: safety precautions and personal hygiene rules during the examination of animals, methods of its fixation; schemes of clinical examination of an animal and the procedure for examination individual body systems; methodology for diagnosis of the pathological process.

1. Structure of a virology laboratory. Operating mode.
2. Technical support for the virology laboratory and safety precautions when working with viruses.
3. Taking, sending and preparing pathological material for virological research.

GPC-1 ID-2 To be able to: collect and analyze anamnesis data, conduct laboratory and functional studies, necessary to determine the animal biological status.

4. General characteristics of viruses.
5. Properties of viruses.
6. Methods for diagnosing infectious diseases.
7. Laboratory methods for diagnosing viral diseases.

GPC-1 ID-3 To possess practical skills: for conducting on its own a clinical examination of an animal, using classical research methods and digital technologies.

8. Microscopic research method. Conventional and microscopy.
9. Microscopic research method. Electron microscopy.
10. Luminescence microscopy, MF.
11. Luminescence microscopy, MFA.

5. The essence and methods of processing preparations for fluorescent microscopy.

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 problems resolution in professional activity.

1. The structure of a light microscope.
2. The structure of a fluorescent microscope.
3. The structure of an electron microscope.

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

4. Enzyme-linked immunosorbent assay (ELISA) in disease diagnostics.
5. Polymerase chain reaction in disease diagnostics.

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

6. Virological method for diagnosing viral diseases.
7. Serological method for diagnosing viral diseases.
8. Molecular biological method for diagnosing viral diseases.

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.

9. The importance of viruses in nature and human life.
10. Subject, tasks of virology, its connection with other biological disciplines.
11. Achievements and prospects for the development of modern virology.

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.

12. Biological method. Goals and methods of infection of laboratory models.
13. Tissue and cell culture. Classification of tissue cultures. Methods for obtaining tissue cultures.
14. Use of cell cultures to study viruses; primary trypsinized, semi-transferable and continuous cultures, growth and maintenance nutrient media; isolation of viruses in cell culture.
15. Methods for infecting tissue cultures with viruses. The concept of CPD of viruses.
16. Indication of viruses in cell culture
17. Intracellular inclusions, cytopathological effect of viruses, plaque formation, interference phenomenon.

GPC-6 ID-3 To possess skills to: conduct identification procedures, select and implement measures that can be used to reduce the risk level.

18. Discovery of the main groups of viruses (works of D.I. Ivanovsky, M. Beyerinck, W. Stanley, F. Leffler and P. Frosch, P. Routh, F. Twort, F. d'Herelle).
19. Definition of the concept of "virus", variety of viruses, principles of classification of animal and plant viruses.
20. Basic properties of viruses.

GPC-7. Is able to understand the principles of modern information technologies and use them to solve professional tasks.

GPC-7 ID-1 To know: modern technical means and information technologies.

21. Spread of viruses, vertical transmission, horizontal transmission (pathways, mechanisms, examples).
22. Features of the epidemiology of viral infections, sources of infection.
23. Paths of penetration of viruses, classification of viral infections, epidemic process.
24. Use of bacteriophages. Titration of bacterial viruses.
25. Cellular and organismal stages of viral pathogenesis, spread of viruses in the host body and tropism to certain tissues, viremia, cytopathic effect induced by the virus in cells.

GPC-7 ID-2 To be able to: use modern technical means and information technologies, including elements of machine learning and artificial intelligence to solve analytical and research problems.

26. Reaction of hemagglutination and hemadsorption.
27. Structure of a chicken embryo (picture).
28. Methods of infecting a chicken embryo.
29. Titration of viruses. Virus titer and method for determining virus titer. Virus titer units.
30. Serological methods in virology.
31. Types and essence of serological reactions for virological studies.
32. Identification of viruses in the neutralization reaction. Detection of virus-neutralizing antibodies in blood serum.

GPC-7 ID-3 To possess skills to: use modern technical means and information technologies to solve analytical and research problems.

33. Virion structure;
34. Functions of protein structures of virions (receptor functions of proteins, outer membranes, enzymatic proteins of virions, matrix proteins, F-proteins).
35. Lipids and carbohydrates of viruses.
36. Interaction of proteins and nucleic acids during packaging of viral genomes
37. Types and principles of symmetry of viruses, examples of viruses with different types of symmetry.
38. The structure of complex viruses (bacteriophages, ortho- and paramyxoviruses, rhabdoviruses, retroviruses, togaviruses, vaccinia virus).

Test

GPC -1 Is able to determine the biological status, normal clinical signs of organs and systems of the animal body.

GPC-1 ID-1 To know: safety precautions and personal hygiene rules during the examination of animals, methods of its fixation; schemes of clinical examination of an animal and the procedure for examination individual body systems; methodology for diagnosis of the pathological process.

1. How many genes do animal and bird viruses have?
1. 500-1000;
2. 1-3;
3. 1000-10000;
4. 6 - 150 depending on the type of virus.

2. How is the nucleotide sequence of the genome of viruses determined?
1. Serological reactions;
2. Bioassay;
3. Genome sequencing;
4. Electron microscopy.

3. How are influenza virus serotypes determined?
1. Neutralization reaction;
2. Genome sequencing;
3. Hemagglutination delay reaction;
4. Enzyme immunoassay.

4. What type of capsid symmetry is characteristic of club-shaped viruses?
1. Linear;
2. Icosahedral;
3. Combined;
4. Spiral.

5. Where are inclusion bodies located in cells infected with the smallpox virus?
1. In the core;
2. In the cytoplasm;
3. On the nuclear membrane;
4. In the cell wall.

6. What type of capsid symmetry is characteristic of rod-shaped viruses?
1. Globular;

2. Icosahedral;
3. Club-shaped;
4. Spiral.

7. What type of capsid symmetry is characteristic of isometric viruses?
1. Bullet-shaped;
2. Icosahedral;
3. Club-shaped;
4. Spiral.

8. Where are antigens located in viruses without a supercapsid?
1. On the lipoprotein membrane;
2. On DNA or RNA;
3. In the nucleus and cytoplasm of the cell;
4. On the capsid.

9. Where are protective antigens located in viruses with a supercapsid envelope?
1. On the lipoprotein membrane;
2. On DNA or RNA;
3. In the nucleus and cytoplasm of the cell;
4. On the nucleocapsid.

10. What material is sent to the laboratory for diagnosing rabies?
1. Blood;
2. Head;
3. Spleen.
4. Lymph nodes.

11. How does infection with the rabies virus occur?
1. Nutritional;
2. By airborne droplets;
3. When bitten by sick animals;
4. By transmission.

12. What property of viruses is taken into account when selecting pathological material for laboratory research?
1. Type of nucleic acid;
2. Tissue tropism;
3. Reproduction;
4. Structure of the virus.

13. How are infectious diseases diagnosed?
1. Comprehensively, with confirmation by laboratory methods;
2. Based on clinical signs;
3. Based on pathomorphological changes;
4. Based on epizootic data.

GPC-1 ID-2 To be able to: collect and analyze anamnesis data, conduct laboratory and functional studies, necessary to determine the animal biological status.
14. What solution is used to preserve pathological material for virological studies?
1. Sodium citrate;
2. 30-50% solution of chemically pure glycerin;

3. 70% alcohol;
4. 10% formaldehyde solution.

15. Which family includes the feline panleukopenia virus and mink enteritis virus?
1. Poxviridae;
2. Adenoviridae;
3. Herpesviridae;
4. Parvoviridae.

16. What methods are used to detect the titer of antiviral antibodies?
1. Serological;
2. Bacterioscopic;
3. PCR;
4. Virological.

17. What intracellular inclusion bodies are formed during infectious laryngotracheitis of birds?
1. Seyfried corpuscles;
2. Taurus Babeshi-Negri;
3. Pashen's corpuscles;
4. Lentz corpuscles.

18. Which virus has surface antigens hemagglutinin and neuraminidase?
1. Influenza virus;
2. Chicken infectious larengotracheitis virus;
3. Chicken infectious bronchitis virus;
4. Rabies virus.

19. What determines the tissue tropism of viruses?
1. The presence of special enzymes;
2. Specificity of receptors;
3. Cell proliferation;
4. Lack of cell proliferation.

20. Which version of the indirect hemagglutination reaction is correct?
1. With erythrocyte diagnosticum;
2. In microplates with adsorbed antibodies;
3. In microplates with adsorbed antigens;
4. On cell cultures.

21. What biological model is used to set up the hemadsorption reaction?
1. Laboratory animals;
2. Bacterial culture;
3. Chicken embryos;
4. Cell culture.

22. What is used as a sensitive biological model when performing a neutralization reaction?
1. Cell cultures;
2. Red blood cells;
3. Bacterial culture;
4. Bacteriophages.

23. Which reaction is NOT serological?

1. RNGA;
2. RGA;
3. RZGA;
4. RN.

24. What type of inclusion bodies are usually formed by DNA-containing viruses?
1. Intracytoplasmic;
2. Intranuclear;
3. Extracellular;
4. Membrane.

25. What type of inclusion bodies are usually formed by RNA viruses?
1. Cytoplasmic;
2. Intranuclear;
3. Extracellular;
4. Membrane.

26. What type of viral inclusion bodies is detected in rabies?
1. Taurus Babesh-Negri;
2. Taurus Rubart;
3. Intranuclear;
4. Lentz corpuscles.

GPC-1 ID-3 To possess practical skills: for conducting on its own a clinical examination of an animal, using classical research methods and digital technologies.

27. What reaction is used to determine the presence of antibodies in viral diseases?
1. Agglutination reaction;
2. Hemagglutination reaction;
3. Enzyme immunoassay;
4. PCR.

28. Which reaction allows you to determine the titer of antibodies ONLY to hemagglutinating viruses?
1. Agglutination reaction;
2. Hemagglutination reaction;
3. Hemagglutination inhibition reaction;
4. Hemadsorption reaction.

29. Which reaction is used only to indicate the virus and is indicative?
1. Agglutination reaction;
2. Hemagglutination reaction;
3. Hemagglutination inhibition reaction;
4. Neutralization reaction.

30. What biological material is used to determine antibodies?
1. Blood serum;
2. Tubular bone;
3. Brain;
4. Intestines with contents.

31. What serological reaction is used to diagnose Aleutian mink disease?
1. Neutralization reaction;

2. Hemagglutination reaction;
3. Hemagglutination inhibition reaction;
4. Immunoelectroosmophoresis reaction.

32. What molecular biological method is used to detect and identify the virus?
1. The reaction is not direct hemagglutination;
2. Diffuse precipitation reaction;
3. Enzyme immunoassay;
4. Polymerase chain reaction.

33. What indicates a positive result when taking into account the reaction of diffuse precipitation?
1. Precipitation band;
2. Erythrocyte sedimentation;
3. Hemolysis of red blood cells;
4. Formation of flakes.

34. What indicates a positive result when taking into account the immune fluorescence reaction?
1. Precipitation band;
2. Glow;
3. Hemolysis of red blood cells;
4. Formation of flakes.

35. What indicates a positive result when considering an enzyme immunoassay?
1. Precipitation band;
2. Erythrocyte sedimentation;
3. Hemolysis of red blood cells;
4. Change in substrate color.

36. What indicates a positive result when taking into account the complement fixation reaction?
1. Precipitation band;
2. Erythrocyte sedimentation;
3. Hemolysis of red blood cells;
4. Formation of flakes.

37. Who first prepared the rabies vaccine?
1. Pasteur;
2. Gamaleya;
3. Ivanovsky;
4. Mechnikov.

38. How to pre-prepare material for virological research?
1. Treat with alkali solution;
2. Wash off the preservative;
3. Warm up at a temperature of 80°C;
4. Flame.

39. What method is used to take into account the hemadsorption reaction?
1. Light microscopy;
2. Luminescent microscopy;
3. Visually;
4. Electron microscopy.

40. What sign shows the effectiveness of virus infection of chicken embryos?
1. Death of embryos;
2. Change in shell color;
3. Violation of the integrity of the shell;
4. Enlargement of the air chamber.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 problems resolution in professional activity.
1. What type of preparations are prepared for electron microscopy?
1. Strokes-imprints;
2. Strokes;
3. Ultrathin histological sections;
4. Infected cell culturea.

2. What form of existence of viruses is absent?
1. Intracellular;
2. Extracellular;
3. Provirus;
4. Intercellular.

3. What main property characterizes viruses of the Retroviridae family?
1. Reproduction in the cell nucleus;
2. Reproduction outside the cell;
3. The presence of the enzyme reversetase;
4. Lack of supercapsid.

4. What serological reaction is used to diagnose leukemia in cattle?
1. Neutralization reaction;
2. Complement fixation reaction;
3. Hemadsorption delay reaction;
4. Diffuse precipitation reaction.

5. What serological reaction is used to determine the serotype of the African swine fever virus?
1. Neutralization reaction;
2. Complement fixation reaction;
3. Hemadsorption delay reaction;
4. Diffuse precipitation reaction.

6. Why is the neutralization reaction not used to identify the Aleutian mink disease virus?
1. Complexity and duration of the production;
2. There are no virus-neutralizing antibodies;
3. Is uninformative;
4. Expensive.

7. What component is needed to perform an indirect hemagglutination reaction?
1. Erythrocyte diagnosticum;
2. Path material;
3. 2% suspension of red blood cells;
4. Virus-containing liquid.

8. What DNA-containing viruses carry out the reproduction cycle in the cytoplasm of an infected cell?
1. Herpesviridae;
2. Adenoviridae;
3. Poxviridae;
4. Parvoviridae.

9. What living objects contain only one nucleic acid, RNA or DNA?
1. Bacteria;
2. Viruses;
3. Chlamydia;
4. Mycoplasmas.

10. What virus causes the formation of Babes-Negri inclusion bodies in neurons?
1. Foot and mouth disease;
2. Rabies;
3. Aujeszki;
4. Plagues of carnivores.

11. What type of reproduction is typical for viruses?
1. Disjunctive;
2. Vegetative;
3. Sexual;
4. Asexual.

12. How does the cytopathogenic effect (CPE) of the virus manifest itself?
1. Increasing cell growth;
2. Morphological and degenerative changes in cells;
3. Slowing cell growth;
4. Cell reproduction.

13. Who is the founder of virology?
1. L. Pasteur;
2. R. Koch;
3. D.I. Ivanovsky;
4. A. Van Leeuwenhoek.

GPC-4 ID-2 To be able to: apply modern technologies and research methods in professional activities, interpret the results obtained.
14. Which of the following staining methods is used to detect Babes Negri bodies in neurons?
1. According to Muromtsev;
2. According to Ziehl-Neelsen;
3. According to Gram;
4. According to Kozlovsky.

15. How can the presence of a virus be detected in an infected cell culture?
1. Hemadsorption reaction (RHAd);
2. To enhance cell growth;
3. By slowing down cell growth;
4. By lack of cell growth.

16. Which enzyme ensures the completion of the complementary DNA strand?
3. 1.Trypsin;
4. DNA polymerase;
5. Catalase;
6. Protease.

17. What can PCR detect?
1. Protein;
2. ATP;
3. DNA or RNA;
4. Enzymes.

18. Which PCR components are used to complete the complementary DNA strand?
1. Nucleotides;
2. Proteins;
3. Lipids;
4. Carbohydrates.

19. How many amplification cycles are performed when performing PCR?
1. 3-4;
2. 30-40;
3. 300-400;
4. 3000-4000.

20. What type of rays is used in a regular microscope for microscopy of specimens?
1. Light waves;
2. Cathode rays (electron beam);
3. Infrared rays;
4. Ultraviolet rays.

21. What is the maximum resolution of an electron microscope?
1. 0.2 nm;
2. 0.2 microns;
3. 20 microns;
4. 0.2 mm.

22. What type of equipment can detect intracellular viral inclusion bodies?
1. Light microscope;
2. Fluorescence microscope;
3. Electron microscope;
4. Reader (spectrophotometer).

23. What type of equipment allows you to study the morphology of the virion?
1. Light microscope;
2. Fluorescence microscope;
3. Electron microscope;
4. Centrifuge.

24. What type of equipment is used in the fluorochrome plating method?
1. Light microscope;
2. Fluorescence microscope;
3. Thermostat;

4. Centrifuge.

25. What equipment ensures the sequential occurrence of the processes of denaturation, annealing and elongation when performing PCR?
1. Incubator;
2. Amplifier;
3. Electron microscope;
4. Centrifuge.

26. What equipment is used for long-term storage of virus-containing material?
1. Domestic refrigerators;
2. Thermostats;
3. Low temperature refrigerators;
4. Incubators.

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.
27. What equipment is used for cultivating viruses in embryos and cell cultures?
1. Domestic refrigerators;
2. Thermostats;
3. Low temperature refrigerators;
4. Centrifuges.

28. What method of staining preparations is used when performing electron microscopy?
1. Negative contrast;
2. Use of aniline dyes;
3. Use of fluorescent dyes;
4. All proposed options.

29. What equipment is used to record the results of the immune fluorescence reaction (IFA)?
1. Light microscope;
2. Fluorescence microscope;
3. Electron microscope;
4. Reader (spectrophotometer).

30. What equipment is used to record the results of enzyme-linked immunosorbent assay (ELISA)?
1. Light microscope;
2. Fluorescence microscope;
3. Electron microscope;
4. Reader (spectrophotometer).

31. What type of interaction between viruses and cells does not exist?
1. Disjunctive;
2. Productive;
3. Abortive;
4. Integrative.

32. How is the productive type of interaction between a virus and a cell characterized?
1. Interruption of the infectious process;
2. Incorporation of viral DNA into the cell genome;
3. Formation of transfer RNA;

4. Formation of a new generation of virions.

33. How is the integrative type of interaction between a virus and a cell characterized?
1. Interruption of the infectious process;
2. Incorporation of viral DNA into the cell genome;
3. Formation of a new generation of virions;
4. Incorporation of viral RNA.

34. How is the abortive type of virus-cell interaction characterized?
1. Interruption of the infectious process;
2. Incorporation of viral DNA into the cell genome;
3. Formation of a new generation of virions;
4. Incorporation of viral RNA.

35. How are simple viruses characterized?
1. Capsid;
2. Nucleoid + capsid + supercapsid;
3. Nucleoid + capsid;
4. Nucleoid.

36. How are complex viruses characterized?
1. Capsid;
2. Nucleoid + capsid + supercapsid;
3. Nucleoid + capsid;
4. Nucleoid.

37. What are the structural subunits of the capsid?
1. Lipids;
2. Capsomeres;
3. Polysaccharides;
4. Lipopolysaccharides.

38. What cell cultures are obtained from primary trypsinized ones?
1. Primary trypsinized;
2. Subcultures;
3. Diploid;
4. Leanable.

39. Which cell cultures do NOT have a limit to growth and reproduction?
1. Primary trypsinized;
2. Subcultures;
3. Diploid;
4. Leanable.

40. Which cell cultures can be transported no more than 50 times?
1. Primary trypsinized;
2. Subcultures;
3. Diploid;
4. Leanable.

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.

1. Which animal virus is classified as DNA-containing?
1. Aujeszky's disease
2. Flu;
3. Rabies;
4. Classical swine fever.

2. Which animal virus is classified as RNA-containing?
1. Aujeszky's disease
2. Smallpox;
3. Rabies;
4. African swine fever.

3. What is the main serological reaction used to identify foot and mouth disease virus?
1. Hemagglutination delay reaction;
2. Complement fixation reaction;
3. Hemadsorption delay reaction;
4. Immunoelectroosmophoresis reaction.

4. What is the main serological reaction used to identify the influenza virus?
1. Hemagglutination delay reaction;
2. Complement fixation reaction;
3. Immune diffusion reaction;
4. Immunoelectroosmophoresis reaction.

5. What is the main serological reaction used to identify the rabies virus?
1. Hemagglutination delay reaction;
2. Complement fixation reaction;
3. Immune diffusion reaction;
4. Immunoelectroosmophoresis reaction.

6. How is the virus identified?
1. Infection of laboratory models;
2. Setting up serological reactions;
3. Light microscopy;
4. Electron microscopy.

7. How are specific antibodies detected in blood serum?
1. Infection of laboratory models;
2. Light microscopy;
3. Setting up serological reactions;
4. Electron microscopy.

8. Which avian virus is classified as DNA-containing?
1. Reduced egg production syndrome -76;
2. Avian influenza;
3. Aujeszky's disease;
4. Rabies.

9. What avian viruses are classified as RNA-containing?

1. Reduced egg production syndrome -76;
2. Infectious bursal disease;
3. Marek's disease;
4. Turkey herpes.

10. How are plague and hepatitis viruses of carnivores differentiated?
1. According to clinical signs;
2. According to pathological changes;
3. Reaction of delay (inhibition) of hemagglutination;
4. Electron microscopy is used.

11. Where are inclusion bodies located in virus-infected cells?
1. On the nuclear membrane
2. In the cell wall;
3. In the nucleus or cytoplasm;
4. On the cell wall.

12. How can control be ensured to prevent the spread of the rabies pathogen?
1. Vaccination of domestic animals;
2. Mass destruction of wild animals;
3. Disinsection;
4. Treatment of animals with rabies.

13. What symptoms are characteristic of rabies?
1. Photophobia, hydrophobia;
2. Regularity of the tail;
3. Retraction of the abdominal muscles (wasp waist);
4. Crepitant swelling of muscles.

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.
14. What viral disease can be assumed when Babes-Negri bodies are detected in brain cells?
1. Bird pox;
2. Plague of carnivores;
3. Infectious bronchitis of chickens;
4. Rabies.

15. What family does the rabies virus belong to?
1. Rhabdoviridae;
2. Coronaviridae;
3. Adenoviridae;
4. Parvoviridae.

16. What family does the foot and mouth disease virus belong to?
1. Rhabdoviridae;
2. Coronaviridae;
3. Adenoviridae;
4. Picornaviridae.

17. What phenomenon of viruses is called hemagglutination?
1. Lyse red blood cells;

2. Adsorb on red blood cells;
3. "Glue" red blood cells;
4. Change the shape of red blood cells.

18. What is the name of the protein shell of the virus?
1. Nucleoid;
2. Capsid;
3. Polymerase;
4. Ash meter.

19. Which family of viruses contains the enzyme RNA-dependent DNA polymerase within virions?
1. Rhabdoviridae;
2. Coronaviridae;
3. Adenoviridae;
4. Retroviridae.

20. What is determined when performing a hemagglutination reaction?
1. Antibody titer;
2. Virus titer for hemagglutinating action;
3. Virus serotype;
4. Number of red blood cells.

21. How many hemagglutinating viral units (HAUs) are used to perform the hemagglutination inhibition reaction (HAI)?
eleven;
2. 2;
3. 3;
4. 4.

22. What result is positive when accounting for DSC?
1. Precipitation;
2. Agglutination;
3. Hemolysis;
4. No hemolysis.

23. Which of the following reactions is not serological?
1. RSK;
2. RGAd;
3. RN;
4. RNGA.

24. What does a negative result of an indirect hemagglutination test (IHA) look like?
1. A sediment of erythrocytes in the form of an "umbrella";
2. Sediment of red blood cells in the form of a "button";
3. Agglutinate flakes;
4. Hemolysis.

25. What laboratory diagnostic method allows a retrospective diagnosis to be made?
1. Serological;
2. Virological;
3. Molecular biological;

4. Histological.

26. What is a specific means of preventing viral diseases?
1. Vaccinal prevention;
2. Antibiotic therapy;
3. Symptomatic therapy;
4. Use of bacteriophages.

GPC-6 ID-3 To possess skills to: conduct identification procedures, select and implement measures that can be used to reduce the risk level.

27. What family does the chicken leukemia virus include?
1. Rhabdoviridae;
2. Coronaviridae;
3. Flaviviridae;
4. Retroviridae.

28. What reaction makes it possible to detect a virus by the presence of nucleic acid?
1. Polymerase chain reaction;
2. Hemagglutination reaction;
3. Enzyme immunoassay;
4. Immune fluorescence reaction.

29. Which reaction is based on the use of antibodies labeled with fluorescent dyes?
1. Polymerase chain reaction;
2. Hemagglutination reaction;
3. Enzyme immunoassay;
4. Immune fluorescence reaction.

30. What serological reaction is based on the use of the hemagglutinating properties of the virus?
1. Agglutination reaction;
2. Enzyme immunoassay;
3. Polymerase chain reaction;
4. Hemagglutination inhibition reaction.

31. Which reaction is based on the use of antibodies labeled with enzymes?
1. Polymerase chain reaction;
2. Hemagglutination reaction;
3. Enzyme immunoassay;
4. Immune fluorescence reaction.

32. How are the average effective doses expressed when determining the infectious activity of a virus in a cell culture?
1. ID50;
2. LD50;
3. EID50;
4. TCD50.

33. What criterion is taken into account when determining the average lethal dose (LD50) of the virus?
1. Death of animals;
2. Clinical signs;
3. Pathomorphological signs;

4. Presence of hemagglutinin.

34. What dilutions are prepared to determine the infectious activity of the virus?
1. Single use;
2. Double;
3. Fivefold;
4. Tenfold.

35. At what age are embryos used to inject the virus into the yolk sac?
1. 5-7 days;
2. 8-10 days;
3. 13-14 days;
4. 17-18 days.

36. At what age are embryos used to infect the chorion-allantoic membrane with a virus?
1. 5-7 days;
2. 8-10 days;
3. 11-12 days;
4. 15-17 days.

37. What family do influenza viruses belong to?
1. Orthomyxoviruses;
2. Rhabdoviruses;
3. Retroviruses;
4. Adenoviruses.

38. What viral disease is considered a zooanthroponosis?
1. Marek's disease;
2. African swine fever (ASF);
3. Rabies;
4. Gumboro disease.

39. What type of nucleic acid do adenoviruses contain?
1. Single-stranded RNA;
2. Double-stranded DNA;
3. Fragmented RNA;
4. Double-stranded RNA.

40. Where does the reproduction of viruses of the Paramyxoviridae family occur?
1. In the core.
2. In mitochondria;
3. In the nucleus and cytoplasm;
4. In the cytoplasm.

GPC-7. Is able to understand the principles of modern information technologies and use them to solve professional tasks.

GPC-7 ID-1 To know: modern technical means and information technologies.

1. What signs distinguish viruses from living things?
1. Gram-variable;
2. Contain one type of nucleoside;
3. Requires nutrients;

4. Nucleus limited by cytoplasm.

2. How do viruses structure themselves?

1. Nucleus limited by cytoplasm;
2. Contain one type of nucleoside and protein;
3. No cellular walls;
4. Contain murine cells;

3. How do viruses characterize themselves?

1. Non-cultivating forms Bakteriy; Filmyushchiyesya Formy Bakteriy; Oy Zhizni Predavleny Virus? Irusnaya Chastitsa; 3. Polnotsennay Virusnay vne Kletki; znovidnost 'virusa;
2. Polluted virus fraction outside the cell;
3. Proteins with abnormal secondary structure;
4. Inpolluted virus fraction.

4. What is the factor of virus resistance?

1. What is the effect of antibiotics;
2. What is high temperature;
3. What is decay;
4. What is formal dehydration.

5. What is the factor of virus non-resistance?

1. What is the effect of antibiotics;
2. What is high temperature;
3. What is low temperature;
4. What is liofilization.

6. What determines the tropism of viruses?

1. Stability of the cell to fermentations;
2. Adaptation of the virus to the cell in which it parasitizes;
3. Specificity of receptors of the virus and the cell;
4. Absence of receptors in the virus.

7. What enzyme is basic in the formation of PCR?

1. Praymer;
2. Taq-polymerase;
3. DNTf;
4. DNK-ligase.

8. What is the basic specificity of PCR?

1. Praymer;
2. Taq-polymerase;
3. DNTf;
4. DNK-ligase.

9. What method is based on detecting DNA/RNA fragments in the studied material?

1. Serological;
2. Bacterial;
3. PTSR;
4. IFA.

10. What is the name of the device for increasing the number of DNA fragment copies using the PCR method?

1. Spectrophotometer;
2. Amplifier;
3. Microscope;
4. Thermostat.

1. What features distinguish viruses from other living objects?

1. Gramvariable;
2. Contain one type of nucleic acid;
3. Demanding on nutrient media;

4. The nucleus is limited from the cytoplasm.

2. How do viruses work?

1. The nucleus is limited from the cytoplasm;
2. One type of nucleic acid and protein shell;
3. No cell wall;
4. The cell wall contains murein;

3. How are viruses characterized?

1. Unculturable forms of bacteria;
2. Filterable forms of bacteria;
3. Obligate intracellular parasites;
4. Facultative intracellular parasites.

4. What form of life are viruses represented by?

1. Bacteria;
2. Mushrooms;
3. Protozoa;
4. Parasites at the genetic level.

5. How is "virion" characterized?

1. Defective viral particle;
2. Prions;
3. A complete viral particle outside the cell;
4. Non-canonical infectious agents;

6. How are Prions characterized?

1. Type of virus;
2. A complete viral particle outside the cell;
3. Proteins with abnormal secondary structure;
4. Defective viral particle.

7. To what factor are viruses resistant?

1. To the action of antibiotics;
2. To high temperature;
3. To rot;
4. To formaldehyde.

8. To what factor are viruses not resistant?

1. To the action of antibiotics;
2. To high temperature;
3. To low temperature;
4. To lyophilization.

9. What determines the tropism of viruses?

1. Resistant to cell enzymes;
2. Adaptation of the virus to the cell in which it parasitizes;
3. Specificity of virus and cell receptors;
4. Lack of receptors in viruses.

10. What enzyme is used in PCR?

1. Primers;
2. Taq polymerase;
3. DNTf;
4. DNA ligase.

11. What is the basis of PCR specificity?

1. Primers;
2. Taq polymerase;
3. DNTf;
4. DNA ligase.

12. Which method is based on the detection of DNA/RNA of pathogens in the material being studied?
1. Serological;
2. Bacterioscopic;
3. PCR;
4. ELISA.

13. What is the name of the device for increasing the number of copies of DNA fragments using the PCR method?
1. Spectrophotometer;
2. Amplifier;
3. Microscope;
4. Thermostat.

GPC-7 ID-2 To be able to: use modern technical means and information technologies, including elements of machine learning and artificial intelligence to solve analytical and research problems.

14. When is reverse transcription PCR used?
1. When studying RNA viruses;
2. When studying DNA-containing viruses;
3. When performing electrophoresis;
4. When performing sequencing.

15. What is the accumulation of copies of a certain DNA fragment called?
1. Amplification;
2. Neutralization;
3. Agglutination;
4. Precipitation.

16. What is the common name for the ability of a virus to cause certain morphological and degenerative changes in cells in infected tissue cultures?
1. LD50;
2. CPP;
3. RGA;
4. TCD50.

17. What method is used to infect chicken embryos?
1. Into the amniotic cavity;
2. On the subshell membrane;
3. In the brain;
4. In protein.

18. What medium is used for culturing cell cultures?
1. MPB;
2. Thioglycol medium;
3. Needle medium;
4. Wilson-Blair environment.

19. Which of the listed cell cultures are considered transplantable?
1. Chicken embryo fibroblasts;
2. Plasma;
3. Worried;
4.Vero.

20. What tissue cultures produce spider-like growth?
1. Continuous;
2. Plasma;
3. Diploid;
4. Primary trypsinized.

21. Which virus has hemagglutinating activity?
1. Newcastle disease virus;
2. Smallpox virus;
3. Foot and mouth disease virus;
4. Rabies virus.
22. Which virus does not have hemagglutinating activity?
1. Canine distemper virus;
2. Newcastle disease virus;
3. Reduced egg production syndrome virus;
4. Teschen disease virus.
23. What virus causes the production of virus-neutralizing antibodies?
1. Bovine leukemia virus;
2. Canine distemper virus;
3. African swine fever virus;
4. Equine infectious anemia virus.
24. What makes it possible to make a final diagnosis of a viral disease?
1. Epizootological data;
2. Clinical signs;
3. Pathological signs;
4. Laboratory research.
25. What activity of the virus needs to be known to determine the titer of virus-neutralizing antibodies?
1. Hemagglutinating;
2. Infectious;
3. Precipitating;
4. Enzymatic.
26. What activity of the virus needs to be known to perform the hemagglutination inhibition reaction (HAI)?
1. Hemagglutinating;
2. Infectious;
3. Precipitating;
4. Enzymatic.

GPC-7 ID-3 To possess skills to: use modern technical means and information technologies to solve analytical and research problems.

27. What method is used to calculate the infectious activity of viruses?
1. Romanovsky-Giemsa;
2. Muromtseva;
3. Rida and Mencha;
4. Pasteur.
28. What type of animal or bird is susceptible to infectious bursal disease virus?
1. Chickens;
2. Cattle;
3. Pigs;
4. Dogs.
29. What type of animal or bird is susceptible to Marek's disease virus?
1. Chickens;
2. Cattle;
3. Pigs;
4. Dogs.

30. What type of animal is susceptible to Teschen disease virus?
1. Chickens;
2. MRS;
3. Pigs;
4. Cats.
31. What viral disease first of all needs to be differentiated from Aujeszky's disease?
1. Smallpox;
2. Parainfluenza;
3. Foot and mouth disease;
4. Rabies.
32. What volume of virus-containing material is administered when infecting chicken embryos?
1. 0.01ml;
2. 0.2 ml;
3. 1 ml;
4. 2 ml.
33. What disease is caused by viruses of the Paramyxoviridae family in cattle?
1. Parainfluenza - 3;
2. Newcastle disease;
3. Rabies;
4. Gumboro disease.
34. Which proteins are NOT structural viral proteins?
1. Capsid;
2. Supercapsid;
3. Genomic;
4. Regulatory.
35. What growth factor does the growth nutrient medium for cultivating cell cultures contain?
1. Cattle blood serum;
2. Rooster red blood cells;
3. Sheep red blood cells;
4. Trypsin.
36. Which method of infecting chicken embryos can be done through a natural or artificial air chamber?
1. On the chorion-allantoic membrane;
2. Into the yolk sac;
3. Into the amniotic cavity;
4. Into the allantoic cavity.
37. What method of infecting white mice is used to isolate the rabies virus?
1. Subcutaneously into the root of the tail;
2. At the tip of the nose;
3. Intramuscularly into the thigh;
4. Application to scarified skin.
38. What is the optimal temperature for cultivating cell cultures and chicken embryos?
1. 37.5°C;
2. 25.0°C;
3. 41.5°C;
4. 34.5 °C.
39. What family does bovine diarrhea virus include?
1. Rhabdoviridae;
2. Coronaviridae;
3. Flaviviridae;

4. Retroviridae.

40. Which family includes infectious bovine rhinotracheitis virus (IBR)?

1. Poxviridae;
2. Adenoviridae;
3. Herpesviridae;
4. Parvoviridae.

4.2.TYPICAL TASKS FOR INTERMEDIATE CERTIFICATION

4.2.1. List of questions for the test in "Virology"

GPC -1 Is able to determine the biological status, normal clinical signs of organs and systems of the animal body.

GPC-1 ID-1 To know: safety precautions and personal hygiene rules during the examination of animals, methods of its fixation; schemes of clinical examination of an animal and the procedure for examination individual body systems; methodology for diagnosis of the pathological process.

GPC-1 ID-2 To be able to: collect and analyze anamnesis data, conduct laboratory and functional studies, necessary to determine the animal biological status.

GPC-1 ID-3 To possess practical skills: for conducting on its own a clinical examination of an animal, using classical research methods and digital technologies.

1. Features of the virology laboratory and its equipment.
2. Virology. Advances and challenges of virology, its connection with other sciences.
3. Routes of transmission of viral diseases (examples). The concept of sterile and non-sterile immunity. Virus carriage.
4. Resistance of viruses to chemical and physical factors. Inactivation of viruses, complete and partial (examples).
5. Forms and structure of virions. Dimensions of viruses and methods of measuring them.
6. Genetics and variability of viruses. Types of variability and their practical significance (examples).
7. Principles of obtaining live antiviral vaccines and their control (examples).
8. Routes of transmission of viral diseases (examples). The concept of virus tropism.
9. Interferon. Interference of viruses and practical use of this phenomenon.
10. Conditions for storing and cultivating viruses in the laboratory. Preservation of viruses.
11. Types of interaction of viruses with cells.
12. Nonspecific factors of antiviral immunity and their role in protecting the body.
13. Characteristics of the main properties of viruses.
14. The concept of viruses and their classification. Name the families of RNA and DNA containing viruses.
15. Virus variability. Directional variability and its practical significance (examples).
16. Principles of obtaining inactivated (killed) vaccines for viral diseases.
17. Controls of inactivated vaccines (examples).
18. Chemical composition of viruses. Antigenic structure of virions.
19. The main stages of reproduction (multiplication) of viruses and their characteristics.
20. Reproduction of viruses.
21. Biological drugs used for the treatment, prevention and diagnosis of viral diseases (examples).
22. Immunity, types of immunity. Sterile and non-sterile immunity. Virus carriage.
23. Antiviral immunity and its features.

24. Resistance of viruses to physical and chemical factors, preservation of viruses. Inactivation of viruses, complete and partial (examples).
25. The role of antibodies and phagocytosis in antiviral immunity.
26. Characteristics of the main properties of viruses.
27. The role of the virus, macroorganism and environmental conditions in viral infection. process.
28. Structure and classification of viruses.
29. Specific factors of immunity in viral diseases and their role in protecting the body. Scheme of immunogenesis.
30. Chemical composition and antigenic structure of viruses.
31. Nonspecific factors of the body's defense and their role in antiviral immunity.
32. Essence, technique and accounting of hemagglutination reaction (HRA). Reaction controls.
33. The essence, technique of staging and accounting for the indirect (passive) hemagglutination reaction (IRHA, RPHA). Reaction controls.
34. The essence and technique of staging the diffusion precipitation reaction (DPR) (RDR). Accounting for reactions and controls.
35. The essence, technique of staging and taking into account the reaction of delay (inhibition) of hemagglutination (RDHA, HRTHA).
36. RSC in the diagnosis of viral diseases. Essence, technique of production and consideration of reaction.
37. Essence, technique of staging and taking into account the virus neutralization reaction (RN).
38. Virus neutralization reaction (RN) in the diagnosis of viral diseases - its essence, technique and recording.

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 problems resolution in professional activity.

GPC-4 ID-2 To 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.

39. Methods of fluorescent antibodies (MFA). The essence and types of MFA.
40. Indirect methods of fluorescent antibodies (IFA), their essence and technique.
41. Microscopic method for studying pathological material in viral diseases. Staining of smears to detect inclusion bodies.
42. The concept of tissue culture (CT). Types of CT. Cytopathogenic effect of the virus on CT cells.
43. Structure of a chicken embryo (CE) - draw a diagram. Selection and preparation of EC for infection. Purpose of EC in virology (examples).
44. Laboratory animals used for the diagnosis of viral diseases. Selection and methods of infection (examples).
45. Features of collecting, transporting and preparing material for virological and serological studies.
46. Methods and sequence of laboratory diagnostics of pathological material for viral diseases (diagnostic scheme).
47. Primary trypsinized tissue cultures, methods of obtaining them.
48. The concept of the cytopathogenic effect (CPE) of the virus.

49. Serological diagnosis of viral diseases. Essence, types and purpose of serological reactions.
50. Features of the work of virology laboratories, equipment, safety precautions when working with viruses.
51. The concept of virus titer, titer units and virus titration technique.
52. Reaction of hemadsorption and delay of hemadsorption (RGAd, RZGAd). Essence, technique of production and consideration of reaction.
53. Luminescence microscopy in virology. Fluorochrome method (MF) and fluorescent antibody methods (MFA) - their essence and technique.
54. The concept of tissue cultures. Types of tissue cultures, principles of their preparation and purpose of tissue cultures in virology.
55. The use of chicken embryos in virology. Selection and preparation of embryos for infection. Methods for infecting embryos (Figure).
56. Methods for purification and concentration of viruses.

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.

57. Animal parvoviruses. Characteristics of the Aleutian mink disease virus (plasmocytosis). Laboratory diagnosis of plasmacytosis.
58. Parvovirus enteritis of minks and dogs. Characteristics of viruses, laboratory diagnostic methods and means for specific prevention of the disease.
59. Taking pathological material and conducting laboratory diagnostics of foot and mouth disease.
60. Method of identification and typing of foot-and-mouth disease viruses. Laboratory diagnosis of foot and mouth disease. Biological preparations for the treatment and prof-ki of foot and mouth disease.
61. Biological preparations used for special purposes. prevention and treatment of swine fever.
62. Birdpox virus. Characteristics of the pathogen, laboratory diagnosis of the disease. Biological products for prevention.
63. African swine fever, differential diagnosis from classical plague. Characteristics of the African swine fever virus.
64. Leukosis of birds and cattle. Characteristics of pathogens and laboratory diagnostic methods.
65. Chicken laryngotracheitis (ILT), characteristics of the virus, laboratory diagnosis and specific prevention.
66. Causative agent of infectious anemia (INAN) of horses. Laboratory diagnostic methods and characteristics of the pathogen.
67. Differential diagnosis of rabies and Aujeszky's disease.
68. Differential diagnosis of plague and viral hepatitis of carnivores. Biological products for disease prevention.
69. Neurolymphomatosis of chickens (Marek's disease) - characteristics of the pathogen, laboratory diagnostics, means for specific prevention.

70. Parvovirus family, characteristics of properties. Parvovirus enteritis of dogs, minks and cats. Conducting laboratory diagnostics.
71. Avian infectious bronchitis virus, laboratory diagnostic methods and means for specific prevention of the disease.
72. Cattle rhinotracheitis (RT). Characteristics of the pathogen, laboratory diagnostic methods, specific prevention.
73. Biological preparations for specific prevention and treatment of rabies.

GPC-7. Is able to understand the principles of modern information technologies and use them to solve professional tasks.

GPC-7 ID-1 To know: modern technical means and information technologies.

GPC-7 ID-2 To be able to: use modern technical means and information technologies, including elements of machine learning and artificial intelligence to solve analytical and research problems.

GPC-7 ID-3 To possess skills to: use modern technical means and information technologies to solve analytical and research problems.

74. Characteristics of the canine distemper virus. Laboratory diagnostics and specific prevention of the disease.
75. Characteristics of animal influenza viruses. Methods for laboratory diagnosis of influenza and means for specific prevention of the disease.
76. Characteristics of the Aujeszky's disease virus. Conducting laboratory diagnostics and specific disease prevention.
77. Characteristics of the sheeppox virus. Means for specific prevention. Laboratory diagnosis of the disease.
78. Characteristics of Newcastle disease virus. Laboratory diagnostic methods and biological products for disease prevention.
79. Characteristics of the cattle plague virus, laboratory diagnostic methods and means for specific prevention.
80. Characteristics of porcine transmissible gastroenteritis virus. Laboratory diagnostic methods and means for specific prevention.
81. Characteristics of the classical swine fever virus. Taking pathological material and conducting laboratory diagnostics. Differentiation from African swine fever.
82. Characteristics of the rabies virus. Fixed virus and street virus. Works by L. Pasteur.
83. Characteristics of foot-and-mouth disease virus. The concept of the types and variants of foot-and-mouth disease virus. Methods for identifying and typing viruses. Biological products for treatment and prevention.
84. Characteristics of the carnivorous hepatitis virus, laboratory diagnosis of the disease. Means for specific prevention and treatment.
85. Characteristics of the malignant catarrhal fever virus Kr.rog.sk. Laboratory diagnostics and specific prevention.

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.

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

1.5.

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.