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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 clinical diagnostics

EDUCATIONAL WORK PROGRAM

for the discipline

"HEMATOLOGY"

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 april 25, 2024.
protocol no. 11

Head of the department
of clinical diagnostics,
doctor of veterinary medicine, professor
Kovalev S.P.

Saint Petersburg
2024

1. AIMS AND OBJECTIVES OF THE DISCIPLINE

The purpose of the discipline: to teach how to work correctly with blood and its fractions, summarize the results obtained, evaluate the interspecies characteristics of the hematopoietic system of animals, and their dependence on environmental, technological and other conditions.

Objectives of the discipline: determining the state of health and an earlier and more comprehensive study of disorders that occur in the body, allowing one to diagnose the disease, determine its etiology and pathogenesis. With the help of hematological research, work out optimal methods for studying the morphological composition of blood, hemoglobin concentration, erythrocyte sedimentation rate and methods of excretion and analysis of leukograms in animals under normal conditions and pathology, establish the diagnostic role of individual tests and their combinations; identify the features of individual indicators. Master the methodology for carrying out clinical examination of productive animals as a set of planned activities, taking blood from different types of animals, master safety precautions when working with animals and biomaterial, prevent the development of diseases in order to create healthy, highly productive herds.

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

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

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

PC-1. Anamnesis of animal life and disease to identify the cause of disease, conduct a general clinical study of animals in order to establish a preliminary diagnosis and determine the ongoing research program

PC-1 ID-5 To be able to establish a preliminary diagnosis based on anamnesis analysis and clinical research, using general methods.

PC-1 ID-8 To know the forms and rules for filling out the journal for the registration of sick animals and the animal's medical history, including in electronic form in accordance with the requirements of veterinary rules.

PC-1 ID-10 To know the technique of conducting an animal clinical study, using general methods, in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals.

PC-2. Development of an animal research program and conduction of clinical study, using special (instrumental) and laboratory methods to clarify the diagnosis

PC-2 ID-4 To be able to take samples of animal biological material for laboratory research.

PC-2 ID-5 To be able to perform analytical preparation, storage of the studied biological material, transportation to the laboratory

PC-2 ID-6 To be able to interpret and analyze data from laboratory animal research methods for diagnosis.

PC-2 ID-7 To know the indication for the use of digital equipment, special (instrumental) and laboratory methods of animal research in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals

PC-2 ID-8 To know the safe rules of operation with digital equipment, tools and equipment, used in special (instrumental) animal studies, including X-ray examinations.

PC-2 ID-11 To possess skills of the technique of setting functional tests for animals.

PC-2 ID-12 To know the methodology of sampling and analytical fulfillment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material

PC-3. To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods

PC-3 ID-2 To possess skills to use specialized information databases for the diagnosis of animal diseases

PC-3 ID-3 To possess skills to document the results of clinical animal studies, using digital technologies.

PC-3 ID-4 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination.

PC-3 ID-5 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms.

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

The discipline B1.B.13 "HEMATOLOGY" 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 7th semesters.

When teaching the discipline "Hematology," the knowledge and skills acquired by students in mastering the disciplines of biophysics, zoology, histology and embryology, animal anatomy, biochemistry, physiology, pathological physiology, clinical diagnostics, and laboratory diagnostics are used.

The discipline "Hematology" is the discipline of Block 1 of the Curriculum, on which most subsequent disciplines are built, such as:

1. Internal non-communicable diseases.
2. Operative surgery with topographic anatomy.
3. General and private surgery.
4. Pathological anatomy and forensic veterinary examination.
5. Veterinary and sanitary examination.
6. Obstetrics and gynecology.
7. Diseases of laboratory, small and exotic animals.
8. Epizootology
9. Parasitology

4. THE SCOPE OF DISCIPLINE AND TYPES OF ACADEMIC WORK

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

Type of educational work	Hours	Semesters
		7
Classroom classes (total)	72/2	72/2
Including:	-	-
Lectures, including interactive forms	16	16
Practical (PP), including interactive forms, among which are:	16	16
practical training (PP)	4	4

Self-study	40	40
Type of intermediate and final certification (credit, exam)	Test	Test
Total labor intensity hours/credits	72/2	72/2

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.	General information about the blood system. Main stages of development of hematology. Characteristics of the blood system of humans and laboratory animals. Embryonic hematopoiesis. The doctrine of the hematopoietic stem cell. Theories of hematopoiesis. Modern scheme of hematopoiesis. Regulation of hematopoiesis. Introduction to hematology. Introduction to equipment used in hematology. Rules for collecting blood from farm and laboratory animals. Technique for preparing slides, preparing, fixing and staining peripheral blood smears (practical work).	PC-1. Anamnesis of animal life and disease to identify the cause of disease, conduct a general clinical study of animals in order to establish a preliminary diagnosis and determine the ongoing research program PC-1 ID-8 To know the forms and rules for filling out the journal for the registration of sick animals and the animal's medical history, including in electronic form in accordance with the requirements of veterinary rules. PC-1 ID-10 To know the technique of conducting an animal clinical study, using general methods, in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals. PC-2. Development of an animal research program and conduction of clinical study, using special (instrumental) and laboratory methods to clarify the diagnosis PC-2 ID-5 To be able to perform analytical preparation, storage of the studied biological material, transportation to the laboratory PC-2 ID-7 To know the indication for the use of digital equipment, special (instrumental) and laboratory methods of animal research in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals PC-2 ID-8 To know the safe rules of operation with digital equipment, tools and equipment, used in special (instrumental) animal studies, including X-ray examinations. PC-2 ID-12 To know the methodology of sampling and analytical fulfillment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material PC-3. To set the diagnose based on the analysis of anamnesis, general,	7	2	2		5

	special (instrumental) and laboratory research methods PC-3 ID-2 To possess skills to use specialized information databases for the diagnosis of animal diseases PC-3 ID-4 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination.						
2.	Morphofunctional characteristics of red blood cells in normal and pathological conditions. Erythron kinetics. Erythrocyte. Pathological forms of red blood cells. Red blood cell counting. Hemoglobinometry. Determination of hematocrit, erythrocyte indices (knowledge control, practical work)	PC-1. Anamnesis of animal life and disease to identify the cause of disease, conduct a general clinical study of animals in order to establish a preliminary diagnosis and determine the ongoing research program PC-1 ID-5 To be able to establish a preliminary diagnosis based on anamnesis analysis and clinical research, using general methods. PC-1 ID-8 To know the forms and rules for filling out the journal for the registration of sick animals and the animal's medical history, including in electronic form in accordance with the requirements of veterinary rules. PC-1 ID-10 To know the technique of conducting an animal clinical study, using general methods, in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals. PC-2. Development of an animal research program and conduction of clinical study, using special (instrumental) and laboratory methods to clarify the diagnosis PC-2 ID-4 To be able to take samples of animal biological material for laboratory research. PC-2 ID-5 To be able to perform analytical preparation, storage of the studied biological material, transportation to the laboratory PC-2 ID-6 To be able to interpret and analyze data from laboratory animal research methods for diagnosis. PC-2 ID-7 To know the indication for the use of digital equipment, special (instrumental) and laboratory methods of animal research in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals PC-2 ID-8 To know the safe rules of operation with digital equipment, tools and equipment, used in special (instrumental) animal studies, including X-ray examinations. PC-2 ID-11 To possess skills of the technique of setting functional tests for	7	2	2	5	

	animals. PC-2 ID-12 To know the methodology of sampling and analytical fulfillment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material PC-3. To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods PC-3 ID-2 To possess skills to use specialized information databases for the diagnosis of animal diseases PC-3 ID-3 To possess skills to document the results of clinical animal studies, using digital technologies. PC-3 ID-4 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination. PC-3 ID-5 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms.					
Morphofunctional characteristics of white blood cells in normal and pathological conditions. Leukocyte kinetics. Pathological forms of leukocytes. Erythrocytometry. Staining of preparations, counting and studying the morphology of reticulocytes (knowledge control, practical work). Determination of osmotic resistance and erythrocyte sedimentation rate (knowledge control, practical work). 3.	PC-1. Anamnesis of animal life and disease to identify the cause of disease, conduct a general clinical study of animals in order to establish a preliminary diagnosis and determine the ongoing research program PC-1 ID-5 To be able to establish a preliminary diagnosis based on anamnesis analysis and clinical research, using general methods. PC-1 ID-8 To know the forms and rules for filling out the journal for the registration of sick animals and the animal's medical history, including in electronic form in accordance with the requirements of veterinary rules. PC-1 ID-10 To know the technique of conducting an animal clinical study, using general methods, in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals. PC-2. Development of an animal research program and conduction of clinical study, using special (instrumental) and laboratory methods to clarify the diagnosis PC-2 ID-4 To be able to take samples of animal biological material for laboratory research.	7	2	2	2	5

concept of hemostasis. Vascular-platelet hemostasis (VTH). Methods for assessing the functional state of the growth hormone. Coagulation hemostasis (CH). Methods for assessing the functional state of the CG. Anticoagulants. Fibrinolytic system. Hemorrhagic diathesis and syndromes (etiology, classification, pathogenesis, clinical and laboratory characteristics). Thrombophilia. DIC syndrome. Determination of the total number of leukocytes. Study of the morphology of peripheral blood leukocytes (knowledge control, practical work).	anamnesis analysis and clinical research, using general methods. PC-1 ID-8 To know the forms and rules for filling out the journal for the registration of sick animals and the animal's medical history, including in electronic form in accordance with the requirements of veterinary rules. PC-1 ID-10 To know the technique of conducting an animal clinical study, using general methods, in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals. PC-2. Development of an animal research program and conduction of clinical study, using special (instrumental) and laboratory methods to clarify the diagnosis PC-2 ID-4 To be able to take samples of animal biological material for laboratory research. PC-2 ID-5 To be able to perform analytical preparation, storage of the studied biological material, transportation to the laboratory PC-2 ID-6 To be able to interpret and analyze data from laboratory animal research methods for diagnosis. PC-2 ID-7 To know the indication for the use of digital equipment, special (instrumental) and laboratory methods of animal research in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals PC-2 ID-8 To know the safe rules of operation with digital equipment, tools and equipment, used in special (instrumental) animal studies, including X-ray examinations. PC-2 ID-11 To possess skills of the technique of setting functional tests for animals. PC-2 ID-12 To know the methodology of sampling and analytical fulfillment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material PC-3. To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods PC-3 ID-2 To possess skills to use specialized information databases for the diagnosis of animal diseases				
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	PC-3 ID-3 To possess skills to document the results of clinical animal studies, using digital technologies. PC-3 ID-4 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination. PC-3 ID-5 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms.					
Anemia. General information (etiology, classification, nonspecific and specific clinical and laboratory manifestations). Posthemorrhagic anemia (etiology, classification, pathogenesis, clinical and hematological picture, laboratory diagnostics). Hemolytic anemia (etiology, classification, pathogenesis, clinical picture, laboratory diagnostics). Iron-, B12- and folate-deficiency anemia (etiology, classification, pathogenesis, clinical picture, laboratory diagnostics). Hypo- and aplastic anemia (etiology, classification, pathogenesis, clinical picture, laboratory	PC-1. Anamnesis of animal life and disease to identify the cause of disease, conduct a general clinical study of animals in order to establish a preliminary diagnosis and determine the ongoing research program PC-1 ID-5 To be able to establish a preliminary diagnosis based on anamnesis analysis and clinical research, using general methods. PC-1 ID-8 To know the forms and rules for filling out the journal for the registration of sick animals and the animal's medical history, including in electronic form in accordance with the requirements of veterinary rules. PC-1 ID-10 To know the technique of conducting an animal clinical study, using general methods, in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals. PC-2. Development of an animal research program and conduction of clinical study, using special (instrumental) and laboratory methods to clarify the diagnosis PC-2 ID-4 To be able to take samples of animal biological material for laboratory research. PC-2 ID-5 To be able to perform analytical preparation, storage of the studied biological material, transportation to the laboratory PC-2 ID-6 To be able to interpret and analyze data from laboratory animal research methods for diagnosis. PC-2 ID-7 To know the indication for the use of digital equipment, special (instrumental) and laboratory methods of animal research in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals PC-2 ID-8 To know the safe rules of operation with digital equipment,					5

diagnostics). Counting and studying platelet morphology. Calculation of leukocyte formula (practical work)	tools and equipment, used in special (instrumental) animal studies, including X-ray examinations. PC-2 ID-11 To possess skills of the technique of setting functional tests for animals. PC-2 ID-12 To know the methodology of sampling and analytical fulfillment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material PC-3. To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods PC-3 ID-2 To possess skills to use specialized information databases for the diagnosis of animal diseases PC-3 ID-3 To possess skills to document the results of clinical animal studies, using digital technologies. PC-3 ID-4 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination. PC-3 ID-5 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms.				
6. Leukocytosis and leukemoid reactions (etiology, classification, pathogenesis, clinical and hematological picture, laboratory diagnostics). Leukopenia (etiology, classification, pathogenesis, clinical and hematological picture, laboratory diagnostics). Blood coagulation and anticoagulation systems in normal and pathological conditions. Methods for assessing the functional state of vascular-platelet	PC-1. Anamnesis of animal life and disease to identify the cause of disease, conduct a general clinical study of animals in order to establish a preliminary diagnosis and determine the ongoing research program PC-1 ID-5 To be able to establish a preliminary diagnosis based on anamnesis analysis and clinical research, using general methods. PC-1 ID-8 To know the forms and rules for filling out the journal for the registration of sick animals and the animal's medical history, including in electronic form in accordance with the requirements of veterinary rules. PC-1 ID-10 To know the technique of conducting an animal clinical study, using general methods, in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals. PC-2. Development of an animal research program and conduction of clinical study, using special (instrumental) and laboratory methods to	7	2	2	5

and coagulation hemostasis.	clarify the diagnosis PC-2 ID-4 To be able to take samples of animal biological material for laboratory research. PC-2 ID-5 To be able to perform analytical preparation, storage of the studied biological material, transportation to the laboratory PC-2 ID-6 To be able to interpret and analyze data from laboratory animal research methods for diagnosis. PC-2 ID-7 To know the indication for the use of digital equipment, special (instrumental) and laboratory methods of animal research in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals PC-2 ID-8 To know the safe rules of operation with digital equipment, tools and equipment, used in special (instrumental) animal studies, including X-ray examinations. PC-2 ID-11 To possess skills of the technique of setting functional tests for animals. PC-2 ID-12 To know the methodology of sampling and analytical fulfillment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material PC-3. To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods PC-3 ID-2 To possess skills to use specialized information databases for the diagnosis of animal diseases PC-3 ID-3 To possess skills to document the results of clinical animal studies, using digital technologies. PC-3 ID-4 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination. PC-3 ID-5 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms.			
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7.	Leukemia. General information (etiology, pathogenesis, clinical and hematological picture, laboratory diagnostics). Classification, differential clinical and hematological characteristics and principles of treatment of acute leukemia. Principles of therapy for chronic leukemia. Methods for collecting bone marrow from farm and laboratory animals. Counting the total number of myelokaryocytes. Preparation, fixation and staining of bone marrow preparations. Study of the morphology of myelokaryocytes. Myelogram counting. Determination of bone marrow indices (practical work).	PC-1. Anamnesis of animal life and disease to identify the cause of disease, conduct a general clinical study of animals in order to establish a preliminary diagnosis and determine the ongoing research program PC-1 ID-5 To be able to establish a preliminary diagnosis based on anamnesis analysis and clinical research, using general methods. PC-1 ID-8 To know the forms and rules for filling out the journal for the registration of sick animals and the animal's medical history, including in electronic form in accordance with the requirements of veterinary rules. PC-1 ID-10 To know the technique of conducting an animal clinical study, using general methods, in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals. PC-2. Development of an animal research program and conduction of clinical study, using special (instrumental) and laboratory methods to clarify the diagnosis PC-2 ID-4 To be able to take samples of animal biological material for laboratory research. PC-2 ID-5 To be able to perform analytical preparation, storage of the studied biological material, transportation to the laboratory PC-2 ID-6 To be able to interpret and analyze data from laboratory animal research methods for diagnosis. PC-2 ID-7 To know the indication for the use of digital equipment, special (instrumental) and laboratory methods of animal research in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals PC-2 ID-8 To know the safe rules of operation with digital equipment, tools and equipment, used in special (instrumental) animal studies, including X-ray examinations. PC-2 ID-11 To possess skills of the technique of setting functional tests for animals. PC-2 ID-12 To know the methodology of sampling and analytical fulfillment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material	7	2	2	5
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		PC-3. To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods PC-3 ID-2 To possess skills to use specialized information databases for the diagnosis of animal diseases PC-3 ID-3 To possess skills to document the results of clinical animal studies, using digital technologies. PC-3 ID-4 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination. PC-3 ID-5 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms.					
8.	Malignant lymphomas (non-Hodgkin's lymphomas, lymphogranulomatosis). Etiology, classification, pathogenesis, clinical picture, laboratory diagnostics, principles of treatment. Pathological forms of erythrocytes and leukocytes (study of peripheral blood and bone marrow smears).	PC-1. Anamnesis of animal life and disease to identify the cause of disease, conduct a general clinical study of animals in order to establish a preliminary diagnosis and determine the ongoing research program PC-1 ID-5 To be able to establish a preliminary diagnosis based on anamnesis analysis and clinical research, using general methods. PC-1 ID-8 To know the forms and rules for filling out the journal for the registration of sick animals and the animal's medical history, including in electronic form in accordance with the requirements of veterinary rules. PC-1 ID-10 To know the technique of conducting an animal clinical study, using general methods, in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals. PC-2. Development of an animal research program and conduction of clinical study, using special (instrumental) and laboratory methods to clarify the diagnosis PC-2 ID-4 To be able to take samples of animal biological material for laboratory research. PC-2 ID-5 To be able to perform analytical preparation, storage of the studied biological material, transportation to the laboratory PC-2 ID-6 To be able to interpret and analyze data from laboratory animal research methods for diagnosis. PC-2 ID-7 To know the indication for the use of digital equipment, special	7	2	2	5	

	(instrumental) and laboratory methods of animal research in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals PC-2 ID-8 To know the safe rules of operation with digital equipment, tools and equipment, used in special (instrumental) animal studies, including X-ray examinations. PC-2 ID-11 To possess skills of the technique of setting functional tests for animals. PC-2 ID-12 To know the methodology of sampling and analytical fulfillment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material PC-3. To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods PC-3 ID-2 To possess skills to use specialized information databases for the diagnosis of animal diseases PC-3 ID-3 To possess skills to document the results of clinical animal studies, using digital technologies. PC-3 ID-4 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination. PC-3 ID-5 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms.					
TOTAL FOR THE 7 TH SEMESTER:						16 12 4 40

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

Correct organization and planned self – work stimulate research and creative activity of students. Self-work should be understood not only as the ability to make independent conclusions and to apply the knowledge, gained in practice, but also as the ability to organize their activities without outside help.

Self-work over the discipline "Veterinary and sanitary expertise" allow to develop skills on the principles of veterinary and sanitary control of the rational use of animal and plant products (controlled by gosvetnadzor), as well as raw materials (for industrial processing of farm and natural fishing resources); environmental protection technologies and equipments; fundamentals of technologies, technical regulation and standardization, professional responsibility; international cooperation in the field of veterinary and sanitary expertise, food safety and protection of the territory of the Russian Federation from the introduction of infectious zoonanthropous and animal diseases; environmental protection; human consciousness and society for the development of the agro-industrial complex of the Russian Federation.

Students self-work illustrates the development of the following qualification requirements:

- the ability to identify problems and interests in the field of quality control and food safety;
- the ability to set an adequate goal, determine the sequence of tasks;
- the ability to find optimal solutions, effective means and methods to achieve the goal;
- the ability to find the necessary information using modern technologies, classify and systematize it;
- the ability to conduct scientific research in the field of food expertise;
- the ability to present the results of their activities, both in written and oral form for the procedure of public presentation, as well as lectures;
- the ability to master the skills of effective business cooperation.

Students self-work over the discipline "Veterinary and sanitary expertise" is the main way of mastering educational material. It is carried out in order to:

- develop and assimilate the educational material of the discipline;
- consolidate and ameliorate knowledge, skills and abilities;
- prepare for upcoming classes and control tasks;
- form the culture of intellectual work, independency and initiative in research and education.

Students self-work includes the development of theoretical material and preparation for practical classes in the basics of technical regulation and standardization of livestock products, TR and GSS of the Russian Federation, the HACCP system, food safety requirements: meat and meat products, milk and dairy products, fish and fish products, raw materials and technological processes of children's and specialized nutrition and others. food security issues.

The forms of student's self-work over the discipline "Veterinary and sanitary expertise" are:

- acquaintance with the work program;
- making notes and processing lecture material;
- preparation for group classes, including:
 - a) selection of necessary sources of information (literature, online publications, regulatory framework);
 - b) taking notes of educational, methodological and scientific literature;
 - c) processing and analysis of laws and regulations;

d) self-control of the processed questions and topics of the curriculum;

In addition, students' self-work in a free form is realized through the preparation of reports and articles for student scientific conferences on the problems of veterinary and sanitary expertise, food security, rational development of the agro-industrial complex of the Russian Federation and the use of natural resources, innovative technologies and technical regulation in the field of veterinary and sanitary expertise, processing of meat, poultry, dairy, etc. raw materials, eggs, honey and bee products, vegetable raw materials, raw materials for food ghee of animal origin, the use of biotechnology.

During the practical classes, the discussion of the topic is conducted in a free creative form. Students discuss with the teacher not only the questions formulated in the educational and methodological complex, but also ask questions that they have during preparation for the seminar, and state their own position on a particular problematic issue in a reasoned manner.

Preparing for the lesson involves the study of theoretical lecture material and regulatory documents. When solving problems, it is recommended to analyze the conditions, formulate a solution clearly and competently, giving references to the relevant legal norms. In order to assimilate the material and better prepare for future professional activity, it is necessary to strive to change the conditions of the task in order to choose the best solution to a specific life situation.

The type of tasks for students' self-work is determined by the teacher through the work program and assessment funds.

Educational and methodological materials for self-work of disabled students are provided in forms adapted to the limitations of their health and perception of information and can be specified depending on the contingent of students.

6.1. Guidelines for self-work

1. Methodological instructions for completing course work in the discipline "Clinical Diagnostics" for students in the specialty "Veterinary Medicine" / compiled by: S. P. Kovalev [etc.]; Ministry of Agriculture of the Russian Federation. SPbGAVM. - St. Petersburg: Publishing house SPbGAVM, 2015. - 27 p. – URL: <https://clck.ru/Vnb8s> (date of access: 27/04/2024). - Access mode: for authorization. users of the SPbSUVMB EB.

2. Clinical diagnostics: guidelines for students of the veterinary faculty of distance learning / compiled by: S. P. Kovalev, V. A. Trushkin; Ministry of Agriculture of the Russian Federation, SPbGAVM. – St. Petersburg: Publishing house SPbGAVM, 2013. - 26 p.

3. Methodological recommendations for organizing independent work in the disciplines "Clinical Diagnostics", "Hematology", "Laboratory Diagnostics", "Instrumental Diagnostic Methods" for students studying in the specialty "Veterinary Medicine" / compiled by: S. P. Kovalev [etc. .]; Ministry of Agriculture, SPbGAVM. - St. Petersburg: Falcon Print, 2019. - 26 p. – URL: <https://clck.ru/eYPBz> (date of access: 27/04/2024). - Access mode: for authorization. users of the SPbSUVMB EB.

6.2. Literature for self-work

1. Kesareva, E. A. Clinical interpretation of biochemical parameters of blood serum of dogs and cats / E. A. Kesareva, V. N. Denisenko. - Moscow: KolosS, 2011. - 29 p.

2. Kovalev, S. P. Clinical assessment of hematological studies in farm animals: guidelines / S. P. Kovalev; Ministry of Agriculture of the Russian Federation, SPbGAVM. – St. Petersburg: Publishing house SPbGAVM, 2004. - 40 p.

3. Handbook of a veterinary therapist: textbook / G. G. Shcherbakov, N. V. Danilevskaya, S. V. Starchenkov [etc.]. - 5th ed., rev. and additional - St. Petersburg: Lan, 2021. - 656 p. - URL: <https://e.lanbook.com/book/167796> (access date 25/04/2024). -Access mode: for authorization. users of EBS "Lan".

4. Basic syndromes of internal diseases of animals: textbook / Kovalev Sergey Pavlovich, A.P. Kurdeko, Yu.K. Kovalenok [etc.]; Ministry of Agriculture of the Russian Federation; SPbGAVM. - St. Petersburg: Publishing house SPbGAVM, 2013. - 48 p. - URL: <https://e.lanbook.com/book/121315> (access date 27/04/2024). - Access mode: for authorization. users of EBS "Lan".

5. Zelenevsky, N.V. Workshop on veterinary anatomy: textbook: in 3 volumes. T. 1. Somatic systems / N. V. Zelenevsky. - St. Petersburg: ISOT: NIK, 2007. - 304 p.: ill. - URL: <https://clck.ru/R6zBq> (date of access: 27/04/2024). - Access mode: for authorization. users of the SPbSUVM EB.

6. Zelenevsky, N.V. Workshop on veterinary anatomy: a textbook for university students. T. 2. Splanchnology and angiology / N. V. Zelenevsky. - 3rd ed., revised. and additional - St. Petersburg, Logos, 2006. - 160 p. - URL: <https://clck.ru/R77Kh> (access date 27/04/2024). - Access mode: for authorization. users of the SPbSUVM EB.

7. Zelenevsky, N.V. Workshop on veterinary anatomy: a textbook for university students. T. 3. Neurology. Sense organs. Features of the structure of poultry / N. V. Zelenevsky, A. A. Stekolnikov, K. V. Plemyashov; ed. N.V. Zelenevsky. - St. Petersburg: Logos, 2005. - 132 p. - URL: <https://clck.ru/ebnFX> (date of access: 27/04/2024). - Access mode: for authorization. users of the SPbSUVM EB.

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

7.1. Basic literature

1. Kovalev, S. P. Clinical diagnosis of internal diseases of animals: a textbook for universities / S. P. Kovalev, A. P. Kurdeko; Edited by S.P. Kovalev [and others]. - 6th ed., erased. - St. Petersburg: Lan. 2022. - 540 p. - URL: <https://e.lanbook.com/book/215744> (access date: 25/04/2024). - Access mode: for authorization. users of EBS "Lan".

2. Clinical diagnostics with radiology: textbook / E. S. Voronin, G. V. Snoz, M. F. Vasiliev [etc.]; ed. E. S. Voronina. - Moscow: KolosS, 2006. - 509 p.: ill. - (Textbooks and study guides for university students).

3. Workshop on clinical diagnostics with radiology: textbook / E. S. Voronin, S. P. Kovalev, G. V. Snoz [etc.]; under general ed. E. S. Voronina, G. V. Snoza. - Moscow: INFRA-M, 2014. - 336 p.

7.2. Additional literature

1. Methods for diagnosing diseases of farm animals: a textbook for universities / A. P. Kurdeko, S. P. Kovalev, V. N. Aleshkevich [and others]; Edited by A. P. Kurdeko and S. P. Kovalev. - 3rd ed., erased. - St. Petersburg: Lan, 2021. - 208 p. - URL: <https://e.lanbook.com/book/174996> (access date 27/04/2024). - Access mode: for authorization. users of EBS "Lan".

2. Ketosis of cows and calves: textbook / A.V. Trebukhov, A.A. Elenschläger, S.P. Kovalev [etc.]. - St. Petersburg: Lan, 2019. - 132 p. - URL: <https://e.lanbook.com/book/115508> (access date: 27/04/2024). - Access mode: for authorization. users of EBS "Lan".

3. Stekolnikov, A. A. X-ray diagnostics in veterinary medicine: textbook: [approved by the Ministry of Agriculture of the Russian Federation for university students] / A. A. Stekolnikov, S. P. Kovalev, M. A. Narusbaeva. - St. Petersburg: SpetsLit, 2016. - 379 p.

4. Methods for diagnosing diseases of farm animals: a textbook for universities / A. P. Kurdeko, S. P. Kovalev, V. N. Aleshkevich [and others]. - 3rd ed., erased. - St. Petersburg: Lan,

2021. - 208 p. - URL: <https://e.lanbook.com/book/174996> (access date: 27/04/2024). - Access mode: for authorization. users of EBS "Lan".

5. Microelementoses of farm animals: a textbook for students of veterinary faculties / S.P. Kovalev, A.P. Kurdeko, Shcherbakov Grigory Gavrilovich [and others]; S. P. Kovalev, A. P. Kurdeko, G. G. Shcherbakov [and others]; ed. S. P. Kovalev; Ministry of Agriculture of the Russian Federation, SPbGAVM. - St. Petersburg: SPbGAVM, 2013. - 132 p. - URL: <https://clck.ru/ekrWA> (date of access: 27/04/2024). - Access mode: for authorization. users of the SPbSUVM EB.

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. <http://fsvps.ru> The official website of the Federal Service for Veterinary and Phytosanitary Surveillance.
2. <http://www.mcx.ru/> Official website of the Ministry of Agriculture
3. <http://vetexpert.pro> The portal "Veterinary expertise".
4. <http://www.gost.ru> Official website of the Federal Agency for Technical Regulation and Metrology.
5. <http://www.kodeks.ru> The electronic fund of normative documents "Code".
6. <https://standartgost.ru> An open database of GOST standards and other regulatory documents.
7. <http://docs.cntd.ru> Electronic fund of legal and regulatory and technical documentation

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 to 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 taking 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 activity are 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://spbguv.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
Veterinary and sanitary expertise	101 (196084, St. Petersburg, Chernigovskaya str., 5, lit.G) Classroom for lecture-type classes, seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification	<i>Specialized furniture:</i> desks, chairs <i>Technical training tools:</i> video projector, slide presentations on the parts of the discipline
	103 (196084, St. Petersburg, Chernigovskaya str., 5, lit.G)	<i>Specialized furniture:</i> desks, chairs <i>Technical training tools:</i> video projector,

	Classroom for lecture-type classes, seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification	slide presentations on the parts of the discipline
	109 (196084, St. Petersburg, Chernigovskaya str., 5, lit.G) Classroom for lecture-type classes, seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification	<i>Specialized furniture:</i> desks, chairs <i>Technical teaching aids:</i> table scales, drying cabinet, tripods, KFK, microscopes.
	206 Large reading room (196084, St. Petersburg, Chernigovskaya str., 5) Room for self-work	<i>Specialized furniture:</i> tables, chairs <i>Technical means of education:</i> 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	<i>Specialized furniture:</i> tables, chairs <i>Technical means of education:</i> 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	<i>Specialized furniture:</i> tables, chairs, special equipment, materials and spare parts for preventive maintenance of technical training facilities
	Box No. 3 Carpentry workshop (196084, St. Petersburg, Chernigovskaya str., 5) Room for storage and preventive maintenance of educational equipment	<i>Specialized furniture:</i> tables, chairs, special equipment, materials and spare parts for preventive maintenance of technical training facilities

Developers:

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Department of clinical diagnostics

FUND OF ASSESMENT TOOLS
for the discipline
"HEMATOLOGY"

Level of higher education
SPECIALIST COURSE

Specialty 36.05.01 Veterinary medicine
Full-time education.

Education starts in 2024.

Saint Petersburg
2024

1. PASSPORT OF THE FUND OF ASSESSMENT TOOLS

Nº	Acquired competence	Assessed modules of a discipline	Assessment tool
1	PC-1. Anamnesis of animal life and disease to identify the cause of disease, conduct a general clinical study of animals in order to establish a preliminary diagnosis and determine the ongoing research program PC-1 ID-5 To be able to establish a preliminary diagnosis based on anamnesis analysis and clinical research, using general methods.	General information about the blood system.	Test
2	PC-1 ID-8 To know the forms and rules for filling out the journal for the registration of sick animals and the animal's medical history, including in electronic form in accordance with the requirements of veterinary rules.	Morphofunctional characteristics of red blood cells in normal and pathological conditions	Test
3	PC-1 ID-10 To know the technique of conducting an animal clinical study, using general methods, in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals.	Morphofunctional characteristics of white blood cells in normal and pathological conditions	Test
4	PC-2. Development of an animal research program and conduction of clinical study, using special (instrumental) and laboratory methods to clarify the diagnosis PC-2 ID-4 To be able to take samples of animal biological material for laboratory research.	Morphofunctional characteristics of platelets in normal and pathological conditions	Test
5	PC-2 ID-5 To be able to perform analytical preparation, storage of the studied biological material, transportation to the laboratory	Anemia. General information	Test
6	PC-2 ID-6 To be able to interpret and analyze data from laboratory animal research methods for diagnosis.	Leukocytosis	Test
7	PC-2 ID-7 To know the indication for the use of digital equipment, special (instrumental) and laboratory methods of animal research in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals	Leukemia	Test
8	PC-2 ID-8 To know the safe rules of operation with digital equipment, tools and equipment, used in special (instrumental) animal	Pathological forms of erythrocytes and leukocytes	Test

	studies, including X-ray examinations. PC-2 ID-11 To possess skills of the technique of setting functional tests for animals. PC-2 ID-12 To know the methodology of sampling and analytical fullfilmnt of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material PC-3. To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods PC-3 ID-2 To possess skills to use specialized information databases for the diagnosis of animal diseases PC-3 ID-3 To possess skills to document the results of clinical animal studies, using digital technologies. PC-3 ID-4 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination. PC-3 ID-5 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms.	
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List of assessment tools

№	Name of the assessment tool	Brief description of the assesment tool	Presentation of the assessment tool in the fund
1.	Test	A system of standardized tasks, which allows to automate the assessment of students knowledge and skills	A fund of test assignments
2.	Credit	A means of monitoring the assimilation of educational material in all sections of the discipline, organized in the form of an interview between the teacher and the students and the student's answer to test questions	Questions for acception credit

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

Planned results of competency acquired	The level of development				Assesment tool
	Unsatisfactory	Satisfactory	Good	Excellent	
PC-1. Anamnesis of animal life and disease to identify the cause of disease, conduct a general clinical study of animals in order to establish a preliminary diagnosis and determine the ongoing research program					
PC-1 ID-5 To be able to establish a preliminary diagnosis based on anamnesis analysis and clinical research, using general methods.	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	Test, Credit
PC-1 ID-8 To know the forms and rules for filling out the journal for the registration of sick animals and the animal's medical history, including in electronic form in accordance with the requirements of veterinary rules.	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	Test, Credit

PC-1 ID-10 To know the technique of conducting an animal clinical study, using general methods, in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals.	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	Test, Credit
PC-2. Development of an animal research program and conduction of clinical study, using special (instrumental) and laboratory methods to clarify the diagnosis					
PC-2 ID-4 To be able to take samples of animal biological material for laboratory research.	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	Test, Credit
PC-2 ID-5 To be able to perform analytical preparation, storage of the studied biological material, transportation to the laboratory	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	Test, Credit

PC-2 ID-6 To be able to interpret and analyze data from laboratory animal research methods for diagnosis.	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	Test, Credit
PC-2 ID-7 To know the indication for the use of digital equipment, special (instrumental) and laboratory methods of animal research in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals	The level of knowledge is below the minimum requirements, gross errors have occurred	The minimum acceptable level of knowledge, many minor errors have been made	The level of knowledge corresponds to the training program, several minor errors have been made	The level of knowledge corresponds to the training program, no errors have been made	Test, Credit
PC-2 ID-8 To know the safe rules of operation with digital equipment, tools and equipment, used in special (instrumental) animal studies, including X-ray examinations.	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	Test, Credit
PC-2 ID-11 To possess skills of the technique of setting functional tests for animals.	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	Test, Credit

PC-2 ID-12 To know the methodology of sampling and analytical fulfillment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material	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	Test, Credit
PC-3. To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods					
PC-3 ID-2 To possess skills to use specialized information databases for the diagnosis of animal diseases	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	Test, Credit
PC-3 ID-3 To possess skills to document the results of clinical animal studies, using digital 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	Test, Credit

PC-3 ID-4 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination.	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	Test, Credit
PC-3 ID-5 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms.	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	Test, Credit

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

PC-1. Anamnesis of animal life and disease to identify the cause of disease, conduct a general clinical study of animals in order to establish a preliminary diagnosis and determine the ongoing research program

PC-1 ID-5 To be able to establish a preliminary diagnosis based on anamnesis analysis and clinical research, using general methods.

PC-1 ID-8 To know the forms and rules for filling out the journal for the registration of sick animals and the animal's medical history, including in electronic form in accordance with the requirements of veterinary rules.

PC-1 ID-10 To know the technique of conducting an animal clinical study, using general methods, in accordance with the guidelines, instructi

Test 1. An increase in erythrocyte sedimentation rate is noted when:

1. anemia.
2. blood thickening
3. colic
4. diarrhea

Test 2. A decrease in erythrocyte sedimentation rate is characteristic:

1. anemia
2. blood spot disease
3. leukemia
4. dehydration

Test 3. A decrease in blood viscosity is typical for:

1. anemia
2. skin hyperhidrosis
3. venous congestion
4. diarrhea

Test 4. What method of counting leukocytes is used to determine the leukocyte formula in horses:

1. three-field
2. linear
3. stepped
4. four-field.

Test 5. To dilute the blood when counting platelets, use:

1. 3% acetic acid solution
2. 1% ammonium oxalate solution
3. 0.9% sodium chloride solution
4. 5% solution of potassium iodide.

Test 6. Which reagent is used when counting red blood cells in birds:

1. Turkish liquid

2. 0.9% sodium chloride solution
3. 0.1% solution Azura II
4. 0.1 n. hydrochloric acid solution

Test 7. In what units is the platelet count measured:

1. $10^6/l$
2. $10^9/l$
3. million/ μl
4. $10^{12}/l$

Test 8. Erythrocytosis is:

1. increase in the number of red blood cells
2. decrease in the number of red blood cells
3. appearance of immature forms of red blood cells
4. change in the shape of red blood cells

Color indicator characterizes:

1. saturation of red blood cells with hemoglobin
2. the number of red blood cells in the blood of animals
3. the amount of hemoglobin in the blood of animals
4. number of leukocytes in the blood of animals

Test 10. How red blood cells are counted in Goryaev's counting chamber:

1. in 5 large squares diagonally.
2. in 5 squares divided into 16 small ones diagonally
3. in 25 large squares
4. in 225 squares

Test 11. To dilute the blood when counting red blood cells in the Goryaev counting chamber, use:

1. 0.9% sodium chloride solution
2. 5% sodium chloride solution
3. Turkish liquid
4. 3% acetic acid solution

Test 12. Hemoglobin is part of:

1. red blood cells.
2. neutrophils
3. monocytes
4. proerythroblasts

Test 13. Erythropenia is recorded when:

1. anemia
2. loss of fluid from the body
3. intestinal obstruction
4. chronic alveolar emphysema

Test 14. A decrease in the number of red blood cells in the blood of animals is called:

1. erythrocytosis
2. erythropenia

3. poikilocytosis
4. leukopenia

Test 15. The lifespan of an erythrocyte is:

1. 100-120 days
2. 100-150 days
3. 20-50 days
4. 10-20 days

Test 16. Agranulocytes include:

1. eosinophils, myelocytes
2. neutrophils, basophils
3. lymphocytes, monocytes
4. eosinophils, neutrophils, basophils, lymphocytes, monocytes

Test 17. The lifespan of platelets is

1. 100-120 days
2. 5-7 days
3. about 10 days
4. 1-2 hours

Test 18. The spleen, in the early stages of fetal development, is an organ related to

1. peripheral lymphoid organs
2. central lymphoid organs
3. hematopoietic organs
4. exocrine glands

Test 19. A lymph node is an organ related to:

1. peripheral lymphoid organs
2. central lymphoid organ
3. hematopoietic organs
4. organs of the central nervous system

Test 20. Life expectancy of monocytes:

1. 4-10 hours circulate in the blood, then enter the tissues
2. 1-3 days circulate in the blood, then enter the tissues
3. from several hours to tens of years
4. 1-2 years

Test 21. Life expectancy of lymphocytes:

1. 4-10 hours circulate in the blood, then enter the tissues
2. 72 hours circulate in the blood, then enter the tissues
3. from several hours to tens of years
4. 1-2 years

Test 22. Granulocytes include:

1. lymphocytes, monocytes
2. eosinophils, basophils
3. myelocytes, blasts
4. neutrophils, monocytes

Test 23. Promyelocyte is

1. cell of the lymphocytic series
2. cell of the monocytic series
3. granulocytic cell
4. erythroid cell

Test 24. Ferritin content reflects the condition

1. iron transport fund
2. iron reserve fund
3. extracellular iron pool
4. extracellular hemoglobin pool

Test 25. Symptoms of anemia include:

1. shortness of breath, pallor
2. bleeding
3. enlargement of the spleen, lymph nodes
4. hyperemia of the mucous membranes

Test 26. Platelets -

1. blood platelets - small anucleate blood cells
2. small blood cells containing hemoglobin, due to which they are able to transfer oxygen from the lungs to the tissues, and carbon dioxide in the opposite direction - from the tissues to the lungs
3. blood cells varied in morphological characteristics and functions
4. biconcave anucleate cells with a lumen in the center.

Test 27. Eosinophilia -

1. reduction in eosinophil content
2. decrease in the content of neutrophils in the blood
3. increased eosinophil content
4. increase in the blood composition of lymphoid cells

Test 28. Neutrophilia -

1. reduction in eosinophil content
2. increase in the content of neutrophils in the blood
3. increased eosinophil content
4. increase in the blood composition of lymphoid cells

Test 29. Neutropenia -

1. reduction in eosinophil content
2. decrease in the content of neutrophils in the blood
3. increased eosinophil content
4. increase in the blood composition of lymphoid cells

Test 30. The respiratory function of blood is:

1. transfer of oxygen from the lungs to tissues and carbon dioxide from tissues to the lungs
2. removal of metabolic end products from body cells
3. heat distribution throughout the body and maintaining a certain body temperature
4. transfer of nutrients from the digestive tract to the cells of the body

Test 31. The internal environment of the body includes:

1. blood and its derivatives - tissue fluid and lymph
2. saliva, gastric juice, cerebrospinal fluid
3. blood, bile, intestinal juice
4. lymph, pancreatic juice, blood

Test 32. Hematocrit or hematocrit value is:

1. volume of shaped elements
2. blood plasma volume
3. percentage of inorganic substances
4. number of red blood cells in the blood

Test 33. What volume of blood, in a state of physiological rest, circulates through the vessels?

1. half the volume of all blood
2. a third of the total blood volume
3. $\frac{3}{4}$ of the total blood volume
4. the entire blood volume

Test 34. Blood depots include:

1. liver, lungs, spleen, subcutaneous tissue
2. bone tissue, intestines, stomach, spinal cord
3. aorta, pulmonary veins, pulmonary artery, left ventricle of the heart
4. pancreas, gall bladder, skeletal muscles, all blood vessels

Test 35. Regulates the transition of blood from the general channel to the blood depot:

1. parasympathetic nervous system
2. adrenaline
3. cortisol
4. physical activity

Test 36. Blood viscosity is determined by the presence of:

1. red blood cells and proteins
2. leukocytes and carbohydrates
3. platelets and lipids
4. leukocytes and lipids

Test 37. Where are albumin and fibrinogen formed:

1. liver
2. bone marrow
3. spleen
4. lymph nodes

Test 38. What proteins include various antibodies:

1. γ – globulin fraction
2. α – globulin fraction
3. β – globulin fraction
4. albumins

Test 39. In what physiological processes is the importance of fibrinogen manifested:

1. blood clotting
2. regulation of blood protein composition
3. regulation of blood pressure

4. regulation of venous pressure

Test 40. What is the pressure of blood plasma proteins called:

1. oncotic pressure
2. venous pressure
3. capillary pressure
4. blood pressure

PC-2. Development of an animal research program and conduction of clinical study, using special (instrumental) and laboratory methods to clarify the diagnosis

PC-2 ID-4 To be able to take samples of animal biological material for laboratory research.

PC-2 ID-5 To be able to perform analytical preparation, storage of the studied biological material, transportation to the laboratory

PC-2 ID-6 To be able to interpret and analyze data from laboratory animal research methods for diagnosis.

PC-2 ID-7 To know the indication for the use of digital equipment, special (instrumental) and laboratory methods of animal research in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals

PC-2 ID-8 To know the safe rules of operation with digital equipment, tools and equipment, used in special (instrumental) animal studies, including X-ray examinations.

PC-2 ID-11 To possess skills of the technique of setting functional tests for animals.

PC-2 ID-12 To know the methodology of sampling and analytical fulfillment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material

Test 41. An increase in the number of red blood cells in the blood of animals indicates:

1. Anemia
2. Loss of fluid from the body
3. Vitamin B12 deficiency
4. Radiation sickness

Test 42. Agranulocytes include:

1. Monocytes
2. Basophils
3. Eosinophils
4. Neutrophils

Test 43. How to count the number of leukocytes in Goryaev's counting chamber

1. In 100 large squares
2. In 5 large squares diagonally
3. In 5 large squares divided into 16 small ones diagonally
4. In 225 squares

Test 44. The most active phagocytes from blood cells are:

1. Lymphocytes
2. Eosinophils
3. Basophils
4. Monocytes

Test 45. The following take an active part in allergic reactions:

1. Plasma cells

2. Monocytes
3. Eosinophils
4. Lymphocytes

Test 46. Drug-induced leukocytosis occurs after administration of:

1. Oral administration of protein preparations
2. Applications of herbal decoctions
3. Antibiotics
4. Parenteral administration of protein drugs

Test 47. Physiological leukocytosis occurs when:

1. In newborn animals in the first days after birth
2. During vaccination
3. After heavy blood loss
4. Exhaustion of the body

Test 48. A decrease in the number of leukocytes occurs when:

1. Animal immunization
2. Extensive burns
3. For viral diseases
4. Subdermatize

Test 49. Thrombocytosis may indicate:

1. Blood thickening
2. Radiation sickness
3. Anemia
4. Hemocytoblastosis

Test 50. A blood leukogram is obtained using:

1. Goryaev's counting chamber.
2. Unstained fixed blood smear
3. Stained fixed blood smear
4. Spectroscopically

Test 51. A blood leukogram is displayed using a microscope lens:

- 18
- 2.40
- 3.90
- 4.120

Test 52. The shift index in the leukogram means:

1. The ratio of the sum of young and young neutrophils to the number segmented
2. The ratio of the number of band neutrophils to the number segmented neutrophils
3. The ratio of the sum of young, juvenile and band neutrophils to number of segmented neutrophils
4. The ratio of the number of segmented neutrophils to the sum of young, young and band neutrophils.

Test 53. The shift of the nucleus to the left in the leukogram means:

1. Increase in the number of segmented neutrophils
2. Increase in the number of lymphocytes
3. Increase in the number of monocytes
4. Increase in the number of band neutrophils

Test 54. Blood from large farm animals is taken from:

1. Left jugular vein
2. Jugular vein.
3. Brachial artery
4. Femoral artery

Test 55. Neutrophilia with hyporegenerative shift is:

1. Increased number of band neutrophils with insignificant leukocytosis.
2. The appearance of myelocytes, young neutrophils and an increase in the number band neutrophils with significant leukocytosis
3. An increase in the number of band neutrophils against the background of a decrease in the number segmented neutrophils.
4. Increase in the number of segmented neutrophils with normal content of rods.

Test 56 Eosinopenia occurs when:

1. For allergic diseases
2. Helminthic infestations
3. Chronic alveolar pulmonary emphysema in horses
4. For acute septic diseases.

Test 57. Lymphocytopenia can occur with:

1. Chronic infectious diseases
2. Severe burns and intoxication
3. Recovery from acute infections
4. For sepsis

Test 58. To determine hemoglobin using the method of Pimenova and Derviz, the following is used:

1. 10% solution of acetone cyanohedrin
2. Turk's Liquid
3. 1% sodium chloride solution
4. 10 calcium chloride solution

Test 59. To count the number of leukocytes in Goryaev's counting chamber, the following is used:

1. 0.9% sodium chloride solution
2. Turk's Liquid
3. 0.1 n. hydrochloric acid solution
4. 1% acetic acid

Test 60. Anisocytosis is:

1. Change in red blood cell size
2. Change in the shape of red blood cells

3. Change in color of red blood cells
4. The appearance of inclusions in red blood cells

Test 61. Osmotic pressure in blood plasma is determined by the concentration of:

1. Soleil
2. Carbohydrates
3. Belkov
4. Zhirov

Test 62. The concentration of salts in the blood plasma is:

1. 1.0%
2. 0.3%
3. 2.0%
4. 5.0%

Test 63. Isotonic or saline solution is:

1. A solution having an osmotic pressure equal to the osmotic pressure blood
2. A solution having an osmotic pressure greater than the osmotic pressure blood
3. A solution having osmotic pressure is less than osmotic pressure blood
4. A solution having an oncotic pressure equal to the oncotic pressure blood

Test 64. What is the composition of the simplest saline solution for mammals?

1. 1.0% sodium chloride solution
2. 2.0% sodium chloride solution
3. 0.9% hydrochloric acid solution
4. 0.6% sodium chloride solution

Test 65. Within what limits does blood pH fluctuate in healthy animals:

1. 7.35 – 7.45
2. 7.10 – 7.20
3. 6.85 – 6.95
4. 7.66 – 7.75

Test 66. Acid-base balance of blood is:

1. The ratio of acidic and alkaline elements
2. Protein to carbohydrate ratio
3. Ratio of adrenaline and acetylcholine
4. Ratio of proteins and lipids

Test 67. Alkaline blood reserve is:

1. content of all alkaline blood elements
2. Protein and carbohydrate reserves
3. Supply of lipids and carbohydrates
4. Supply of hydrochloric and nitric acid

Test 68. The carbonate buffer system includes:

1. Carbonic acid and sodium and potassium bicarbonates

2. Phosphoric acid and sodium and potassium bicarbonates
3. Carbonic acid and sodium phosphate
4. Nitric acid and sodium and potassium bicarbonates

Test 69. What is acidosis:

1. Increase in acidic elements in the blood
2. Increase in alkaline elements in the blood
3. Acid-base balance is at the lower limit of normal
4. Change in blood pressure

Test 70. What is alkalosis:

1. Increase in alkaline elements in the blood
2. Increase in acidic elements in the blood
3. Acid-base balance is at the upper limit of normal
4. Change in venous pressure

Test 71. Metabolic acidosis is characterized by:

1. Accumulation of acidic substances and carbon dioxide in the blood
2. Increased concentration of bicarbonates in the blood
3. Increased concentration of carbon dioxide in the blood
4. Reducing the concentration of carbon dioxide in the blood

Test 72. Metabolic alkalosis is characterized by:

1. Increasing the concentration of all alkaline components, not only bicarbonates in the blood
2. Decrease in the concentration of bicarbonates in the blood
3. Increased concentration of phosphates in the blood
4. Reducing the concentration of phosphates in the blood

Test 73. Respiratory acidosis is characterized by:

1. An increase in the concentration of carbon dioxide in the blood
2. A decrease in the concentration of carbon dioxide in the blood
3. Increased concentration of bicarbonates in the blood
4. Increased concentration of nitric acid in the blood

Test 74. Respiratory alkalosis is characterized by:

1. A decrease in the concentration of carbon dioxide in the blood
2. An increase in the concentration of carbon dioxide in the blood
3. Decrease in the concentration of bicarbonates in the blood
4. Increased concentration of salts in the blood

Test 75. Compensated acidosis is:

1. Blood pH does not change, but the supply of alkaline elements in the blood decreases
2. Blood pH shifts to the acidic side
3. Blood pH shifts to the alkaline side
4. Blood pH does not change, but the content of acidic substances in the blood increases

Test 76. Uncompensated alkalosis and acidosis are:

1. Blood pH changes to acidic or alkaline
2. Blood pH does not change, but the capacity of buffer systems decreases
3. Blood pH does not change, but the content of acidic substances in the blood increases

4. Blood pH is at the upper or lower limits of normal

Test 77. Hemostasis is:

1. Stopping bleeding and simultaneously keeping blood in a liquid state
2. Constancy of the internal environment of the body
3. Formation of formed elements in red bone marrow
4. Mechanisms to stop bleeding

Test 78. What process does blood clotting begin with:

1. Formation of microcirculatory thrombus
2. Formation of tissue prothrombinase
3. Thrombin formation
4. Fibrin formation

Test 79. Retraction of a blood clot is:

1. Reducing the clot in volume and compacting it with simultaneous separation serum
2. Increase in volume of the clot and its compaction with simultaneous separation serum
3. Blood clotting process
4. Dissolution of fibrin using the enzyme plasmin

Test 80. What is fibrinolysis:

1. Dissolution of fibrin using the enzyme plasmin
2. Reducing the clot in volume and compacting it with simultaneous separation serum.
3. Nutrient hydrolysis
4. Blood clotting process

PC-3. To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods

PC-3 ID-2 To possess skills to use specialized information databases for the diagnosis of animal diseases

PC-3 ID-3 To possess skills to document the results of clinical animal studies, using digital technologies.

PC-3 ID-4 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination.

PC-3 ID-5 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms.

Test 81. Oligochromemia is:

1. Increase in the amount of hemoglobin
2. Increase in the number of red blood cells
3. Decrease in hemoglobin amount
4. Decreased red blood cell count

Test 82. The number of leukocytes is measured in:

1. $10^5 / \mu\text{l}$.
2. $10^9 / \text{l}$
3. $10^{12} / \mu\text{l}$
4. $10^9 / \mu\text{l}$

Test 83. Which blood cell is the largest:

1. Lymphocyte
2. Neutrophil
3. Monocyte
4. Eosinophyll

Test 84. Where does the synthesis of plasma blood clotting factors occur:

1. Liver
2. Red bone marrow
3. Large intestine
4. Lymph nodes

Test 85. Signs of intravascular hemolysis of erythrocytes are:

1. Increased content of indirect bilirubin
2. Reticulocytosis
3. Increase in red blood cell count
4. The appearance of young immature forms of red blood cells.

Test 86. In what units is the amount of hemoglobin in the blood measured:

1. g/l
2. $\mu\text{mol/l}$
3. mg/%
4. G/l

Test 87. To derive the leukocyte formula, use:

1. Unstained blood smear
2. Stained and fixed blood smear
3. Blood plasma
4. Blood serum

Test 88. The following is used as an anticoagulant when collecting blood serum:

1. Sodium citrate
2. 0.1 n. hydrochloric acid solution
3. Nikiforov liquid
4. 0.9% sodium chloride solution

Test 89. The following are not used as a blood anticoagulant:

1. EDTA solution
2. sodium oxalate solution
3. heparin solution
4. Turk's Liquid

Test 90. Physiological leukocytosis is recorded when:

1. After eating food
2. Administration of protein preparations
3. Myocardial infarction
4. Uremia

Test 91. In which blood cells are azurophilic granules detected during smear microscopy:

1. Eosinophils
2. Monocytes
3. Lymphocytes

4. Basophils

Test 92. Basophilia is noted when:

1. Aplastic anemia
2. Pericarditis
3. Allergies
4. Chronic inflammatory processes of the gastrointestinal tract

Test 93. Which blood cells lack a nucleus:

1. Megakaryoblasts
2. Red blood cells
3. Monocytes
4. Leukocytes

Test 94. Blood does not clot at all when:

1. Leukemia
2. Anthrax
3. Hypervitaminosis C
4. Cholemia

Test 95. What is the change in the shape of red blood cells called?

1. poikilocytosis
2. anisochromia
3. erythrocytosis
4. megalocytosis

Test 96. Thrombocytopenia is accompanied by:

1. Increased blood viscosity
2. Hemoglobinemia
3. Decrease in relative blood density
4. Slowing down the rate of blood clotting

Test 97. Which substances are not natural anticoagulants:

1. Zookoumarin
2. Antithroblastins
3. Antithrombin
4. Heparin

Test 98. Which factor is not related to the blood anticoagulation system:

1. Amylase
2. Smooth endothelium of blood vessels
3. Continuous movement of blood through the vessels
4. Anti-clotting agents

Test 99. Which substances are not considered artificial anticoagulants:

1. Heparin
2. Sodium citrate
3. Trilon B
4. Sodium oxalate

Test 100. What is the mechanism of the effect of sodium citrate on blood clotting:

1. Binds calcium ions
2. Binds sodium ions
3. Neutralizes prothrombinase
4. Blocks fibrin

Test 101. What substances are involved in the regulation of blood clotting:

1. Adrenaline, acetylcholine, fatty acids
2. Insulin, glucagon, thyroxine
3. Pancreatic juice, bile, mucin
4. Amylase, trypsin, hydrochloric acid

Test 102. What is oxyhemoglobin:

1. The combination of oxygen with hemoglobin
2. Combination of hemoglobin with carbon dioxide
3. Combination of hemoglobin with carbon monoxide
4. Hemoglobin giving up oxygen

Test 103. What is carbohemoglobin:

1. Combination of hemoglobin with carbon dioxide
2. The combination of oxygen with hemoglobin
3. Combination of hemoglobin with carbon monoxide
4. Hemoglobin giving up oxygen

Test 104. What is the horse's ESR:

1. 40 – 70 mm/h
2. 0.5 – 1.5 mm/h
3. 2.0 – 10 mm/h
4. 2.0 – 4.0 mm/h

Test 105. What is the ESR in cattle:

1. 0.5 – 1.5 mm/h
2. 40 – 70 mm/h
3. 0.5 – 2.0 mm/h
4. 2.0 – 4.0 mm/h

Test 106. What is hemolysis:

1. Destruction of red blood cells and release of hemoglobin from them
2. Formation of red blood cells in red bone marrow
3. Increase in the number of red blood cells in the blood
4. Decrease in the number of red blood cells in the blood

Test 107. Which leukocytes belong to microphages:

1. Neutrophils
2. Monocytes
3. Lymphocytes
4. Mast cells

Test 108. Which leukocytes belong to macrophages:

1. Monocytes
2. Basophils
3. Neutrophils
4. Eosinophils

Test 109. What is a leukogram:

1. Percentage of all types of leukocytes
2. Ratio of red blood cells and white blood cells
3. Ratio of platelets and leukocytes
4. Ratio of granulocytes and agranulocytes

Test 110. Which animals have a neutrophilic blood profile:

1. Horses
2. Cattle
3. Goats
4. Rabbits

Test 111. Which animals have a lymphocytic blood profile:

1. Cattle
2. Horses
3. Dogs
4. Reindeer

Test 112. What is the number of red blood cells in the blood of cattle:

1. 5 – 7.5 T/l
2. 8.2 – 10.5 T/l
3. 3.0 – 4.0 T/l
4. 6 – 12 T/l

Test 113. What is the number of leukocytes in the blood of horses:

1. 7 – 12 G/l
2. 8 – 16 G/l
3. 8 – 10 G/l
4. 10 – 15 G/l

Test 114. What is the value of platelets in the blood:

1. Participate in blood clotting
2. Prevents blood clotting
3. Regulate blood pressure
4. Regulate osmotic pressure

Test 115. What chemical element is part of hemoglobin:

1. Iron
2. Magnesium
3. Calcium
4. Sodium

Test 116. Which hormone is involved in erythropoiesis:

1. Erythropoietin
2. Insulin
3. Gastrin
4. Secretin

Test 117. What type of erythrocytosis develops with sudden muscle load:

1. Redistributive

2. Relative
3. True
4. Pathological

Test 118. How will the volume of tissue fluid change with a decrease in protein content in the blood:

1. Increase
2. Will decrease
3. Will not change
4. All of the above are incorrect.

Test 119. What methods are used to fix blood smears:

1. Chemical
2. Physical
3. Biological
4. Radiological

Test 120. What chemical compound is used to fix blood smears:

1. Methyl alcohol
2. Benzene
3. Formalin
4. Glycerin

3.2. Standard tasks for intermediate certification

3.2.1. Questions for acception credit

The competence achieved:

PC-1. Anamnesis of animal life and disease to identify the cause of disease, conduct a general clinical study of animals in order to establish a preliminary diagnosis and determine the ongoing research program

PC-1 ID-5 To be able to establish a preliminary diagnosis based on anamnesis analysis and clinical research, using general methods.

PC-1 ID-8 To know the forms and rules for filling out the journal for the registration of sick animals and the animal's medical history, including in electronic form in accordance with the requirements of veterinary rules.

PC-1 ID-10 To know the technique of conducting an animal clinical study, using general methods, in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals.

1. What is blood? What are its main functions?
2. Briefly outline the history of the development of domestic veterinary hematology.
3. Which of the domestic scientists made the greatest contribution to the development of veterinary hematology. What are the specific merits of each of them?
4. What are the prospects for further development of veterinary hematology?
5. Give a blood test diagram and what does each section include?
6. Briefly describe the methods for determining ESR in animals.
7. What factors of the external and internal environment have the greatest impact on ESR?
8. Indicate the ESR indicators in healthy horses and cattle (in the latter case, with a vertical and inclined position of the tripod).
9. What are the changes in ESR in pathology?
10. What is ESR, what does it indicate and in what diseases is it observed?

11. Physiological functions of hemoglobin and the clinical significance of its determination in the blood?

12. What are oxyhemoglobin, carboxyhemoglobin and methemoglobin? How does the latter differ from the former?

13. Name the methods for determining the amount of hemoglobin. What principles are these methods based on and what is the advantage of one over the other?

14. What changes in the amount of hemoglobin occur in pathology? What are these changes called?

15. Name the diseases. Which are accompanied by a change in the amount of hemoglobin.

16. What are the formed elements of blood? What are the physiological functions of each?

17. What methods can be used to determine the number of red blood cells in the blood of animals? What principles are these methods based on?

PC-2. Development of an animal research program and conduction of clinical study, using special (instrumental) and laboratory methods to clarify the diagnosis

PC-2 ID-4 To be able to take samples of animal biological material for laboratory research.

PC-2 ID-5 To be able to perform analytical preparation, storage of the studied biological material, transportation to the laboratory

PC-2 ID-6 To be able to interpret and analyze data from laboratory animal research methods for diagnosis.

PC-2 ID-7 To know the indication for the use of digital equipment, special (instrumental) and laboratory methods of animal research in accordance with the guidelines, instructions, rules for the diagnosis, prevention and treatment of animals

PC-2 ID-8 To know the safe rules of operation with digital equipment, tools and equipment, used in special (instrumental) animal studies, including X-ray examinations.

PC-2 ID-11 To possess skills of the technique of setting functional tests for animals.

PC-2 ID-12 To know the methodology of sampling and analytical fulfillment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material

18. Give a complete description of Goryaev's counting chamber: structure, area, dimensions, volume of the entire chamber.

19. How does erythrocyte melangeur differ from leukocyte melangeur, how and how many times is the blood diluted accordingly before counting them?

20. Briefly describe the method of counting erythrocytes and leukocytes in the Goryaev chamber.

21. Indicate and explain the formulas by which the number of erythrocytes and leukocytes is calculated.

22. What is the number of erythrocytes and leukocytes in healthy horses, cattle, small cattle and pigs and what are their changes in pathology?

23. Name at least three diseases that are accompanied by each change in the number of erythrocytes and leukocytes.

24. Why are blood smears made? What does a good blood smear mean?

25. Which blood smears are considered bad? What are the reasons for such smears?

26. What reaction should distilled water have when staining blood smears, how is it determined, and what needs to be done to be able to use it?

27. Indicate the composition of Romanovsky-Giemsa paint and describe the technique for staining blood smears using this method.

28. Why is supravital staining of blood smears performed, what paints are used?

29. Give a classification of leukocytes and explain why each type is called that.

30. Briefly give the morphological and chemical characteristics of granulocytes.
31. Briefly describe the morphology and chemical composition of agranulocytes.
32. What is a leukogram and by what methods can it be obtained?
33. Write leukograms of healthy horses, cattle, pigs and dogs. What are their similarities and differences?

PC-3. To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods

PC-3 ID-2 To possess skills to use specialized information databases for the diagnosis of animal diseases

PC-3 ID-3 To possess skills to document the results of clinical animal studies, using digital technologies.

PC-3 ID-4 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination.

PC-3 ID-5 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms.

34. What changes in leukograms occur in pathology and what are these changes called?
35. Name the changes in leukograms during acute septic processes and characterize these changes.
36. Give the classification of leukocytosis.
37. How to distinguish homogeneous leukocytosis from heterogeneous?
38. What types of neutrophilic leukocytosis occur in pathology, how are they characterized and what do they indicate?
39. Name at least three diseases that are accompanied by neutrophilic, lymphocytic, monocytic and eosinophilic leukocytosis.
40. What do they pay attention to when assessing the morphology of leukocytes, what changes occur and what do they indicate?
41. What do you pay attention to when assessing the morphology of erythrocytes.
42. Give a brief description of red blood cells in healthy animals and birds.
43. What are the changes in the morphology of red blood cells and what do these changes indicate?
44. Give the classification of granulocytes. What is the amount of them in the blood of healthy horses, cattle, and pigs?
45. What does an increase in the number of granulocytes in the blood indicate?
46. Why, where and how is bone marrow punctate taken?
47. What is determined in the bone marrow of animals) How do the results of bone marrow studies differ from those of blood in healthy animals?
48. What is the clinical significance of blood testing?
49. Describe anemic syndrome.
50. Hemorrhagic diathesis syndrome.
51. DIC syndrome.

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 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

4.2. Criteria of knowledge during the credit

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

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;
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	– 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.