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

"Laboratory diagnostics"
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 learn to correctly recognize and examine a sick animal, summarize the results obtained, evaluate the anatomical and physiological characteristics of the animal's body depending on environmental, technological and other conditions.
The objective of the discipline is to determine the state of health and, as early as possible, to comprehensively study the disorders that occur in the body, making it possible to diagnose the disease, determine its etiology and pathogenesis. Using general clinical research methods and laboratory diagnostics within the framework of propaedeutics, work out optimal methods for studying the biochemical, biophysical and cytological composition of biological fluids of the body, indicators of the health of animals in normal and pathological conditions, establish the diagnostic role of individual tests and their combinations; identify the features of individual indicators. To master the methodology for conducting clinical examination of productive animals as a set of planned measures aimed at the timely detection of animal diseases, disease prevention, with the aim of timely treatment of sick people and the creation of healthy, highly productive herds.
Laboratory diagnostics as a subject is an integral part of clinical diagnostics, which requires students to master medical diagnostic techniques, semiotics and medical logic, as well as diagnostic techniques. Students' mastery of laboratory methods for researching farm animals, gaining experience in identifying symptoms and syndromes, and the ability to analyze a situation in order to make a diagnosis are of great importance.

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

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

The field of professional activity:

13 Agriculture

Types of professional activity tasks:

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

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

The education of the discipline should form the following competencies:

a) professional competencies (PC):

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-12

To know the methodology of sampling and analytical fullfilment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material

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

The discipline B1.V.01 " Laboratory diagnostics " is a discipline formed by participants in educational relations of the federal state educational standard of higher education in the specialty 36.05.01 "Veterinary Medicine" (specialty level).

Mastered: full-time - in the 6th semester.

Laboratory diagnostics as a subject is one of the main sections closely related to general diagnostics, helping to master semiotics and medical logic, and diagnostic techniques. The course is aimed at developing the skills of drawing up an algorithm for laboratory diagnostics and tactics of therapeutic and diagnostic measures based on the clinical interpretation of laboratory data results while ensuring the continuity of laboratory examination at different stages of veterinary care for animals. Familiarity with laboratory research methods not performed in laboratories. Of great importance are students' mastery of clinical laboratory methods for researching farm animals, gaining experience in identifying symptoms and syndromes, and the ability to analyze a situation in order to make a diagnosis.

4. THE SCOPE OF DISCIPLINE AND TYPES OF ACADEMIC WORK

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

Type of educational work	Hours	semester
		6
The amount of hours	72/2	72/2
Auditory lessons	**32**	**32**
Lectures, including interactive forms	16	16
Practical exercises, including interactive forms, including:	16	16
practical training (PT)	4	4
Independent work	**40**	**40**
Type of final control – credit		+

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.	Subject and components of clinical laboratory diagnostics. The main goals and objectives of laboratory diagnostics. Organization of laboratory 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-12. To know the methodology of sampling and analytical fullfilment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material	6	1			2
2.	Laboratory diagnosis of protein metabolism disorders, clinical significance.	***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	8	2			4

3.	Laboratory diagnosis of carbohydrate metabolism disorders, clinical significance.	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-12. To know the methodology of sampling and analytical fullfilment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material	**6**	**2**			**4**
4.	Laboratory diagnosis of lipid metabolism disorders, clinical significance.		**6**	**2**			**4**
5.	Clinical significance of determining liver pigment metabolism. Differentiation of jaundices.		**6**	**2**			**4**
6.	Clinical significance of determining enzymes in the blood (ALT, AST, alkaline phosphatase, amylase, lipase, urea, urea nitrogen, creatinine, lipids, cholesterol).		**6**	**2**			**4**
7.	Laboratory diagnosis of mineral metabolism disorders, clinical significance.		**6**	**2**			**4**
8.	Laboratory diagnosis of vitamin metabolism disorders, clinical significance		**6**	**2**			**2**
9.	Laboratory diagnosis of water-electrolyte metabolism disorders. The importance of studying the biochemical composition of blood for diagnosing animal diseases.		**6**	**1**			**2**

10	Study of skin scrapings, washings from mucous membranes, nasal discharge, sputum. Obtaining and examining punctures from the chest and abdominal cavities.	***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-12. To know the methodology of sampling and analytical fullfilment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material	6		2		1
11	Study of the contents of rumen and abomasum in ruminants.		6		2		1
12	Obtaining and studying gastric juice in horses and carnivores.		6		2		1
13	Fecal examination. Clinical significance of indicators of physical and chemical properties of feces. Microscopic examination of stool. Scatological syndromes.	***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-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,	6			2	1
14	Laboratory examination of urine - determination of physical and chemical parameters of urine.		6			2	1
15	Microscopy of urine sediment.		6		2		1

16	Diagnostic value of determining inorganic phosphorus and total calcium in blood serum, reserve alkalinity of blood plasma and acid capacity of blood serum.	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-12. To know the methodology of sampling and analytical fullfilment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material	**6**		**2**		**2**
17	Determination of carotene in blood serum, vitamin A and C in blood.		**6**		**2**		**2**
18	**Total for 6th semester**			**16**	**12**	**4**	**40**

6. THE LIST OF EDUCATIONAL AND METHODOLOGICAL SUPPORT FOR THE DISCIPLINE "LABORATORY DIAGNOSTICS"

6.1. Guidelines for independent 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: 04/27/2024). - Access mode: for authorization. users of the SPbSUVM 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: 04/27/2024). - Access mode: for authorization. users of the SPbSUVM EB.

6.1. 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 04/27/2024). -

Access mode: for authorizations. 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 04/27/2024). - 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: 04/27/2024). - 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 04/27/2024). - 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; edited by N.V. Zelenevsky. - St. Petersburg: Logos, 2005. - 132 p. – URL: https://clck.ru/ebnFX (date of access: 04/27/2024). - 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: 04/27/2024). - Access mode: for authorization. users of EBS "Lan".
2. Clinical diagnostics with radiology: textbook / E. S. Voronin, G. V. Snoz, M. F. Vasiliev [etc.]; edited by 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 04/27/2024). - 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: 04/27/2024). - 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 04/27/2024). - 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]; edited by S. P. Kovalev; Ministry of Agriculture of the Russian Federation. SPbGAVM. - St. Petersburg: SPbGAVM, 2013. - 132 p. - URL: https://clck.ru/ekrWA (access date 04/27/2024). - 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 practical classes and perform independent work, students can use the following Internet resources:

1. https://meduniver.com – Medical information site.
2. http://vanat.cvm.umn.edu – Animal Anatomy University of Minnesota

Electronic library systems:

1. EBS "SPBGUVM" https://ebs.spbgavm.ru/MarcWeb2
2. EBS "Publishing house "Lan" http://www.e.lanbook.com/
3. EBS "Student Consultant" http://www.studentlibrary.ru/
4. Legal reference system "ConsultantPlus" https://www.ascon-spb.ru/konsultant_plus/

5. Scientific electronic library ELIBRARY.RU http://elibrary.ru/defaultx.asp
6. Russian Scientific Network http://www.nature.web.ru/
7. DATABASE OF INTERNATIONAL SCIENTIFIC CITATION INDICES WEB OF SCIENCE
http://apps.webofknowledge.com/WOS_GeneralSearch_input.do?product=WOS&search_mode=GeneralSearch&SID=F2BVMWGiLDMousbT5UG&preferencesSaved=
8. ELECTRONIC BOOKS BY THE PUBLISHING HOUSE "PROSPEKT NAUKI" HTTP://PROSPEKTNAUKI.RU/EBOOKS/ http://prospektnauki.ru/ebooks/

9. METHODOLOGICAL GUIDELINES FOR STUDENTS ON EDUCATION OF THE DISCIPLINE

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

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

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

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

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

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

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

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

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

• Recommendations for preparing for practical classes

Practical (seminar) classes are an important part of the professional training of students. The main purpose of conducting practical (seminar) classes is to form students' analytical,

creative thinking through the acquisition of practical skills. Practical classes are also conducted in order to deepen and consolidate the knowledge gained in lectures and in the process of independent work on normative documents, educational and scientific literature. For student, it is necessary, to study or repeat theoretical material on a given topic when preparing for a practical lesson for students.

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

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

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

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

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

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

• Practical (seminar) classes perform the following tasks:

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

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

• Recommendations for working with literature.

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

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

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

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

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

10. EDUCATIONAL SOCIAL WORK

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

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

11.1 Information technologies

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

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

11.2. Software

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

№ п/п	Technical and computer programs recommended by sections and topics of the program	License
1	MS PowerPoint	67580828
2	LibreOffice	free software
3	OS Alt Education	AAO.0022.00
4	ABIS " MARK-SQL"	02102014155
5	MS Windows 10	67580828
6	System Consult Plus	503/КЛ
7	Android OS	free software

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

The title of the discipline (module), practice in accordance with the curriculum	The title of special rooms and rooms for self-work	Equipment of special rooms and rooms for self-work
Laboratory diagnostics	101 (196084, St. Petersburg, Chernigovskaya str., 5, «J») Classroom for conducting seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification	Specialized furniture: desks, chairs, stools, blackboard, aluminum trays. Visual aids and educational materials: posters for sections of the discipline.
	102 (196084, St. Petersburg, Chernigovskaya str., 5, «J») Classroom for conducting seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification	Specialized furniture: desks, chairs, stools, blackboard, aluminum trays. Visual aids and educational materials: posters for sections of the discipline.
	111 (196084, St. Petersburg, Chernigovskaya str., 5, «J») Educational laboratory of the department	Specialized furniture: stainless steel sink tables, containers. Technical teaching aids: table scales, drying cabinet, tripods, KFK, microscopes. Visual aids and educational materials: posters on sections of clinical diagnostics.
	196084, St. Petersburg, Chernigovskaya str., 5, «J» Workshop of the department	Technical training aids: stalls for animals, means for restraining animals. Visual aids and educational materials: cow, small livestock - sheep, goats).
	206, Large reading room 196084, St. Petersburg, Chernigovskaya str., 5, «J» Workshop of the department Room for independent work	Specialized furniture: tables, chairs Technical teaching aids: computers with an Internet connection and access to the electronic information and educational environment
	214, Small reading room 196084, St. Petersburg, Chernigovskaya str., 5, «J» Workshop of the department Room for independent work	Specialized furniture: tables, chairs, special equipment, materials and spare parts for preventive maintenance of educational equipment.
	324 Information Technology Department 196084, St. Petersburg, Chernigovskaya str., 5, Room for storage and preventive maintenance of educational equipment.	Specialized furniture: tables, chairs, special equipment, materials and spare parts for preventive maintenance of educational equipment.
	Box No. 3 Carpentry workshop, 196084, St. Petersburg, Chernigovskaya str., 5, Room for storage and preventive maintenance of educational equipment	Specialized furniture: tables, chairs, special equipment, materials for preventive maintenance of specialized furniture

Developers:

Head of the Department of Clinical Diagnostics, Doctor of Veterinary Medicine, Professor — Kovalev S.P..

Associate Professor of the Department of Clinical Diagnostics, Candidate of Veterinary Sciences. — Nikitina A.A.

Annex 1

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

Department of Clinical Diagnostics

FUND OF ASSESMENT TOOLS
for the discipline
"LABORATORY DIAGNOSTICS"

Level of higher education
SPECIALIST COURSE

Specialty 36.05.01 Veterinary medicine
Full-time education.

Education starts in 2024.

Saint Petersburg
2024

1. PASSPORT OF THE FUND OF ASSESMENT TOOLS

№	Acquired competence	Assessed modules of a discipline	Assesment 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**	**Section 1.** Subject and composite part of the clinical laboratory diagnostics. Basic goals and objectives laboratory diagnostics. Organization of laboratory work.	Test
2	PC-1 ID-5 To be able to establish a preliminary diagnosis based on anamnesis analysis and clinical research, using general methods.	Section 2. Diagnosis of carbohydrate, protein and lipid metabolism disorders	Test
3	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.	Section 3. Diagnosis of disorders of mineral metabolism and vitamins.	test
4	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.	Section 4. Importance of laboratory urine testing	Test
5	**PC-2. Development of an animal research program and conduction of clinical study, using special (instrumental) and laboratory methods to clarify the diagnosis**	Section 5. The importance of examining gastric contents. rumen contents, and feces.	Test
6	PC-2 ID-4 To be able to take samples of animal biological material for laboratory research.	Section 6. Study of skin scrapings, exudates, transudates.	Test
7	PC-2 ID-5 To be able to perform analytical preparation, storage of the studied biological material, transportation to the laboratory	Section 7. Study of liver enzyme metabolism.	Test
8	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	Assessment of knowledge in all sections of the discipline	Credit

	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 fullfilment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material		

2. List of assessment tools

№	Name of the assessment tool	Brief description of the assesment tool	Presentation of the assessment tool in the fund
2.	Test	A system of standardized tasks, which allows to automate the assessment of students knowledge and skills	A fund of test assignments
3.	Credit	A means of monitoring the assimilation of educational material of discipline sections.	Questions for credit

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

Planned results of competency acquaired	The level of development				Assesment tool
	Unsatisfactory	Satisfactory	Good	Exellent	
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.	When deciding standard tasks basic skills not demonstrated there were rough errors	When deciding standard tasks basic skills have not been demonstrated, there were rough errors	Basic skills demonstrated when deciding standard tasks with some shortcomings	The level of knowledge corresponds to the training program, no errors have been made	Test
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.	When deciding standard tasks basic skills not demonstrated there were rough errors	When deciding standard tasks basic skills have not been demonstrated, there were rough errors	Basic skills demonstrated when deciding standard tasks with some shortcomings	The level of knowledge corresponds to the training program, no errors have been made	Test

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 deciding standard tasks basic skills not demonstrated there were rough errors	When deciding standard tasks basic skills have not been demonstrated, there were rough errors	Basic skills demonstrated when deciding standard tasks with some shortcomings	The level of knowledge corresponds to the training program, no errors have been made	Test
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.	Knowledge level below minimum requirements, had the place is rude errors	Minimum acceptable knowledge level, a lot was allowed minor mistakes	Level of knowledge in volume, appropriate program preparation, admitted a few rough ones errors	Level of knowledge in volume, appropriate program preparation, without errors.	Test
PC-2 ID-5 To be able to perform analytical preparation, storage of the studied biological material, transportation to the laboratory	When deciding standard tasks do not demonstrate basic skills, there were rough errors	Minimum acceptable knowledge level, a lot was allowed minor mistakes	All basic skills have been demonstrated, all basic problems have been solved with non-rough errors, all tasks were completed in full volume, but some with shortcomings	All basic skills have been demonstrated, all basic problems have been solved some non-essential shortcomings, all completed assignments in full	Test

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
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	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	All basic skills have been demonstrated, all basic problems have been solved some non-essential shortcomings, all completed assignments in full	Test
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.	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	All basic skills have been demonstrated, all basic problems have been solved some non-essential shortcomings, all completed assignments in full	Test
PC-2 ID-12 To know the methodology of sampling and analytical fullfilment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material	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	All basic skills have been demonstrated, all basic problems have been solved some non-essential shortcomings, all completed assignments in full	Test

4. LIST OF CHECK TASKS AND OTHER MATERIALS REQUIRED FOR THE ASSESSMENT OF KNOWLEDGE, ABILITIES, SKILLS AND ACTIVITY EXPERIENCE

Formed competence:

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-12

To know the methodology of sampling and analytical fullfilment of biological material samples for execution of laboratory analyses in accordance with the instructions and methodological documents, regulating the sampling of biological material

4.1. List of questions for credit

1. Taking the contents of the rumen. Basic studies of rumen contents.
2. Obtaining and examining the contents of the rennet.
3. Laboratory examination of gastric juice. List the main indicators and describe in detail the study of the digestive ability of pepsin.
4. Determination of gastric leukopedesis (the number of leukocytes in gastric juice).
5. Study of gastric juice for total acidity, free and bound HCl.
6. Laboratory examination of stool. List the main studies. Describe the physical properties of feces and their changes in various pathologies.
7. Describe the shape and consistency of feces in different animals and their changes during pathology.
8. Examination of feces for occult blood. Clinical significance.
9. Determination of protein and bile pigments in feces. Clinical significance.
10. Microscopic examination of stool. Clinical significance.
11. Laboratory examination of urine. List the main studies. Study of the physical properties of urine (list).
12. Determination of the physical properties of urine. Clinical significance.

13. Determination of protein, blood pigments, ketone bodies in urine. Clinical significance.

14. Chemical examination of urine. List the main indicators.

15. Determination of pH and sugar in urine. Clinical significance.

16. What substances belong to bile pigments? On what principle are qualitative tests for these pigments based? Name the tests that determine the presence of bile pigments in the urine.

17. What is considered a positive test for bile pigments? If it is in the urine of healthy animals? What is bilirubinuria? Name at least three diseases that are accompanied by bilirubinuria.

18. What is the clinical significance of urine testing in animals?

19. Microscopic examination of organized urine sediment. Clinical significance.

20. Microscopic examination of unorganized urine sediment. Clinical significance.

21. Determination of color, odor, transparency of urine and their changes in pathology.

22. Study of transudates and exudates. Clinical significance.

23. Determination of total calcium and inorganic phosphorus in blood serum. Clinical significance.

24. Determination of reserve alkalinity and acid capacity in blood serum. Clinical significance.

25. Determination of total protein and protein fractions in blood serum. Clinical significance.

26. Determination of carotene (vitamin A) in blood serum. Clinical significance.

27. Diagnosis of mineral metabolism disorders. Clinical significance.

28. Diagnosis of protein metabolism disorders. Clinical significance.

29. Diagnosis of carbohydrate metabolism disorders. Clinical significance.

30. Diagnosis of fat metabolism disorders. Clinical significance.

31. Diagnosis of water-electrolyte metabolism disorders. Clinical significance.

32. Diagnosis of vitamin metabolism disorders. Clinical significance.

4.2. Laboratory diagnostic tests:

Formed competence:

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

1. What does the smell of hydrogen sulfide in gastric contents indicate:
1. gastric atony
2. purulent-hemorrhagic gastritis
3. ketosis
4. stomach ulcer
2. What is determined in gastric juice using a 0.5% solution of dimethylamidoazobenzene:
1. total acidity
2. free hydrochloric acid
3. bound hydrochloric acid
4. determining the acidity of gastric juice
3. What is the normal pH of the rumen contents:
1. 7.5 - 7.7
2. 6.8 - 7.4
3. 6.6 - 6.8
4. 6.0 - 6.5
4. What is used to determine the activity of rumen microflora:
1. 20% solution of sulfasalicylic acid
2. methylene blue
3. acetic acid
4. 5% trichloroacetic acid solution
5. How to prepare a stool sample to detect plant fiber:
1. With Lugol's solution
2. With Saathoff reagent
3. With 20% TCA solution
4. from an aqueous emulsion of feces
6. To determine what the Saathoff reagent is used when examining stool:
1. fat
2. starch
3. muscle fibers
4. indigestible fiber
7. To determine what Lugol's solution is used when examining stool:
1. fat
2. digestible fiber
3. starch
4. indigestible fiber
8. For what purpose is a saturated solution of table salt used when examining stool:
1. to identify helminth eggs
2. for determination of fatty acids
3. for determination of starch
4. for determination of neutral fats
9. Why is a benzidine test used when examining stool:
1. to determine occult blood
2. for determination of stercobilin
3. alkaline phosphatase activity
4. for determination of bilirubin
10. What does an increase in the concentration of indirect bilirubin in the blood serum indicate:
1. hemolytic jaundice
2. parenchymal jaundice
3. obstructive jaundice
4. liver cirrhosis
11. What pathology is oliguria typical for:
1. diabetes
2. feeding succulent feed

3. nervous excitement
4. acute renal failure

12. What provokes polyuria:
1. heart failure
2. diabetes mellitus
3. profuse sweating
4. fever

13. Which type of animal normally has mucus in its urine:
1. horse
2. pig
3. cattle
4. dog

14. What pathology causes watery urine:
1. oliguria
2. ishuria
3. polyuria
4. pollakisuria

15. What pathology is characterized by a fruity smell of urine:
1. pyelonephritis
2. cystitis
3. ketosis
4. urolithiasis

16. What qualitative test is used to determine protein in urine:
1. test with 20% sulfasalicylic acid
2. test with sulfuric acid
3. test with methylene blue
4. test with benzidine

17. To determine sugar in urine, the following is used:
1. test with ammonium sulfate
2. Jaffe test
3. Benedict's test
4. Bogomolov's test

18. What pathology causes an increase in the level of bilirubin in the urine:
1. diabetes
2. obstructive jaundice
3. pyelonephritis
4. ketosis

19. What reagent is used to determine bilirubin in urine:
1. 1% alcohol solution of iodine
2. 3% hydrogen peroxide solution
3. chloroform
4. 2% potassium permanganate solution

20. Which pathology is not characterized by urobilinuria:
1. hemolysis of red blood cells in the bloodstream
2. heavy metal poisoning
3. obstructive jaundice
4. fatty liver

21. What is classified as organized urine sediment:
1. red blood cells
2. triple phosphates
3. oxalates
4. uric acid salts

22. What are hyaline casts in urine formed from:
1. bilirubin
2. cholesterol
3. protein
4. hemoglobin

23. Which epithelial cells in urine are the smallest:
1. kidney cells
2. bladder cells
3. urethral cells

4. ureter cells

24. How many leukocytes are there in healthy animals in one field of view during microscopy of urine sediments:
1. 5–10
2. 0 – 2
3. 10 – 15
4. 15 – 30

25. Which of the urinary cylinders are characterized by strong refraction and a slightly yellowish color upon microscopy of urine sediments:
1. hyaline
2. epithelial
3. waxy
4. red blood cells

26. Which of the urinary cylinders are transparent and have a delicate contour upon microscopy of urine sediment?
1. hyaline
2. waxy
3. epithelial
4. hemoglobin

27. Changes in which organ are indicated by the appearance of cylinders in the urine:
1. bladder
2. urethra
3. kidneys
4. liver

28. Which of the urinary cylinders have a granular structure and are dark brown in color:
1. hemoglobin
2. leukocyte
3. epithelial
4. hyaline

29. Which of the unorganized sediments of urine are characteristic of an alkaline reaction of urine:
1. calcium oxalate
2. calcium sulfate
3. triple phosphates
4. uric acid salts

30. Which of the unorganized sediments of urine form a reddish sediment when standing and dissolve when heated:
1. calcium sulfate
2. uric acid salts
3. calcium oxalate
4. salts of hippuric acid

31. Which unorganized urine sediments resemble a "coffin lid" in appearance?
1. triple phosphates
2. calcium carbonate
3. salts of hippuric acid
4. calcium oxalate

32. Which of the unorganized sediments of urine resemble envelopes in appearance:
1. calcium sulfate
2. calcium oxalate
3. ammonium biurate
4. triple phosphates

33. What crystals of organic origin are found during microscopy of urine in the form of bright yellow needles:
1. leucine
2. bilirubin
3. hemoglobin
4. cholesterol

34. Which of the organic crystals of urine have the shape of rhombic transparent tablets:
1. hemoglobin
2. cystine
3. cholesterol
4. bilirubin

35. In what pathology is hypophosphatemia registered:
1. rickets
2. hypervitaminosis D

3. healing of fractures
4. kidney failure
36. Under what condition is hypocalcemia recorded:
1. cystitis
2. hypervitaminosis B12
3. rickets
4. hepatitis
37. Under what condition is hypercalcemia recorded:
1. rickets
2. osteodystrophy (stage III)
3. postpartum paresis
4. hypoparathyroidism
38. What is the normal ratio of calcium and phosphorus in blood serum:
1. 3 : 1
2. 2 : 1
3. 1:1
4.0.8:1
39. In what units is reserve alkalinity measured:
1.% CO2 by volume
2. mg/100 ml
3. mg/%
4. g/l
40. What pathology causes metabolic acidosis:
1. abundant feeding with concentrates
2. vomiting
3. fibrinous pneumonia
4. overfeeding with sugar-containing feeds
41. What method is used to determine total protein:
1. microscopic method
2. refractometric method
3. Sali method
4. Kudryavtseva's method
42. What pathology is hypoproteinemia observed in:
1. lack of carbohydrates in the body
2. sepsis
3. nephrosis
4. diabetes
43. What accompanies gas acidosis:
1. overheating of the body
2. anemia
3. encephalitis
4. bronchitis
44. What reagent is used to determine carotene in blood:
1. 95% ethyl alcohol
2. Lugol's solution
3. hydrochloric acid
4. Turk's liquid
45. In what units is the acid capacity of blood expressed:
1. mmol/l
2. g/l
3. mg/%
4.% CO2 by volume
46. What method is used to determine inorganic phosphorus in blood serum:
1. Spera
2. Koromyslova and Kudryavtseva
3. refractometric method
4. according to Vichev's method
47. What does a lack of carotene in the blood of animals lead to:
1. cardiac ischemia
2. damage to the epithelium of the genital organs
3. jade

4. hepatitis
48. What pathology causes weakening of twilight vision in animals:
1. hypovitaminosis C
2. hypoproteinemia
3. hypokaratinemia
4. hypercalcemia
49. What pathology causes an increase in the concentration of direct bilirubin in the blood serum:
1. obstructive jaundice
2. hemolytic jaundice
3. liver cirrhosis
4. bloodspot disease
50. By what method is the amount of total calcium in the blood serum determined:
1. Spera
2. Koromyslova and Kudryavtseva
3. refractometric method
4. Vicheva
51. Where is bilirubin formed:
1. liver and spleen
2. kidneys
3. small intestine
4. stomach
52. What is the pH value of blood plasma in mammals:
1. pH 1.0 - 2.0
2. pH 7.3 – 7.45
3. pH 6.8 - 7.0
4. pH 7.0 – 8.6
53. When hemolytic jaundice is observed:
1. blockage of the bile ducts
2. hemolysis of red blood cells
3. damage to liver cells (hepatocytes)
4. platelet hemolysis.
54. At what acidity does chronic gastritis occur:
1. with normal acidity
2. with increased (hyperaciditis)
3. from reduced (hypoacidas) down to zero level (anacitas)
4. for all types of acidity
55. What type of acid-base imbalance is preferable for the animal's body:
1. slight compensated alkalosis
2. slight compensated acidosis
3. uncompensated alkalosis
4. uncompensated acidosis
56. What elements are present in the feces of a healthy animal:
1. particles of plant food, tendons, cartilage, bones
2. large fragments of undigested food
3. mucus, pus, blood, parasites
4. muscle and connective tissue fibers
57. What are the reasons for increased smell of urine:
1) increased concentration of urine
2) with watery urine
3) polyuria
4) nocturia
58. What causes obstructive jaundice:
1. blockage of the biliary tract
2. hemolysis of red blood cells
3. damage to liver cells (hepatocytes)
4. damage to the central nervous system
59. What is the level of total acidity in hyperacid type of gastritis:
1. reaches 70 units. and is rapidly declining
2. on an empty stomach is 25–45 units, at the height of gastric digestion it increases to 90 units.
3. there is a sharp decrease in total acidity in gastric juice
4. there is an absence of free hydrochloric acid and a reaction to the test stimulus

60. What type of acid-base imbalance is most common in animals:
1. slight compensated alkalosis
2. slight compensated acidosis
3. uncompensated alkalosis
4. uncompensated acidosis
61. What is revealed in a stool smear with the addition of Lugol's solution:
1. fatty acids
2. starch and iodophilic microflora
3. mucus and films
4. undigested fiber
62. What physiological fluctuations in the relative density (g/ml) of urine are observed in healthy cows:
1) 1.005 - 1.025
2) 1.015 - 1.045
3) 1.015 - 1.050
4) 1.020 - 1.050
63. What causes parenchymal jaundice:
1) blockage of the bile ducts
2) hemolysis of red blood cells
3) damage to liver cells (hepatocytes)
4) damage to the central nervous system
64. What is the level of total acidity in asthenic type of gastritis:
1) reaches 70 units. and is rapidly declining
2) on an empty stomach is 25–45 units, at the height of gastric digestion it increases to 90 units
3) there is a sharp decrease in total acidity in gastric juice
4) there is an absence of free hydrochloric acid and a reaction to the test stimulus
65. What are the reference values of total calcium in cattle blood serum (mg/100 ml):
1) 9.5 - 13.5
2) 15 - 27
3) 10 - 12.5
4) 10 -14
66. What is revealed in a stool smear with the addition of Saathoff's reagent:
1) starch and iodophilic microflora
2) fats and their breakdown products
3) helminth eggs and cysts
4) undigested and digested fiber
67. What are the fluctuations in the relative density (g/ml) of urine in healthy dogs:
1) 1.005 - 1.025
2) 1.015 - 1.025
3) 1.015 - 1.030
4) 1.020 - 1.050
68. What is carotene:
1) amino acid
2) fatty acid
3) alcohol
4) unsaturated hydrocarbon
69. What smell of stomach contents is observed during atony:
1) carious
2) hydrogen sulfide
3) sour
4) acetone
70. What disease is accompanied by a lack of calcium in the body of animals:
1) ketosis
2) osteodystrophy and rickets
3) scurvy
4) nephrosis
71. What is detritus represented in a coprogram:
1) undigested fiber
2) accumulation of muscle and connective tissue fibers
3) unrecognizable feed particles
4) accumulation of fatty elements
72. What is determined during a chemical study of urine:

1) protein, sugar, ketone bodies, bile pigments
2) reaction of the medium, specific gravity, transparency, indican
3) specific gravity, pH, blood, bile pigments, consistency
4) transparency, bile pigments, relative density, glucose
73. Where does the conversion of carotene into vitamin A occur:
1) In the stomach
2) In the blood
3) In the liver and small intestine
4) In the large intestine
74. To determine what, a reaction with sulfosalicylic acid in urine is carried out:
1) glucose
2) ketone bodies
3) squirrel
4) indicana
75. Where does calcium absorption occur in the animal's body:
1) in the colon
2) in the large intestine
3) in the initial part of the small intestine
4) in the ileum
76. What is meconium:
1) unrecognizable feed particles.
2) original feces
3) accumulation of mucus
4) digested and undigested fiber.
77. How to determine urine pH:
1) pH meter, indicator paper, test strips
2) rifan, fan universal, biuret reaction
3) test with sulfosalicylic acid
4) quantitative Roberts-Stolnikov test
78. In which processes is vitamin A not involved?
1) regulation of vision
2) increasing immunity
3) formation of the skeleton
4) regulation of reproductive function
79. What is the density of stomach contents in healthy horses (g/ml):
1) from 1.006 to 1.016
2) from 1.002 to 1.015
3) from 0.015 to 0.045
4) from 1.003 to 1.005
80. How is calcium released from the body of animals:
1) large intestine, liver, kidneys, with milk
2) with milk
3) liver and kidneys
4) small intestine

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

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

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

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

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

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

4.2. Criteria for evaluating students' knowledge during testing

The test result is evaluated on a percentage rating scale. Each student is offered a set of test tasks of 25 questions:
The mark "**excellent**" is 25-22 correct answers.
The mark "**good**" is 21-18 correct answers.
The mark "**satisfactory**" is 17-13 correct answers.
The mark "**unsatisfactory**" is less than 13 correct answers

Knowledge criteria for the credit:

• The "credit" grade must correspond to the parameters of any of the positive grades ("excellent", "good", "satisfactory").
• A "no credit" grade must meet the parameters of an "unsatisfactory" grade.
• Mark "excellent" – all types of academic work provided for by the curriculum have been completed. The student demonstrates the correspondence of knowledge, skills and abilities to the indicators given in the tables, operates with acquired knowledge, skills and abilities, and applies them in situations of increased complexity. In this case, inaccuracies and difficulties may occur during analytical operations and the transfer of knowledge and skills to new, non-standard situations.
• Mark "good" – all types of educational work provided for by the curriculum have been completed. The student demonstrates the correspondence of knowledge, skills and abilities to the indicators given in the tables, operates with acquired knowledge, skills and abilities, and applies them in standard situations. In this case, minor errors, inaccuracies, and difficulties during analytical operations and the transfer of knowledge and skills to new, non-standard situations may be made.
• Mark "satisfactory" – one or more types of academic work provided for by the curriculum have not been completed. The student demonstrates incomplete compliance of knowledge, abilities, skills with the indicators given in the tables, significant mistakes are made, a partial lack of knowledge, abilities, and skills is manifested in a number of indicators, the student experiences significant difficulties in operating knowledge and skills when transferring them to new situations. –
• Mark "unsatisfactory" – the types of educational work provided for by the curriculum have not been completed. demonstrates incomplete compliance of knowledge, abilities, and skills with those given in the tables of indicators, significant errors are made, a lack of knowledge, abilities, and skills is manifested in a larger number of indicators; the student experiences significant difficulties in operating knowledge and skills when transferring them to new situations

6. ACCESSIBILITY AND QUALITY OF EDUCATION FOR DISABLED PEOPLE

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

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

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

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

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

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

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

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

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