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
_____ A.A. Sukhinin
27 June 2025

Department of Biology, Ecology and Histology

EDUCATIONAL WORK PROGRAM

for the discipline

"ZOOLOGY"

The level of higher education
SPECIALIST COURSE

Specialty 36.05.01 Veterinary Medicine
Profile: «General clinical veterinary medicine»
Full-time education
Education starts in 2025

Reviewed and adopted
at the meeting of the department
June 20, 2025
Protocol No. 10

Head of the Department of Biology, Ecology and Histology,
Doctor of Veterinary Sciences, Associate Professor
_____ M.E. Mkrtchyan

Saint Petersburg
2025

1. GOALS AND OBJECTIVES OF THE DISCIPLINE

The main purpose of the discipline is to master the fundamental morphological, physiological and environmental knowledge of organisms and their adaptive evolution to environmental conditions.

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

a) The general educational task consists in in-depth familiarization of students with the variety of morphological types of the structure of animal organisms and provides fundamental biological education in accordance with the requirements for higher educational institutions of a biological profile.

b) The applied task covers issues related to functional, evolutionary morphology, physiology and ecology of animals and creates a conceptual framework for the implementation of interdisciplinary structural and logical connections in order to develop medical thinking skills.

c) A special task is to familiarize students with modern trends and methodological approaches used in zoology to solve problems of animal husbandry and veterinary medicine, as well as existing achievements in this field.

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2. THE LIST OF PLANNED RESULTS OF MASTERING THE DISCIPLINE (MODULE), CORRELATED WITH THE PLANNED RESULTS OF MASTERING THE 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 Federal State Educational Standard on 36.05.01 "Veterinary Medicine".

The field of professional activity:

13 Agriculture

The universal competencies formed as a result of mastering the discipline

The study of the discipline should form the following competencies:

a) Universal competencies:

UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation

UC-1 ID-1 - **To know** methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis.

UC-1 ID-2 - **To be able to** gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies.

UC-1 ID-3 - **To possess skills** of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations.

b) General professional competencies:

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

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

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

GPC-2 ID-3 - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.

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

Discipline B.1.O.09 "Zoology" is a discipline of Block 1 of the mandatory part of the federal state educational standard of higher education in the specialty 36.05.01 "Veterinary Medicine" (specialty level).

It is mastered in the 2nd semester of full-time education.

During teaching the discipline "Zoology", the knowledge and skills acquired by students during the development of the disciplines: anatomy, cytology, histology and embryology, physiology, parasitology are used. The discipline of Zoology is the basic one on which most subsequent disciplines are based, such as:

1. Physiology and ethology of animals.
2. Cytology, histology and embryology.
3. Parasitology and invasive animal diseases.
4. Epizootology and infectious diseases of animals.
5. Veterinary-sanitary examination.

4. THE SCOPE OF THE DISCIPLINE “ZOOLOGY”

The scope of the discipline “Zoology” for full-time education

Type of educational work	Total hours	2nd semester
Class work (total)	**68**	**68**
Including:	**-**	**-**
Lectures, including interactive forms	34	34
Practical lessons (PL), including interactive forms	34	34
Practical training (PT)	8	8
Independent work (total)	**76**	**76**
Type of intermediate certification (test, exam)	**exam**	**exam**
Total labor intensity hours / credit points	**144/4**	**144/4**

5. THE CONTENT OF THE DISCIPLINE “ZOOLOGY”

The content of the discipline “Zoology” for full-time education

№	Name	Forming competencies	Semester	Types of academic work, including students' independent work and labor intensity (in hours)			
				L	PL	PT	IW
1.	The subject and objectives of zoology. The place of zoology in the system of biological and veterinary sciences. Methods of zoology	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies. **UC-1 ID-3** - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3** - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society;	2	2	-	-	2

		skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.					
2.	Single-cell animals. Phylum Sarcomastigophora SARCOMASTIGOPHORA. Subphylum Sarcodina and Flagellates. Plant and animal flagellates	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies. **UC-1 ID-3** - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3** - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.	2	1	1	-	5
3.	Phylum Apicomlex APICOMPLEXA. Class Sporozoa. Brief description of the types of Myxosporidia MYXOZOA and Microsporidia MICROSPORA	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies.	2	2	1	-	3

		UC-1 ID-3 - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3** - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.					
4.	Phylum Ciliata, or Infusorium CILIOPHORA. Phylogeny and ecological radiation of single-cell animals	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies. **UC-1 ID-3** - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts;	2	1	1	-	5

		ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3** - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.					
5.	Multi-cellular animals. Phylum Coelenterata COELENTERATA. hydroid, scyphozoan jellies, coral hydranths	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies. **UC-1 ID-3** - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3** - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying	2	2	1	-	2

		environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.					
6.	Phylum Flatworm PLATHELMINTHES. Classes: Turbellarian worms, Trematodes, Monogeneans, Cestodes	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies. **UC-1 ID-3** - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3** - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.	2	2	1	-	4
7.	Phylum Nematoda NEMATHELMINTHES. The main classes. Proper roundworms NEMATODA, proboscis worms ACANTHOCEPHALA	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and	2	2	1	-	3

		communication technologies. **UC-1 ID-3** - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3** - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.					
8.	Phylum Ringworms ANNELIDA. Polychaetae worms, oligochaetes, leeches. The importance of annelids in animal evolution.	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies. **UC-1 ID-3** - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of	2	2	1	-	8

		bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3** - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.					
9.	Phylum Mollusca MOLLUSCA. Gastropods, bivalves, cephalopods.	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies. **UC-1 ID-3** - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3** - Possess an idea of the origin of living organisms, the levels of organization	2	2	2	-	2

		of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.					
10.	Phylum Arthropods ARTHROPODA. Subphylum Gill-breathing. Class Crustacean. Subphylum Chelicerate. Class Arachnids. Spiders and ticks.	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies. **UC-1 ID-3** - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3** - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.	2	2	2	-	2
11.	Phylum Arthropods ARTHROPODA. Subphylum Tracheata. Class Insects	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for	2	2	2	2	8

		information and solutions based on actions, experiment, experience, and information and communication technologies. **UC-1 ID-3** - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3** - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.					
12.	General characteristics and origin of the phylum Chordate CHORDATA. Subphylum Acranial ACRANIA. Subphylum Urochordates UROCHORDATA. Ascidium.	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies. **UC-1 ID-3** - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification	2	2	2	-	2

		and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3** - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.					
13.	Phylum Vertebrate VERTEBRATA. Agnathia and Gnathostomes. Superclass Fish PISCES. Chondrichthyes and Osteichthyes.	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies. **UC-1 ID-3** - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body.	2	2	2	2	8

		GPC-2 ID-3 - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.					
14.	Class Amphibia AMPHIBIA	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies. **UC-1 ID-3** - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3** - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.	2	2	2	-	2
15.	Class Reptiles REPTILIA	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect	2	2	2	-	2

		and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies. **UC-1 ID-3** - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3** - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.					
16.	Class Birds AVES	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies. **UC-1 ID-3** - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism**	2	2	2	-	2

		GPC-2 ID-1 - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3** - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.					
17.	Class Mammal MAMMALIA	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies. **UC-1 ID-3** - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess	2	2	2	2	8

		the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3 -** Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.					
18.	Animal phylogeny. The evolution of individual organ systems.	**UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation** **UC-1 ID-1** - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis. **UC-1 ID-2** - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies. **UC-1 ID-3 -** To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations. **GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism** **GPC-2 ID-1** - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body. **GPC-2 ID-2** - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body. **GPC-2 ID-3** - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.	2	2	2	2	8
TOTAL FOR 2ND SEMESTER				**34**	**26**	**8**	**76**

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

6.1. Methodological instructive regulations for independent work

1. Amosov P.N. Biologiya: metodicheskie rekomendacii dlya studentov fakul'teta veterinarnoj medicin [Biology: Methodological recommendations for students of the Faculty of Veterinary Medicine] / P.N. Amosov, L.I. Prilutskaya, E.I. Chumasov; SPbGAVM – St. Petersburg: Publishing House of SPbGAVM, 2017. – 33 p. URL: https://search.spbguvm.informsystema.ru/viewer.jsp?aWQ9NTUmcHM9MzE (date of access: June 20, 2025). - Access mode: for authorization. EB SPbGUVM users. - Text : electronic.

2. Amosov, P. N. Zoologiya : metodicheskie ukazaniya po samostoyatel'noj rabote dlya studentov, obuchayushchihsya po special'nosti 36.05.01 «Veterinariya» ochnoj, ochno-zaochnoj i zaochnoj form obucheniya [Zoology: methodological guidelines for independent work for students studying in the specialty 36.05.01 "Veterinary Medicine" full-time, part-time and extramural forms of education] / Pavel Nikolaevich Amosov; Ministry of Agriculture of the Russian Federation, SPbGAVM. - St. Petersburg: SPbGAVM, 2019. - 27 p. - URL: https://search.spbguvm.informsystema.ru/viewer.jsp?aWQ9NTE4JnBzPTI3 (date of access: June 20, 2025). - Access mode: for authorization. EB SPbGUVM users. - Text : electronic.

6.2. Literature for independent work

1. Konstantinov V.M. Zoology of vertebrates: Textbook for students of biol. spec. pedagogical universities. [Zoologiya pozvonochnyh: Uchebnik dlya studentov biol. spec. ped. vuzov.] / V.M. Konstantinov, S.P. Naumov, S.P. Shatalova. – M.: Academy, 2000. – 496 p. (1 copy)

2. Sharova I.H. Zoologiya bespozvonochnyh: Uchebnik dlya studentov vyssh. uchebn. zavedenij [Zoology of invertebrates: Textbook for university students. educational. Institutions] / Sharova Inessa Khristianovna. – M.: Vlados, 2002. – 592 p.

3. Dzerzhinsky, Felix Yanovich. Sravnitel'naya anatomiya pozvonochnyh zhivotnyh: Ucheb. dlya stud. vuzov [Comparative anatomy of vertebrates: Studies for students. Universities] / Dzerzhinsky Felix Yanovich ; Moscow State University named after M.V. Lomonosov. - 2nd ed., ispr., reprint. and additional - M.: Aspect Press, 2005. - 304 p.: ill.

4. Dogel V.A. Zoologiya bespozvonochnyh: uchebnik dlya un-tov [Zoology of invertebrates: a textbook for scientists] / Dogel Valentin Alexandrovich. – 9th ed., ster. – M.:Alliance, 2011. – 606 p. (5 copies)

5. Naumov, N. P. Zoologiya pozvonochnyh: ucheb. dlya biol. spec. un-tov: V 2-h ch. CH. 1. Nizshie hordovye, beschelyustnye, ryby, zemnovodnye [Zoology of vertebrates: studies. for biol. special units: In 2 hours. 1. Lower chordates, jawless, fish, amphibians] / Naumov Nikolay Pavlovich, Kartashev Nikolay Nikolaevich. - M. : Higher School, 1979. - 333 p. - 1-10. (14 copies)

6. Naumov, N. P. Zoologiya pozvonochnyh: ucheb. dlya biol. spec. un-tov: V 2-h ch. CH. 2. Reptilii. Pticy. Mlekopitayushchie [Zoology of vertebrates: studies. for biol. special units: In 2 hours. 2. Reptiles. Birds. Mammals] / Naumov Nikolay Pavlovich, Kartashev Nikolay Nikolaevich. - M. : Higher School, 1979. - 272 p. - 1-10. (13 copies)

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

a) basic literature:

1. Handbook of Zoology: annelida. Volume 1. Annelida Basal Groups and Pleistoannelida, Sedentaria I / Edited by Günter Purschke, Markus Böggemann and Wilfried Westheide. - Berlin ; Boston : Walter de Gruyter GmbH & Co. KG, [2019]. - 480 p. - URL: https://search.spbguvm.informsystema.ru/viewer.jsp?aWQ9MjEwMjAmcHM9NDkz (date of access: June 20, 2025). - Access mode: for authorization. EB SPbGUVM users. - Text : electronic.

2. Handbook of Zoology: annelida. Vol.2. Pleistoannelida, Sedentaria II / Editor-in-chief

A. Schmidt-Rhaesa; Ed. by G. Purschke, M. Boggemann, W. Westheide. - Berlin ; Boston : Walter de Gruyter GmbH & Co. KG, 2019. - 465 p. - URL: https://search.spbguvm.informsystema.ru/viewer.jsp?aWQ9MjA5MDcmcHM9NDc3 (date of access: June 20, 2025). - Access mode: for authorization. EB SPbGUVM users. - Text : electronic.

b) additional literature:

1. Lukin E.I. Zoologiya: Uchebnik dlya studentov VUZov [Zoology: Textbook for university students] / E.I. Lukin. – M.: Agropromizdat, 1989 – 384 p. 415 copies.

2. Veselov, E.A. Praktikum po zoologii [Practicum on zoology] / E. A. Veselov. - 3rd ed., add. Moscow : Higher School of Economics, 1979, - 240 p. - URL: https://search.spbguvm.informsystema.ru/viewer.jsp?aWQ9MzI1JnBzPTEyMQ (date of access: June 20, 2025). - Access mode: for authorization. EB SPbGUVM users. - Text : electronic.

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

To prepare for practical classes and perform independent work, students can use the following online resources:

1. http://www.theanimalworld.ru/ Animals
2. http://www.zin.ru/museum/ Website of the Zoological Museum of the ZIN RAS (St. Petersburg)
3. http://www.sbio.info Biology

Electronic library system:

1. ELS «SPBGUVM»
2. ELS «Konsultant studenta»
3. Legal Reference System «KonsultantPlyus»
4. University Information System «ROSSIYA»
5. Full-text database POLPRED.COM
6. Scientific Electronic Library ELIBRARY.RU
7. Rossijskaya nauchnaya Set
8. Electronic library system IQlib
9. Full-text interdisciplinary database on agricultural and environmental sciences ProQuest AGRICULTURAL AND ENVIRONMENTAL SCIENCE DATABASE
10. E-books of the publishing house «Prospekt Nauki» http://prospektnauki.ru/ebooks/
11. Collection «Selskoe khozyajstvo. Veterinariya» izdatelstva «Kvadro» http://www.iprbookshop.ru/586.html

9. METHODOLOGICAL GUIDELINES FOR STUDENTS ON THE DEVELOPMENT OF THE DISCIPLINE

Methodological recommendations for students are a set of recommendations and explanations that allow the student to optimally organize the process of studying this discipline. 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 fruitful 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 mastery 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).

- Recommendations for working on lecture material

When preparing for a lecture, the student is recommended:

1) view the recordings of the previous lecture and restore the previously studied material in memory;

2) it is also useful to review the upcoming material of a future lecture;

3) if an independent study of individual fragments of the topic of the last lecture is set, then it must be completed without delay;

4) psychologically tune in to the lecture.

This work includes two main stages: lecture notes and subsequent work on lecture material.

Taking notes means making a synopsis, i.e. a brief written statement of the content of something (an oral presentation - a speech, lecture, report, etc., or a written source – a document, article, book, etc.).

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 repeatedly read 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 postpone most of the complex 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 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 and which 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, the number, topic, list of issues under consideration, volume in hours and links to recommended literature are provided. For classes conducted in interactive forms, their 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. When preparing for a practical lesson for students, it is necessary to study or repeat theoretical material on a given topic.

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

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

2) to 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 is assignments. The basis of the assignment 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;
- instill skills of independent thinking, oral presentation;
- contribute to the free operation of terminology;
- provide the teacher with the opportunity to systematically monitor the level of independent work of students.

Methodological guidelines for practical (seminar) classes in 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 independent 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 their hypotheses and ideas. In addition, the skills of research work necessary for further professional activity are being developed.

When starting to study the literature on the topic, it is necessary to make notes, extracts. It is imperative 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 extracts from the studied sources. All extracts and quotations must have the exact "return address" (author, title of the work, year of publication, page, etc.). It is advisable to write an abbreviated title of the question to which the extract or quotation refers. In addition, it is necessary to learn how to immediately compile a file of special literature and publications of sources, both proposed by the teacher and identified independently, as well as refer to bibliographic reference books, chronicles of journal articles, book chronicles, abstract journals. At the same time, publications of sources (articles, book titles, etc.) should be written on separate cards, which must be filled in according to the rules of bibliographic description (surname, initials of the author, title of the work. Place of publication, publisher, year of publication, number of pages, and for journal articles – the name of the journal, year of publication, page numbers). On each card, it is advisable to record the thought of the author of the book or a fact from this book on only one specific issue. If the work, even in the same paragraph or phrase, contains more judgments or facts on another issue, then they should be written out on a separate card. The presentation should be concise, accurate, without subjective assessments. On the back of the card, you can make your own notes about this book or article, its content, structure, on which sources it is written, etc.

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

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

10. EDUCATIONAL 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 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

The educational process of the discipline provides for the use of information technology:

- ✓ conducting practical classes using multimedia;
- ✓ interactive technologies (conducting dialogues, collective discussion of various approaches to solving a particular educational and professional task);
- ✓ interaction with students via e - mail;
- ✓ EIOS SPbGUVM: https://spbguvm.ru/academy/eios/

11.2. Software

The list of licensed and freely distributed software, including domestic production

№	The name of the technical and computer training tools recommended by sections and topics of the program	License
1	MS PowerPoint	67580828
2	LibreOffice	free software
3	OS Alt Obrazovanie 8	AAO.0022.00
4	ABIS "MAPK-SQL"	02102014155
5	MS Windows 10	67580828
6	Sistema KonsultantPlyus	503/КЛ
7	Android OC	free software

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

The name of the discipline (module), practice in accordance with the curriculum	**The name of special rooms and rooms for independent work**	**Equipment of special rooms and rooms for independent work**
Zoology	223 (196084, St. Petersburg, Chernihiv str., 5) Classroom for laboratory classes, seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification	*Specialized furniture:* blackboard, tables, chairs. *Technical training tools:* Interactive whiteboard. *Visual aids and educational materials:* microscopes, a set of educational micro-preparations of animals, wet preparations of animals, posters on sections of zoology.

	219 (196084, St. Petersburg, Chernihiv str., 5) Classroom for laboratory classes, seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification	*Specialized furniture:* blackboard, tables, chairs. *Technical training facilities:* TV, laptop. *Visual aids and educational materials:* microscopes, a set of educational micro-preparations of animals, wet preparations of animals, posters on sections of zoology.
	206 Large reading room (196084, St. Petersburg, Chernihiv str., house 5) Room for independent work	*Specialized furniture:* tables, chairs *Technical means of education:* computers connected to the Internet and access to an electronic information and educational environment
	214 Small reading room (196084, St. Petersburg, Chernihiv str., house 5) Room for independent work	*Specialized furniture:* tables, chairs *Technical means of education:* computers connected to the Internet and access to an electronic information and educational environment
	324 Information Technology Department (196084, St. Petersburg, Chernihiv str., house 5) Room for storage and preventive maintenance of educational equipment	*Specialized furniture:* tables, chairs, special equipment, materials and spare parts for preventive maintenance of technical training facilities
	Box No. 3 Carpentry workshop (196084, St. Petersburg, Chernihiv str., house 5) A room for storage and preventive maintenance of educational equipment	*Specialized furniture:* tables, chairs, special equipment, materials for preventive maintenance of specialized furniture

Developer:

Candidate of Biological Sciences,
Associate Professor _____ P.N. Amosov

Annex

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

Department of Biology, Ecology, Histology

FUND OF ASSESMENT TOOLS
for the discipline

" ZOOLOGY "
Level of higher education
SPECIALIST COURSE
Specialty 36.05.01 Veterinary Medicine
Profile: «General clinical veterinary medicine»
Full-time education

Education starts in 2025

Saint Petersburg
2025

1. PASSPORT OF THE EVALUATION FUND

Table 1

№	Emerging competencies	Supervised sections (topics) of the discipline	Evaluation tool
1.	**UC-1 ID-1** **UC-1 ID-2** **UC-1 ID-3** **GPC-2 ID-1** **GPC-2 ID-2** **GPC-2 ID-3**	Section 1. Single-cell animals	Colloquium, tests, abstract
2.		Section 2. Acoelomate forms and primary cavities many-celled animals	Colloquium, tests, abstract
3.		Section 3. Coelomate animals (except chordates)	Colloquium, tests, abstract
4.		Section 4. Coelomate animals. Chordates.	Colloquium, tests, abstract

An approximate list of evaluation tools

Table 2

№	Name of the evaluation tool	Brief description of the evaluation tool	Presentation of the evaluation tool in the fund
1.	Colloquium	A means of controlling the assimilation of educational material of a topic, section or sections of a discipline, organized as an educational activity in the form of an interview between a teacher and students	Questions on topics/sections of the discipline
2.	Test	A system of standardized tasks that allows you to automate the procedure for measuring the level of knowledge and skills of a student	The fund of test tasks
3.	Abstract	The product of the student's independent work, which is a written summary of the results of the theoretical analysis of a certain scientific (educational and research) topic, where the author reveals the essence of the problem under study, provides various points of view, as well as his own views on it	Topics of the abstracts

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

Table 3

Planned results of competence development	The level of development				Evaluation tool
	unsatisfactory	**satisfactory**	**good**	**excellent**	
UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation					
UC-1 ID-1 - **To know** methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis.	The level of knowledge is below the minimum requirements, gross errors have occurred	The minimum acceptable level of knowledge, many blunders have been made	The level of knowledge in the volume corresponding to the training program, several blunders were made	The level of knowledge in the volume corresponding to the training program, without errors.	Colloquium, tests, abstract
UC-1 ID-2 - **To be able to** gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies.	Basic skills were not demonstrated when solving standard tasks, and gross errors occurred	Basic skills have been demonstrated, typical tasks with minor errors have been solved, all tasks have been completed, but not in full	All basic skills have been demonstrated, all basic tasks have been solved with minor errors, all tasks have been completed in full, but some with flaws	All basic skills have been demonstrated, all basic tasks have been solved with some minor flaws, and all tasks have been completed in full	Colloquium, tests, abstract
UC-1 ID-3 - **To possess skills** of evaluation of the problem of professional activity with the analyze of		There is a minimal set of skills for solving	All basic skills have been demonstrated, all	Demonstrated skills in solving	Colloquium, tests, abstract

synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations.	Basic skills were not demonstrated when solving standard tasks, and gross errors occurred	standard tasks with some shortcomings	basic tasks have been solved with minor errors, all tasks have been completed in full, but some with flaws	non-standard tasks without errors and shortcomings	
GPC-2 Is able to interpret and evaluate in its professional activity the influence of natural, socio-economic, genetic and economic factors on the physiological state of the animal organism					
GPC-2 ID-1 - To know the environmental factors of the environment, their classification and the nature of relationships with living organisms; basic ecological concepts, terms and laws of bioecology; interspecific relations of animals and plants, predator and prey, parasites and hosts; ecological features of some types of pathogenic microorganisms; mechanisms of influence of anthropogenic and economic factors on the animal body.	The level of knowledge is below the minimum requirements, gross errors have occurred	The minimum acceptable level of knowledge, many blunders have been made	The level of knowledge in the volume corresponding to the training program, several blunders were made	The level of knowledge in the volume corresponding to the training program, without errors.	Colloquium, tests, abstract
GPC-2 ID-2 - Be able to use environmental factors and environmental laws in agricultural production; apply the achievements of modern microbiology and ecology of microorganisms in animal husbandry and veterinary medicine in order to	Basic skills were not demonstrated when solving	Basic skills have been demonstrated, typical tasks with minor errors have been solved, all	All basic skills have been demonstrated, all basic tasks have been solved with minor errors, all tasks	All basic skills have been demonstrated, all basic tasks have been solved with some minor flaws, and all tasks	Colloquium, tests, abstract

prevent infectious and invasive diseases and treat animals; use environmental monitoring methods in the environmental examination of agricultural facilities and the production of agricultural products, including using digital to assess the impact of anthropogenic and economic factors on the animal body.	standard tasks, and gross errors occurred	tasks have been completed, but not in full	have been completed in full, but some with flaws	have been completed in full	
GPC-2 ID-3 - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.	Basic skills were not demonstrated when solving standard tasks, and gross errors occurred	There is a minimal set of skills for solving standard tasks with some shortcomings	Basic skills are demonstrated in solving standard tasks with some shortcomings	Demonstrated skills in solving non-standard tasks without errors and shortcomings	Colloquium, tests, abstract

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

3.1. Typical tasks for the current monitoring of academic performance

3.1.1. Questions for the colloquium

Questions for competence assessment:

UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation

UC-1 ID-1 - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis.

UC-1 ID-2 - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies.

UC-1 ID-3 - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations.

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

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

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

GPC-2 ID-3 - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.

Section 1. Single-cell animals:

1. Phylum Sarcomastigophora SARCOMASTIGOPHORA. General characteristics of the type and division into subtypes and classes. Principles of classification
2. Subphylum Sarcodes SARCODINA. Structural and functional characteristics. Classes: Rhizopods, Radiolarian, Heliozoa
3. Subphylum Flagellates MASTIGOPHORA. Characteristics of the class Plant Flagellates. The structure of Euglena and Volvox. Reproduction of colonial flagellates

4. Subphylum Flagellates MASTIGOPHORA. Characteristics of the class Flagellate. Kinetoplastids (Trypanosomes and Leishmanias), multiflagellate (Giardia and Trichomonad). Structural features and parasitological significance
5. Electron microscopic structure of cilia and flagella
6. Phylum Apicomplexa APICOMPLEXA. General characteristics of the phylum and classification (Perkinsea and Sporozoan). Features of the life cycle of Sporozoan. The structure of the apical complex and its function
7. Ordo Sporozoan (Gregarines, Coccidia). Suborders Coccidia (Eimeria, Hemosporidia, Phyroplasma). Their parasitological significance
8. Coccidiosis of animals. The life cycle of Eimeria
9. The life cycle of Toxoplasma gondii
10. Hemosporidia. The life cycle of representatives of the genus Plasmodium. The main and intermediate hosts of the parasite. Malaria.
11. Phylum Myxosporidia MYXOZOA and Microsporidia MICROSPORA. General characteristics
12. The structure of unicellular animals of the Phylum CILIOPHORA. Classes and main subclasses of infusoria.
13. Ciliates are symbionts and parasites.
14. Conjugation of Infusoria is one of the ways of sexual reproduction
15. Phylogeny and environmental radiation of PROTOZOA

Section 2. Acoelomate forms and primary cavities many-celled animals:

1. Sub-kingdom METAZOA multicellular animal. Hypotheses of the origin of multicellular
2. Phylum Sponge SPONGIA. General characteristics
3. Phylum Coelenterata COELENTERATA. General characteristics
4. Phylum Coelenterata COELENTERATA. Class Hydroid HYDROZOA. The structure of the Freshwater Hydra. Colonial marine Hydroids. The life cycle of an Obelia
5. Phylum Coelenterata COELENTERATA. Scyphozoan jellies SCYPHOZOA and Coral hydranths ANTHOZOA. Brief description and meaning
6. Phylum Flatworms PLATHELMINTHES. Systematic division into classes and general characteristics
7. Phylum Flatworms PLATHELMINTHES. TURBELLARIA ciliate worms. Building
8. Phylum Flatworms PLATHELMINTHES. Class Flukes TREMATODA. The peculiarities of structure and reproduction.
9. The life cycle of the liver fluke Fasciola Hepatica
10. The life cycle of the lanceolate fluke Dicrocoelium lanceatum
11. The life cycle of the feline fluke Opistorchis felineus
12. Class Monogeneia MONOGENOIDEA
13. Class Tapeworms (Cestodes) CESTODA. Classification. Features of the structure and reproduction
14. The life cycle of armed (porcine) Taenia solium and unarmed (bovine) tenacious Taeniarhynchus saginatus
15. The life cycle of the broad tapeworm Diphyllobothrium latum
16. The life cycle of Echinococcus Echinococcus granulosus
17. Phylum Roundworms NEMATHELMINTHES. General characteristics of the phylum. Division into classes.
18. The structure of the ascaris as a representative of the Class Nematode NEMATODA.
19. The life cycle of the equine Parascaris equorum and the human ascaris Ascaris lumbricoides.
20. The life cycle of pinworms (equine Oxyura Equi, human Enterobius ver-micularis)
21. The life cycle of the spiral trichinella Trichinella spiralis.

22. Class Scrapers ACANTHOCEPHALA. General characteristics

Section 3. Coelomate animals (except chordates):

1. Formation and meaning of the whole. Secondary cavities (main types)
2. Phylum Annelid worms ANNELIDA. General characteristics
3. Phylum Annelid worms ANNELIDA. Class Polychaete worms POLYCHAETA. Characteristics of organ systems
4. Phylum Annelid worms ANNELIDA. Class small-scale worms OLIGOCHAETA. The structure of the earthworm. Reproduction
5. Phylum Annelid worms ANNELIDA. Class Leech HIRUDINEA. Ancient and present leeches. Structure, veterinary and medical significance.
6. Phylum Arthropods ARTHROPODA. General characteristics
7. Phylum Arthropods ARTHROPODA. Subphylum gill-breathing BRANCHIATA. Class Crustacea CRUSTACEA. Class systematics and structure.
8. Phylum Arthropods ARTHROPODA. Subphylum Chelicerata CHELICERATA. Class Arachnides ARACHNIDA. Classification and structural features.
9. Ticks are parasitic arachnids and disease vectors
10. Phylum Arthropodes ARTHROPODA. Subphylum Tracheal TRACHEATA. Class Millipede MIRIAPODA. Class Insect INSECTA. Systematic classification and structural features of insects
11. Phylum Mollusca MOLLUSCA. Class Gastropoda GASTROPODA. Classification and structural features
12. Phylum Mollusca MOLLUSCA. Class bivalve, or LAMELLIBRANCHIA BIVALVIA (LAMELLIBRANCHIA).
13. Class CEPHALOPODA cephalopods. Features of the structure
14. Phylum Hemichordata HEMICHORDATA as possible ancestors of chordates

Section 4. Coelomate animals. Chordates.:

1. Systematic classification of the phylum Chordate CHORDATA. Non-systematic chordal groups
2. Phylogeny of Chordates. Modern views
3. Subphylum Craneless ACRANIA. Class Cephalochordata CEPHALOCHORDATA. The structure of the lanceolate Branchiostoma lanceolatum
4. Reproduction and embryonic development of the lanceolate
5. Subphylum Larval chordates UROCHORDATA. The structure of ascidia. Salps and appendicularies*
6. Subphylum vertebrate VERTEBRATA. General characteristics
7. *Jawless. Class round-mouthed CYCLOSTOMATA. Brief description
8. Maxillofacial. Superclass Fish PISCES. Class Cartilaginous fish CHONDRICHTIES. Shark and Stingray squadrons. The origin of fish
9. Superclass Fish PISCES. Class Bony fish OSTEYCHTYES. Lobe-finned and ray-finned fish. Structural features of bony fish TELEOSTEI
10. Superclass Terrestrial vertebrates TENRAPODA. Class Amphibian AMPHIBIA. Characteristics of organ systems of the first terrestrial vertebrates of animals.
11. Amniotes. Class Reptiles REPTILIA. Systematic classification (subclasses, detachments, sub-orders). The structure of organ systems
12. Class Bird AVES. Features of birds related to the ability to fly. External structure, integuments, skeleton and musculature
13. Class Bird AVES. Digestive system, respiration, circulatory system, excretion in birds
14. Class Bird AVES. Nervous system and sensory organs
15. Class Bird AVES. Reproduction and development (embryonic and postembryonic) of birds. Mature and immature hatchlings

16. The origin and evolution of birds
17. Class Mammals MAMMALIA. Systematic and ecological classification. Oviparous and viviparous mammals. The origin of mammals
18. Class Mammals MAMMALIA. External structure, integuments and their production, skeleton and musculature
19. Class Mammals MAMMALIA. The digestive system and respiration.
20. Class Mammals MAMMALIA. The circulatory and excretory system.
21. Class Mammals MAMMALIA. Nervous system and sensory organs
22. Class Mammals MAMMALIA. Reproduction and development. The structure of the polo organs. The uterus and its types. The placenta and its types. Postembryonic development

Note: *The question is additional and can be excluded

3.1.2. Topics of the abstracts

Topics of abstracts for competence assessment: **US-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation**

UC-1 ID-1 - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis.

UC-1 ID-2 - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies.

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

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

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

GPC-2 ID-3 - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.

1. Modern systematic classification of flagellates. Plant flagellates and their role in nature.

2. The diversity of representatives of the Class Sarcodaceae (Phylum SARCOMASTIGOPHORA). Parasitological and geological significance of sarcodes.
3. Animal flagellates are parasites. Diseases caused by representatives of the zoo are stigophores.
4. Eimeriosis in birds and mammals and their prevention.
5. Malaria in humans. Types of malaria plasmodium, its vectors.
6. Modern classification of infusoria. The sexual process (conjugation) in infusaries. Parasitic and free-living infusoria.
7. Hypotheses of the origin of multicellular.
8. Coral hydranths. The importance of coral polyps in marine ecosystems.
9. The diversity and significance of scyphozoan jellies.
10. Turbellaria ciliate worms, their diversity and importance as free-living organisms.
11. Trematoda flukes are parasites of animals and humans.
12. Monogeneia (MONOGENOIDEA) are parasites of fish and amphibians.
13. Parasitological significance of tapeworms. Prevention of Cestodoses.
14. Nematodes are parasites of animals and plants.
15. Scrapers, their structure and meaning.
16. The importance of rotifers in aquatic ecosystems.
17. Marine annelid worms.
18. The role of annelids in soil formation.
19. Leeches and their meaning. The use of medical leeches in medicine.
20. The diversity of crustaceans in freshwater ecosystems.
21. Marine crustaceans and their significance.
22. Ticks are parasites of animals and carriers of dangerous diseases. Prevention of diseases carried by ticks.
23. Millipedes, their significance and habitats.
24. Insects are parasites of animals.
25. Insects are carriers of dangerous diseases.
26. Social insects.
27. Poisonous arthropods.
28. Lampreys and myxins, diversity of species and significance.
29. The role of mollusks in the transmission of dangerous parasitic diseases.
30. Commercial importance of shellfish. The volume and regulation of fishing in Russia.
31. Salps and appendicularies.
32. Sharks and rays.
33. Sturgeon-like fish of Russia, their importance and protection.
34. Salmon fish and protection of fish stocks in Russia.
35. Fish diseases in pond farms and their prevention.
36. The importance of insectivorous birds in agriculture.
37. Nest parasitism in cuckoos.
38. The origin and evolution of birds – a modern view of the problem.
39. Oviparous mammals.
40. Marsupial mammals.
41. Rodents are carriers of dangerous diseases.
42. Studying the behavior of toothed whales.

3.1.3. Tests

Competency assessment tests:

UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation

UC-1 ID-1 - To know methods of critical analysis and evaluation of modern scientific

achievements; basic principles of critical analysis.

UC-1 ID-2 - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies.

UC-1 ID-3 - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations.

Section 1. SINGLE-CELL ANIMALS

1. What is the structure of the cover of an ordinary ameba?
a) the cell membrane;
b) cellulose shell;
c) pellicle;
d) a membrane and a cellulose shell.

2. Which of the unicellular organisms does not have a permanent body shape:
a) Infusoria paramecia;
b) Volvox;
c) Trypanosome;
d) an ordinary ameba.

3. How many nuclei are there in the cyst of a Dysentery ameba?
a) 8;
b) 4;
c) 2;
d) 1.

4. Which sarcodes do not have shells?
a) Foraminifera;
b) Difflugia;
c) Intestinal ameba;
d) Radiolaria.

5. What structure is covered by the Euglena viridis cell:
a) four membranes;
b) one membrane;
c) a cellulose shell;
d) pellicle of membrane and dense ectoplasm.

6. How is the pellicle of infusoria arranged?
a) it consists of two membranes;
b) consists of a membrane and a dense layer of ectoplasm;
c) consists of two outer and two inner membranes with an interval between them;
d) consists of three membranes.

7. Name the function of the contractile vacuole:
a) phagocytosis;
b) osmoregulation and isolation;
c) pinocytosis;
d) digestion.

8. In what condition do the roots survive adverse conditions:
a) they usually die;
b) form a shell;
c) form a cyst (protective shell);
d) they are always in favorable conditions.

9. Where do foraminifera live?
a) in salty marine and oceanic waters;
b) in fresh water;
c) in the soil;
d) in humid air.

10. Which of the listed unicellular organisms have a cytostome (cellular mouth):
a) Amoeba proteus;
b) Entamoeba coli;
c) Eimeria stiedae;
d) Euglena viridis.

11. Which of the listed organisms have palinomic cell division in their life cycle:
a) Paramecium caudatum;
b) Euglena viridis;
c) Amoeba histolitica;
d) Volvox sp.

12. Continue the definition: Schizogony is… . Choose the correct and complete answer.
a) the process of asexual reproduction;
b) the process of sexual reproduction;
c) the process of asexual reproduction of unicellular organisms, in which multiple nuclear division occurs followed by cytotomy;
d) the process of asexual reproduction of organisms, in which a series of binary divisions occurs without a stage of cell growth.

13. What structures are part of the apical complex in most Sporozoa?
a) conoid;
b) grumbles;
c) conoid and murmurs;
d) conoid, roptria and micronemes.

14. Which organism is the carrier of malaria plasmodium of the genus Plasmodium?
a) tsetse fly Clossina morsitans, Cl. palpalis;
b) mosquitoes of the genus Anopheles;
c) mosquitoes of the genus Culex;
d) housefly Musca domesticus.

15. How many membranes does the Coccidium pellicle consist of:
a) one;
b) two;
c) three;
d) four.

16. At what stage of the life cycle of Eimeria does the rabbit become infected?

a) schizont;
b) sporozoite;
c) macro- and microgamont;
d) oocyst.

17. In which rabbit tissue does schizogony and the formation of merozoites occur in Eimeria?
a) in skeletal muscles;
b) in the heart muscle;
c) in the intestinal epithelium;
d) in the skin epithelium.

18. Where does sporogony occur in coccidia of the genus Eimeria:
a) in the intestines of a rabbit;
b) in the body of an intermediate host;
c) in the rabbit's brain;
d) in the environment, outside the host's body.

19. What stages of the life cycle of Toxoplasma gondii occur in the body of the main host (cat)?
a) schizogony and stages of the reproductive cycle (formation of germ cells and their copulation);
b) the development of oocysts – sporogony;
c) asexual reproduction of cells by type of endodiogeny;
d) stages of germ cell formation.

20. How many spores and sporozoites are formed in the oocyst of Toxoplasma gondii?
a) four spores with two sporozoites in each;
b) two spores with four sporozoites in each;
c) one spore with eight sporozoites;
d) four spores with one sporozoite in each spore.

21. In which human organs and tissues do schizogony and the formation of malarial plasmodium stem cells occur?
a) in liver cells;
b) in blood cells;
c) in intestinal epithelial cells;
d) in liver cells and blood cells (erythrocytes).

22. In the body of which host of malarial plasmodium (primary or intermediate) and where is the copulation of germ cells and the formation of a motile zygote - ookineta?
a) in the erythrocytes of the intermediate host – human;
b) in the intestinal cells of an intermediate human host;
c) in the intestinal cavity of the main host, the mosquito of the genus Anopheles;
d) in the intestinal epithelial cells of an Anopheles mosquito.

23. Where does the formation of oocysts with sporozoites of malarial plasma occur?
a) on the outer wall of the intestine of the Anopheles mosquito;
b) in the intestinal epithelium of the Anopheles mosquito;
c) in the external environment;
d) in human erythrocytes.

24. How does human malaria infection occur (sources and pathways):

a) when eating insufficiently thermally processed foods;
b) in contact with a sick person by airborne droplets;
c) during sexual contact;
d) when bitten by Anopheles mosquitoes infected with malaria plasmodium or through the blood of a person with malaria (for example, during blood transfusion).

25. Where do pyroplasmids parasitize in the mammalian body with the disease of pyroplasmosis and who is their carrier?
a) in intestinal cells, the vector is mosquitoes;
b) in skin cells, carriers are blood–sucking insects;
c) in the intestinal cavity, vectors – houseflies, infection – through food products;
d) in erythrocytes, carriers are blood–sucking mites.

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

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

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

GPC-2 ID-3 - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.

Section II. Phylums COELENTERATES, FLATWORMS, ROUNDWORMS

1. In what environment do coelenterates live?
a) air-ground,
b) water,
c) soil,
d) in all environments.

2. What type of symmetry is typical for coelenterates?
a) bilateral,
b) radial,
c) there is no symmetry.

3. What types of cells do hydra have in the ectoderm?
a) epithelial, muscular, stinging, sensitive, interstitial (pro-interstitial),
b) epithelial-muscular, stinging, sensitive, nervous,
c) epithelial-muscular, stinging, sensitive, nervous, interstitial (intermediate),
d) epithelial, muscular, stinging, sensitive, interstitial (intermediate), nervous, sexual.

4. What types of cells make up the endoderm?
a) epithelial-muscular digestive cells, glandular, stinging;
b) epithelial-muscular digestive cells, glandular, nervous;
c) epithelial-muscular digestive cells, glandular, stinging, nervous;
d) epithelial-muscular digestive cells, glandular.

5. What is the name of the stage of the life cycle of scyphozoa jellie developing from a fertilized egg (zygote)?
a) microscopic larva with cilia – planula;
b) scyphostoma polyp;
c) ether;
d) an immobile bottom larva.

6. What stage is missing in the life cycle of coral polyps?
a) planula;
b) jellyfish;
c) all stages are present (planula, jellie, hidrants);
d) polyp.

7. What type of epithelium do turbellariae have?
a) single-layer submerged;
b) single-layer ciliated (shimmery);
c) the tegument;
d) single-layer submerged and ciliated.

8. What is the function of ciliated worms (Turbellaria) performed by rhabditic cells with rhabdites?
a) protective;
b) reduces friction against water;
c) serve to attack the victim;
d) perform all the specified functions.

9. What muscle layers does the musculature of the turbellaries consist of?
a) annular and longitudinal;
b) of longitudinal and diagonal;
c) of annular and diagonal;
d) of annular, longitudinal and diagonal.

10. How many branches of the intestine does the planaria Dendrocoelum lacteum have?
a) one blindly ending;
b) two blind branches;
c) three blind branches;
d) the intestine is reduced.

11. Name the sensory organs available in turbellaria.
a) photosensitive eyes;
b) photosensitive eyes and statocysts;
c) statocysts and tactile cells;
d) photosensitive eyes, statocysts and tactile cells.

12. What organs are represented by the excretion system in flatworms?
a) epithelial cells are involved in the secretion;
b) protonephridia;

b) metanephridia;
c) all cells of the body are involved in the process of excretion of metabolic products.

13. What attachment organs do trematodes have?
a) one circumferential suction cup;
b) two (circumoral and abdominal) suckers;
c) a lot of suction cups;
d) two suckers (circumferential and abdominal) and spikes in the tegument.

14. What is the name of the specialized epithelium of trematodes?
a) atrial fibrillation;
b) ciliated;
c) tegument (submerged);
d) single-layer with cuticle.

15. The digestive system of trematodes is represented by:
a) mouth, pharynx, esophagus and bivalve caecum;
b) mouth, pharynx, esophagus and intestine with anal opening;
c) mouth, pharynx and blind single-branched intestine;
d) the digestive system is reduced.

16. Features of the reproductive system of trematodes:
a) bisexual, males have 2 testes with vas deferens, an ejaculatory canal with cirrus in the genital cloaca, females have 1 ovary with an oviduct ending in the ootype, a long uterus with a genital opening at the end departs from the ootype, the yolk, the body of Meles flow into the ootype;
b) hermaphrodites with the male and female sex systems described in paragraph a;
c) hermaphrodites (except for blood flukes) with the male and female reproductive systems described in paragraph a.

17. Where does the liver fluke Fasciola hepatica parasitize?
a) in the bile ducts of the liver of herbivorous and omnivorous mammals and humans;
b) in a person's heart;
c) in the stomach of cattle;
d) in the pancreas and liver of animals and humans.

18. Where does the egg develop and what is the name of the first free-living larva Fasciola hepatica in water?
a) development occurs in the body of an intermediate host – an aquatic mollusk, whose body is left by a free-swimming larva of the miracidium;
b) development takes place in water, where a free-swimming larva of myrcidium emerges from the egg;
c) development occurs in water, where a free-floating larva of a sporocyst emerges from the egg;
d) development occurs in the body of an intermediate host – an aquatic mollusk, in which a sporocyst larva develops.

19. What stages of the liver fluke live in the body of an aquatic mollusk of a small pond?
a) miracidium, sporocyst and redia;
b) sporocyst and redia;
c) sporocyst, redia and cercarium;
d) sporocyst and adolescarium.

20. How does fascioliasis infect the final hosts?

a) when eating coastal grass with adulterants;
b) when drinking from reservoirs with miracides;
c) in case of accidental eating of a small pond worm infected with larvae of the liver co-greaser;
d) when drinking water with cercariums.

UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation

UC-1 ID-3 - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations.

Section III. Phylums ANNELIDS, MOLLUSKS, ARTHROPODS

1. Characteristic features of annelids:
a) they are primary cavities with homonomous body segmentation with a well-developed skin-muscle sac;
b) these are primary cavities with heteronomous body segmentation with a well-developed skin-muscle sac;
c) these are secondary cavities with homonomous body segmentation with a well-developed musculoskeletal sac;
d) these are secondary cavities with heteronomous segmentation of the body with a well-developed musculoskeletal sac.

2. The integuments of annelids are represented by:
a) multilayer epithelium with cuticle;
b) a single-layer epithelium with a cuticle;
c) submerged epithelium (tegument);
d) single-layered epithelium without cuticle.

3. The nervous system of annelids consists of:
a) a paired brain, a pair of near-pharyngeal nerve trunks and a paired or non-paired abdominal nervous chain with a pair of ganglia in each segment of the body;
b) paired brain, spinal cord and abdominal nerve trunks connected in each segment of the body by commissures of a pair of ganglia;
c) the subcaryngeal and supra-pharyngeal brain ganglion, the periaryngeal nerve ring and the stair nervous system of the body;
d) the subcaryngeal and supra-pharyngeal brain ganglia connected by a nerve ring and the diffuse nervous system of the body.

4. The circulatory system of annelids:
a) is not developed;
b) closed and consists of dorsal, abdominal and annular vessels, there is no heart;
c) unclosed, there is a heart and a spinal vessel;
d) closed, consists of an abdominal and spinal vessel, there is a heart.

5. Do annelids have a separation of the sexes?
a) all annelids are bisexual;
b) all ringers are hermaphrodites;
c) there are bisexual species and hermaphrodites;
d) all ringlets reproduce only asexually – by dividing the body into parts.

6. What organs of excretion are characteristic of annelids?
a) accumulation kidneys;
b) a pair of protonephridia with protonephridial channels;
c) two methanephridia and a pair of metabolic waste ducts;
d) a pair of metanephridia with outflow channels in each segment of the body.

7. Polychaetes are characterized by:
a) the presence of bristles on the entire body;
b) the presence of gill appendages only on the prostomium;
c) the presence of appendages on all segments – parapodia with bristles and gill appendages;
d) the absence of appendages, except for sensitive tentacles on the head segment.

8. What are the stages of polychaetes in the development process?
a) a well-developed but immature individual comes out of the egg;
b) a larva emerges from the egg, which goes through two more larval stages before turning into an adult;
c) rapid development, inside the egg shells, occurs without passing through the larval stages;
d) a planktonic larva, trochophora, develops from the egg, which gradually turns into an adult.

9. What function does the longitudinal fold of the midgut perform in the earthworm Lumbricus terrestris?
a) promotes the movement of food through the intestines;
b) increases the absorption surface of the middle intestine;
c) contains glands that secrete digestive enzymes;
d) is a vestige and has no meaning.

10. In which body segments are the organs of the hermaphrodite reproductive system Lumbricus terrestris located?
a) segments 32 to 37;
b) in every segment of the body, except for the prostomium and pygidium;
c) from 9 to 15 body segments;
d) from 9 to 13 body segments.

11. What are the features of oligochaete development?
a) development proceeds through the larva trochophora;
b) development proceeds through the larva of the oncosphere;
c) development takes place inside the body – live birth;
d) development takes place inside the cocoon without a larval stage.

12. Where do oligochaetes live?
a) in the soil;
b) in the water;
c) in the ground-air environment;
d) there are parasitic species in water, soil, and terrestrial environment.

13. Characteristic features of representatives of the class of Leeches (Hirudinea):
a) Secondary segmentation (fusion of primary segments), 30 or, more often, 33 segments, there is an anterior suction cup, the whole is reduced;
b) Secondary segmentation (fusion of primary segments), stable 30 or, more often, 33 segments, there are anterior and posterior suckers, generally reduced;

c) Secondary segmentation (fusion of primary segments), 30 or, more often, 33 segments, there are anterior and posterior suckers, generally well developed;
d) Primary segmentation, stable 30 or, more often, 33 segments, there are anterior and posterior suckers, generally well developed.

14. The circulatory system and respiration in leeches:
a) The circulatory system is reduced in all leeches, gill respiration;
b) The circulatory system is reduced in jawed leeches, it is present in lower ones and, more often, in proboscis, breathing with the entire surface of the body;
c) The circulatory system is well developed in all leeches; respiration is pulmonary;
d) The circulatory system is reduced in all leeches, respiration is pulmonary.

15. Body cavity in mollusks:
a) primary;
b) secondary;
c) primary and secondary (mixed – mix purpose);
d) mixed – mixocele, the secondary cavity is preserved only in the pericardium.

16. The nervous system of mollusks:
a) diffuse;
b) orthogon;
c) several pairs of nerve nodes located in different parts of the body;
d) the abdominal nerve chain.

17. What respiratory organs are found in mollusks?
a) only the gills;
b) only the lungs;
c) breathe through the entire surface of the body;
d) gills or lungs.

18. Organs of excretion in mollusks:
a) paired kidneys – modified metanephridia, open into the pericardial cavity, and the other end into the mantle cavity;
b) typical metonephridia, open into the pericardial cavity, and the other end into the mantle cavity;
c) protonephridia on the dorsal side of the body;
d) accumulation kidneys without excretory ducts on the dorsal side of the body.

19. Features of reproduction and development of mollusks:
a) bisexual, the ducts of the genital glands open into the kidneys, or into the mantle cavity, development without metamorphosis;
b) bisexual, the ducts of the genital glands open into the kidneys or into the mantle cavity, development with metamorphosis;
c) bisexual and hermaphrodites, the ducts of the genital glands open into the kidneys or into the mantle cavity, development with metamorphosis, live birth occurs;
d) hermaphrodites, sex glands open with ducts into the kidneys or mantle cavity, development with metamorphosis or live birth.

20. Which of the following classes of mollusks have jaws and a tongue with a radula in the initial part of the digestive system?
a) gastropods, bivalves and cephalopods;
b) only in gastropods;
c) in gastropods and cephalopods;

d) only in cephalopods.
г) только у головоногих.

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UC-1 ID-2 - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies.

Section IV. Phylum CHORDAL

1. From the listed signs, select those that relate only to chordates:
a) bilaterally symmetrical, second-cavity, second-mouthed animals;
b) metameric, secondary-mouthed, coelomic animals;
c) animals whose axial skeleton is represented by a chord, the central nervous system is a dorsal neural tube with a neurocele inside, gill slits are formed in the pharynx on the sides;
d) bilateral, metameric, coelomic animals.

2. The skin of the lanceolate is represented by:
a) a single-layered epidermis with glandular cells and a dermis made of connective tissue;
b) multi-layered epidermis;
c) multilayer epidermis and connective tissue dermis;
d) a single-layered epidermis with glandular cells.

3. Lanceolate musculature:
a) metameric, represented by myomers on the right and left sides of the body;
b) metameric, represented by myomers and myosepts on the right and left sides;
c) consists of longitudinal fibers;
d) consists of longitudinal and annular fibers.

4. The sense organs of the lancet are represented by:
a) Hesse's eyes in the neurocele of the neural tube;
b) paired eyes, perioral tentacles with tactile functions, olfactory pit;
c) Hesse's eyes in the neurocele of the neural tube; perioral tentacles with tactile functions, olfactory fossa;
d) Hesse's eyes, organs of touch and smell.

5. The digestive organs of the lanceolate consist of:
a) the pre-oral funnel, mouth, pharynx and intestines with an anus;
b) pre-oral funnel, mouth opening, pharynx with endostyle and gill slits, intestines with hepatic outgrowth and anus;
c) mouth opening, pharynx, pierced by gill openings and having an endo-style, intestine;
d) mouth, esophagus, stomach, intestines with hepatic outgrowth and anus.

6. Circulatory system of the lancet:
a) abdominal aorta, gill arteries (bringing and carrying), dorsal aorta, anterior and posterior cardinal veins, venous sinus;
b) abdominal aorta, gill arteries (bearing and carrying), roots of the dorsal aorta, dorsal aorta, anterior and posterior cardinal veins, heart;
c) abdominal aorta, gill arteries (bearing and carrying), roots of the dorsal aorta, dorsal aorta, anterior and posterior cardinal veins, subcutaneous vein, 2-chamber heart;

d) abdominal aorta, gill arteries (bearing and carrying), roots of the dorsal aorta, dorsal aorta, anterior and posterior cardinal veins, Cuvier ducts, subcutaneous vein, portal system of hepatic outgrowth, hepatic vein, venous sinus.

7. Organs of excretion and genital organs of the lancet:
a) metanephridia, testes and ovaries are paired, located in males and females in the near-gill (atrial) cavity;
b) kidneys with ducts; paired testes and ovaries without ducts, located in the near-gill (atrial) cavity;
c) metanephridia up to 100 pairs, bisexual, paired testes and ovaries without ducts, located in the periabular (atrial) cavity;
d) metanephridia up to 100 pairs, hermaphrodites, paired testes and ovaries without ducts, located in the near-gill (atrial) cavity.

8. Ascidia (cl. Ascidiae) – representatives of the subtype of Larval Chordates Urochordata are:
a) sedentary aquatic animals whose body is covered with a shell of fiber;
b) free-swimming animals with a fish-like body;
c) sedentary animals in an adult state, whose body is covered with a tunic;
d) sedentary animals in an adult state, living in an aquatic environment, whose body is covered with a tunic made of the substance tunicin and having two holes – siphons.

9. Most of the organs of the digestive system are occupied by volume:
a) a pharynx pierced by gill slits;
b) the stomach;
c) the intestines;
d) the esophagus.

10. Isolation and reproductive organs in ascidia:
a) metanephridia; bisexual – testes in males and ovaries in females;
b) metanephridia; hermaphrodites: each individual has a testis and an ovary;
c) there are no excretory organs; bisexual – testes in males and ovaries in females;
d) there are no excretory organs; hermaphrodites: each individual has a testis and an ovary.

11. Features of larval chordate development:
a) development is direct, eggs develop in the genitals;
b) development with a larval stage, the larva leads an attached lifestyle;
c) development with a larval stage, the larva is free–swimming and has an axial organ - a chord;
d) development with a larval stage, the larva is free-swimming, it does not have an internal skeleton.

12. Vertebrate skeleton Vertebrata:
a) Internal, bony. Axial (skull, spine), skeleton of limb belts and free limbs;
b) Internal, cartilaginous or bony. Axial (skull, spine), the skeleton of the limb belts and free limbs;
c) External, cartilaginous or bony. Axial (skull, spine), the skeleton of the limb belts and free limbs;
d) Internal, cartilaginous or bony. Axial (spine), the skeleton of the limb belts and free limbs.

13. What elements of the skeleton formed the maxillary and sublingual arches of the visceral skull of maxillofacial vertebrates?
a) are neoplasms;
b) of the 1st and 2nd jawless gill arches;
c) of the 3rd and 4th jawless gill arches;
d) from the elements of the bottom of the cerebral skull of the ancestors.

14. The skin of cartilaginous fish consists of:
a) from the multilayer epidermis and dermis, placoid scales of dermal origin;
b) from the multilayer epidermis and dermis, ganoid scales of epidermal origin;
c) from the multilayer epidermis and dermis, bone, ganoid or cosmoid scales of dermal origin;
d) from a single-layered epidermis and dermis, there are no scales.

15. In all representatives of which systematic group of fish does the arterial cone attach to the ventricle of the heart?
a) Class Bony fish Osteichthyes;
b) The group of Bony fish Teleostei;
c) The ray-finned fish subclass Actinopterygii;
d) The cartilaginous fish class is Chondrichthyes.

16. There is no spiral valve in the intestine _____?
a) in bony fish Teleostei;
b) in all bony fish Osteichthyes;
c) in cartilaginous fish Chondrichthyes;
d) all fish have fish.

17. In which fish are the gills devoid of interdigital septa and covered with a gill roof?
a) in cartilaginous fish Chondrichthyes;
b) in bony fish Teleostei;
c) in bony fish Osteichthyes;
d) all fish have Pisces.

18. Which fins in fish perform the function of an engine?
a) paired: pectoral and abdominal;
b) dorsal;
c) tail;
d) anal.

19. What type of vertebral bodies is characteristic of Osteichthyes bony fish?
a) concave on both sides (amphicellular), with remnants of a chord between them;
b) concave in front and convex in back (parallel), the chord is completely reduced;
c) convex in front and concave in back (opisthocellular), the chord is completely reduced;
d) amphicels and percentages.

20. Which part of the vertebrate brain is adjacent to the pituitary gland?
a) to the bottom of the forebrain;
b) to the roof of the intermediate brain;
c) to the bottom of the intermediate brain;
d) to the bottom of the midbrain.

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UC-1 ID-1 - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis.

UC-1 ID-2 - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies.

UC-1 ID-3 - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations.

б) General professional competencies:

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

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

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

GPC-2 ID-3 - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.

Typical tasks for intermediate certification

3.1.4. Exam questions

Emerging competencies:

UC-1- Is able to carry out a critical analysis of problematic situations based on a systematic approach, to develop a strategy for manipulation

UC-1 ID-1 - To know methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis.

UC-1 ID-2 - To be able to gain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific problems, related to the professional field; search for information and solutions based on actions, experiment, experience, and information and communication technologies.

UC-1 ID-3 - To possess skills of evaluation of the problem of professional activity with the analyze of synthesis and other methods of intellectual activity, including the use of information and communication technologies; identification of problems and the use of adequate methods to solve them; demonstration of value judgments to solve problematic professional situations.

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GPC-2 ID-3 - Possess an idea of the origin of living organisms, the levels of organization of living matter, about favorable and unfavorable factors affecting the body; the basis for studying environmental knowledge of the surrounding world, the laws of development of nature and society; skills of observation, comparative analysis, historical and experimental modeling of the impact of anthropogenic and economic factors on living objects, including using digital technologies.

1. Phylum SARCOMASTIGOPHORA. Subphylum Sarcodina (SARCODINA): classification, structural an characteristics
2. Phylum SARCOMASTIGOPHORA. Subphylum Flagellate: classification, general characteristics of organoids of life support of plant flagellates. Euglen and volvox
3. Animal flagellates, structural features. Parasitic forms and diseases caused by them. Extracellular and intracellular parasites. Adaptations to parasitism
4. Phylum APICOMPLEXA. General characteristics. Class Sporozoa (SPOROZOEA): characterization by the example of coccidia. The structure of the apical complex
5. Coccidia COCCIDIA: the life cycle of eimeria
6. Coccidia COCCIDIA: the life cycle of toxoplasma.
7. Hemosporidia (HAEMOSPORINA): the life cycle of malarial plasmodium (genus Plasmodium). Malaria. Pyroplasmides
8. Phylum Infusoria (CILIOPHORA). The structure of the infusoria. Infusoria – symbionts and parasites of animals
9. Reproduction of infusoria (asexual and sexual)
10. Phylum COELENTERATA: classification, general characteristics of the first two-layered organisms. Cellular specialization. Coral hydranths
11. Phylum COELENTERATA: features of the structure of Scyphozoan jellies, Coral hydranths
12. Phylum Flatworms (PLATHELMINTHES): classification and general structural and functional characteristics of the first three-layered animals. Class TURBELLARIAN
13. Phylum Flatworms (PLATHELMINTHES): Class Flukes (TREMATODA). The characteristics of organ systems. Features of the reproductive system and reproduction of trematodes
14. Phylum Flatworms (PLATHELMINTHES): the life cycle of the hepatic fluke.
15. Phylum Flatworms (PLATHELMINTHES): the life cycle of the lanceolate fluke.
16. Phylum of flatworms (PLATHELMINTHES): the life cycle of the feline fluke
17. Phylum Flatworms (PLATHELMINTHES). Class Tapeworms (CESTODA): classification and structural characteristics
18. Morphological differences between armed and unarmed tapeworms, Echinococcus and broad tapeworm. The structure of finns (cysticercus, cenurus, plerocercoid, cysticercoid, echinococcus)
19. Phylum Flatworms (PLATHELMINTHES). Tapeworms (CESTODA): the cycle of development of armed and unarmed tapeworms.
20. Phylum Flatworms (PLATHELMINTHES). Tapeworms (CESTODA): the development cycle of echinococcus
21. Phylum Flatworms (PLATHELMINTHES). Tapeworms (CESTODA): the development cycle of the broad tapeworm
22. Phylum Roundworms (NEMATHELMINTHES): classification. Characteristics of Nematode organ systems. Scrabbles

23. Phylum Roundworms (NEMATHELMINTHES): features of the structure of the reproductive system and the development cycle of the equine ascarids
24. Phylum Roundworms (NEMATHELMINTHES): the life cycle of Pinworms
25. Phylum roundworms (NEMATHELMINTHES): the life cycle of Trichinella spiralis
26. Phylum Annelidae (ANNELIDA): systematic classification, general morphological and functional characteristics. The development of the whole
27. Phylum ANNELIDA: characteristic of polychaetes
28. Phylum ANNELIDA: characteristic of oligochaetes. Peculiarities of the structure of the hermaphrodite reproductive system of the earthworm
29. Phylum ANNELIDA: morphofunctional characteristics of leeches (HIRUDINEA)
30. Phylum Mollusca (MOLLUSCA): classification, general characteristics of gastropods (GASTROPODA)
31. Phylum Mollusca (MOLLUSCA): general characteristics of bivalves (BI-VALVIA)
32. Phylum Mollusca (MOLLUSCA): Class Cephalopods (CEPHALOPODA)
33. Phylum Arthropods (ARTHROPODA): classification and general characteristics of the type
34. Phylum Arthropods (ARTHROPODA): systematics and characteristics of the class of crustaceans (CRUSTACEA)
35. Phylum Arthropods (ARTHROPODA): general characteristics of Arachnids
36. Phylum Arthropoda: general characteristics and parasitological significance of Ticks
37. Phylum Arthropoda: classification and morphofunctional characteristics of Insects (INSECTA)
38. Phylum Arthropoda: reproduction and development of Insects. Direct development, development with incomplete transformation, development with complete transformation
39. Phylum Arthropods: parasitic insects. The life cycles of gastric, abdominal and skin gadflies
40. Phylum Hemichordata: general characteristics on the example of the ball-noglossus. The importance of Semichordates for elucidating the phylogeny of Chordates
41. Phylum Chordate (CHORDATA): subtypes and classes of chordates, general characteristics and main features of chordate animals
42. Subphylum Headless (ACRANIA). Class Head-chord. The structure of the Lancelet
43. Subphylum Craneless (ACRANIA): embryogenesis of the Lancelate. Laying of germ leaves. The formation of a whole. Bookmark organ systems.
44. Subphylum Tunicates, or Larval chords (UROCHORDATA, seu TUNICATA): the structure of Ascidia. Salpae and Larvacean (Appendicularia)
45. General characteristics of the Vertebrate subphylum (VERTEBRATA)
46. Superclass Fish (PISCES): classification and general characteristics. Differences between cartilaginous and bony fish. The origin of fish
47. Class Chondrichthyes (CHONDRICHTYES): systematic classification and structural features
48. Class Osteichthyes (OSTEICHTHYES): morphofunctional and ecological characteristics. Main detachments
49. Class Amphibians (AMPHIBIA): classification and morphofunctional characteristics. Phylogeny of Amphibians
50. Class Reptile (REPTILIA): systematic classification and characteristics of organ systems (integuments, skeleton, musculature, digestive system)
51. Class Reptile (REPTILIA): characteristics of organ systems (respiratory organs, circulation, excretion and reproduction)
52. The origin and evolution of Reptiles
53. Class AVES: systematic classification and structure of the digestive system of organs, its features in comparison with reptiles
54. Class Bird (AVES): features of the structure of integuments and their derivatives
55. Class Bird (AVES): the structure of the skeleton and musculature, in connection with the adaptation of birds to flight
56. Class Bird (AVES): features of the structure of the respiratory and circulatory systems

57. Class Poultry (AVES): features of the excretory system
58. Class Bird(AVES): the structure of the central nervous system and sensory organs
59. Class Avian (AVES): reproductive system, embryonic and postembryonic development. Egg structure
60. Class Bird (AVES): origin and phylogenetic development
61. Class Mammals (MAMMALIA): a systematic classification. Main detachments
62. Class Mammals (MAMMALIA): integuments, skeleton, musculature
63. Class Mammals (MAMMALIA): the digestive system. Features of the digestive system of ruminant mammals
64. Class Mammals (MAMMALIA): circulatory system
65. Class Mammals (MAMMALIA): respiratory system. The mechanism of respiration
66. Class Mammals (MAMMALIA): the structure of the reproductive system and reproduction. Uterus, types of uterus. The placenta
67. Class Mammals (MAMMALIA): the structure of the excretory system.
68. Class Mammals (MAMMALIA): the structure of the nervous system and sensory organs.
69. Class Mammals (MAMMALIA): phylogenetic development.
70. Class Mammals (MAMMALIA): features of embryonic development
71. Evolution of animal integuments
72. Evolution of the nervous system
73. Evolution of the body cavity
74. Evolution of the circulatory system
75. Evolution of the excretory system
76. Evolution of the animal skeleton
77. The evolution of the digestive system
78. Veterinary-sanitary significance of protozoa
79. Veterinary-sanitary significance of flatworms
80. Veterinary-sanitary significance of roundworms
81. Veterinary-sanitary significance of insects and ticks

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

Criteria for evaluating students' knowledge during the colloquium:

• **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

• **Mark "satisfactory"** - the student discovers gaps in knowledge of the basic educational and normative material.

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

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:

• **Mark "excellent"** – 25-22 correct answers.

• **Mark "good"** – 21-18 correct answers.

• **Mark "satisfactory"** - 17-13 correct answers.
• **Mark "unsatisfactory"** – less than 13 correct answers

Criteria for evaluating students' knowledge when conducting abstracts:

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

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

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

• **Mark "unsatisfactory"** - a significant misunderstanding of the problem is revealed or the abstract is not presented at all.

Criteria for assessing knowledge during the exam:

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

• **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 shown in the tables, significant errors are made, a partial lack of knowledge, skills, and skills is manifested according to the set of indicators, the student experiences significant difficulties in operating with knowledge and skills when transferring them to new situations.

• **Mark "unsatisfactory"** – the types of educational work provided for in the curriculum have not been completed. It demonstrates an incomplete correspondence of knowledge, skills, and abilities given in the tables of indicators, significant errors are made, there is a lack of knowledge, skills, and skills for a large number of indicators, the student experiences significant difficulties in operating with knowledge and skills when transferring them to new situations.

5. ACCESSIBILITY AND QUALITY OF EDUCATION FOR PEOPLE WITH DISABILITIES

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 persons with disabilities, their own technical means can be used.

The procedure for evaluating the learning outcomes of 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 persons with hearing impairments:
– in printed form,
– in the form of an electronic document.
For persons 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 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 (in writing on paper, a set of answers on a computer, orally).
If necessary, for students with disabilities and innovators, 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 people with disabilities is allowed using distance education technologies.