Ministry of Agriculture of the Russian Federation
Federal State Budgetary Educational Institution
of Higher Education
"St. Petersburg State University of Veterinary Medicine"

APPROVED BY
Vice-Rector for Educational
Work and Youth Policy
_____ Sukhinin A.A.
April 10, 2026

Department of Aquaculture and Fish Diseases

EDUCATIONAL WORK PROGRAM

for the discipline

«DISEASES OF BEES AND FISH»

The level of higher education
SPECIALTY

Specialty 36.05.01 Veterinary Medicine
Profile: «General clinical veterinary medicine»
Full-time education
Education starts in 2026

Reviewed and adopted
at the meeting of the department
on April 06, 2026
Protocol No 11

Head of the Department of Aquaculture and Fish Diseases,
Doctor of Biological Sciences, Associate Professor
_____ V.N. Voronin

Saint Petersburg
2026

1. PURPOSES AND OBJECTIVES OF THE DISCIPLINE

The main purpose of the discipline is to study bee and fish diseases that cause significant economic damage, as well as diseases and parasites transmitted through fish to humans and animals. Familiarization with various types of fish farms, peculiarities of biology and the most important fish species of Russia and neighboring countries. Assessment of the damage caused by diseases to fish and bee farms.

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 biological foundations of fish farming and beekeeping and provides biological education in accordance with the requirements for higher educational institutions of a biological profile.

b) The applied task highlights issues related to existing widespread and especially dangerous diseases of fish, bees, their etiology, clinic, pathology, diagnosis, treatment, prevention and implementation of veterinary and sanitary, antiepizootic measures 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 the directions and methodological approaches used in the diagnosis, treatment and prevention of diseases of fish and bees to solve problems of animal husbandry and veterinary medicine, as well as the available achievements in this field.

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

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

The field of professional activity:

13 Agriculture

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

The education of the discipline should form the following competencies:

a) Professional competencies (PC):

Type of tasks of professional activity: medical

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

ID-1 PC-3 To possess skills to make a diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases;

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

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

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

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

ID-6 PC-3 To know the etiology and pathogenesis of animal diseases of various species.;

ID-7 PC-3 To know the generally accepted criteria and classifications of animal diseases, approved lists of animals' disease.

PC-5 To carry out plan of animal treatment, based on the stated diagnosis and animals individual character ristics, signature of necessary remedies of chemical and biological nature for the treatment, taking into account combination of its pharmacological effect on the animal body:

PC-5 ID-1 To be able to use specialized information databases at a choice of animal treatment methods.;

PC-5 ID-2 To be able to calculate the number of remedies for the treatment of animals and the prevention of diseases with the receipts signature for a certain period.;

PC-5 ID-3 To be able to calculate the number of remedies for the treatment of animals and for the prevention of diseases with the receipts signature for a certain period, using digital technologies as well;

PC-5 ID-4 To be able to administer drugs to the animals' body in various techniques;

PC-5 ID-5 To know the methods of pharmacological treatment of sick animals and indications for its administration, in accordance with the guidelines, instructions, manuals, rules of diagnosis, prevention and treatment.;

PC-5 ID-8 To know the ways of drug injections, used both for animals enteral (oral, sublingual and rectal administration) and parenteral (injections, inhalations and skin applications) methods.

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

Discipline B1.V.06 "Diseases of bees and fish" is part of the disciplines formed by participants in educational relations, the federal state educational standard of higher education in the specialty 36.05.01 "Veterinary Medicine" (specialty level), Profile: «General clinical veterinary medicine»

Full-time studies are mastered in the 6th semester.

When teaching the discipline "Diseases of bees and fish", the knowledge and skills acquired by students during the development of disciplines are used: zoology, histology and embryology, biochemistry, physiology and ethology of animals, animal anatomy, biology with the basics of ecology, pathological physiology, animal feeding, animal hygiene. The discipline "Diseases of bees and fish" is a part formed by participants in educational relations, on which subsequent disciplines are based, such as:

1. Pathological anatomy of animals.
2. Veterinary and sanitary examination.
3. Toxicology.
4. Parasitology and invasive animal diseases.
5. Epizootology and infectious diseases of animals.

4. THE SCOPE OF DISCIPLINE «DISEASES OF BEES AND FISH»

The scope of the discipline for full-time education

Type of educational work	Hours	**6th semester**
Classroom classes (total)	**50**	**50**
Including:		
Lectures, including interactive forms	16	16
Practical lessons (PL), including interactive forms, among which are:	34	34
practical training (PT)	6	6
Self-study	58	58
Type of intermediate and final certification (test, exam)	test	test
Total labor intensity hours/credits	**108/3**	**108/3**

5. THE CONTENT OF THE DISCIPLINE «DISEASES OF BEES AND FISH»

The content of the discipline (full-time education)

№	The title	Achieved competences	Semester	Types of academic work, including students' self-study and labor intensity (in hours)			
				L	PL	PT	SS
1.	Organization of industrial fish farming. Theoretical foundations of preventive and curative work.	**PC-3** To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods: ID-1 PC-3 To possess skills to make a diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases; ID-2 PC-3 To possess skills to use specialized information databases for the diagnosis of animal diseases; ID-3 PC-3 To possess skills to document the results of clinical animal studies, using digital technologies.; ID-4 PC-3 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination.; ID-5 PC-3 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms; ID-6 PC-3 To know the etiology and pathogenesis of animal diseases of various species.; ID-7 PC-3 To know the generally accepted criteria and classifications of animal diseases, approved lists of animals diseases **PC-5** To carry out plan of animal treatment, based on the stated diagnosis and animals individual character ristics, signature of necessary remedies of chemical and biological nature for the treatment, taking into account combination of its pharmacological effect on the animal body: PC-5 ID-1 To be able to use specialized information databases at a choice of animal treatment methods.; PC-5 ID-2 To be able to calculate the amount of remedies for the treatment of animals and the prevention of diseases with the receipts signature for a certain period.; PC-5 ID-3 To be able to calculate the amount of remedies for the treatment of animals and for the prevention of diseases with the receipts signature for a certain period, using digital technologies as well; PC-5 ID-4 To be able to administer drugs to the animals body in various techniques; PC-5 ID-5 To know the methods of pharmacological treatment of sick animals and indications for its administration, in accordance with the guidelines, instructions, manuals, rules of diagnosis, prevention and treatment.; PC-5 ID-8 To know the ways of drug injections, used both for animals enteral (oral, sublingual and rectal administration) and parenteral (injections, inhalations and skin applications) methods.	6	8	-	-	8

2.	Biological features of hydrobionts	**PC-3** To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods: ID-5 PC-3 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms;	6	-	2	-	2
3.	Aquatic toxicology	**PC-3** To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods: ID-1 PC-3 To possess skills to make a diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases; ID-2 PC-3 To possess skills to use specialized information databases for the diagnosis of animal diseases; ID-3 PC-3 To possess skills to document the results of clinical animal studies, using digital technologies.; ID-4 PC-3 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination.; ID-5 PC-3 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms; ID-6 PC-3 To know the etiology and pathogenesis of animal diseases of various species.; ID-7 PC-3 To know the generally accepted criteria and classifications of animal diseases, approved lists of animals diseases	6	2	-	-	4

4.	Non-infectious diseases of fish	**PC-3** To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods: ID-1 PC-3 To possess skills to make a diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases; ID-2 PC-3 To possess skills to use specialized information databases for the diagnosis of animal diseases; ID-3 PC-3 To possess skills to document the results of clinical animal studies, using digital technologies.; ID-4 PC-3 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination.; ID-5 PC-3 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms; ID-6 PC-3 To know the etiology and pathogenesis of animal diseases of various species.; ID-7 PC-3 To know the generally accepted criteria and classifications of animal diseases, approved lists of animals diseases **PC-5** To carry out plan of animal treatment, based on the stated diagnosis and animals individual character ristics, signature of necessary remedies of chemical and biological nature for the treatment, taking into account combination of its pharmacological effect on the animal body: PC-5 ID-1 To be able to use specialized information databases at a choice of animal treatment methods.; PC-5 ID-2 To be able to calculate the amount of remedies for the treatment of animals and the prevention of diseases with the receipts signature for a certain period.; PC-5 ID-3 To be able to calculate the amount of remedies for the treatment of animals and for the prevention of diseases with the receipts signature for a certain period, using digital technologies as well; PC-5 ID-4 To be able to administer drugs to the animals body in various techniques; PC-5 ID-5 To know the methods of pharmacological treatment of sick animals and indications for its administration, in accordance with the guidelines, instructions, manuals, rules of diagnosis, prevention and treatment.; PC-5 ID-8 To know the ways of drug injections, used both for animals enteral (oral, sublingual and rectal administration) and parenteral (injections, inhalations and skin applications) methods.	6	2	-	-	4

5.	Invasive fish diseases	**PC-3** To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods: ID-1 PC-3 To possess skills to make a diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases; ID-2 PC-3 To possess skills to use specialized information databases for the diagnosis of animal diseases; ID-3 PC-3 To possess skills to document the results of clinical animal studies, using digital technologies.; ID-4 PC-3 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination.; ID-5 PC-3 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms; ID-6 PC-3 To know the etiology and pathogenesis of animal diseases of various species.; ID-7 PC-3 To know the generally accepted criteria and classifications of animal diseases, approved lists of animals diseases **PC-5** To carry out plan of animal treatment, based on the stated diagnosis and animals individual character ristics, signature of necessary remedies of chemical and biological nature for the treatment, taking into account combination of its pharmacological effect on the animal body: PC-5 ID-1 To be able to use specialized information databases at a choice of animal treatment methods.; PC-5 ID-2 To be able to calculate the amount of remedies for the treatment of animals and the prevention of diseases with the receipts signature for a certain period.; PC-5 ID-3 To be able to calculate the amount of remedies for the treatment of animals and for the prevention of diseases with the receipts signature for a certain period, using digital technologies as well; PC-5 ID-4 To be able to administer drugs to the animals body in various techniques; PC-5 ID-5 To know the methods of pharmacological treatment of sick animals and indications for its administration, in accordance with the guidelines, instructions, manuals, rules of diagnosis, prevention and treatment.; PC-5 ID-8 To know the ways of drug injections, used both for animals enteral (oral, sublingual and rectal administration) and parenteral (injections, inhalations and skin applications) methods.	6	-	10	6	18

6.	Infectious diseases of fish	**PC-3** To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods: ID-1 PC-3 To possess skills to make a diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases; ID-2 PC-3 To possess skills to use specialized information databases for the diagnosis of animal diseases; ID-3 PC-3 To possess skills to document the results of clinical animal studies, using digital technologies.; ID-4 PC-3 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination.; ID-5 PC-3 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms; ID-6 PC-3 To know the etiology and pathogenesis of animal diseases of various species.; ID-7 PC-3 To know the generally accepted criteria and classifications of animal diseases, approved lists of animals diseases **PC-5** To carry out plan of animal treatment, based on the stated diagnosis and animals individual character ristics, signature of necessary remedies of chemical and biological nature for the treatment, taking into account combination of its pharmacological effect on the animal body: PC-5 ID-1 To be able to use specialized information databases at a choice of animal treatment methods.; PC-5 ID-2 To be able to calculate the amount of remedies for the treatment of animals and the prevention of diseases with the receipts signature for a certain period.; PC-5 ID-3 To be able to calculate the amount of remedies for the treatment of animals and for the prevention of diseases with the receipts signature for a certain period, using digital technologies as well; PC-5 ID-4 To be able to administer drugs to the animals body in various techniques; PC-5 ID-5 To know the methods of pharmacological treatment of sick animals and indications for its administration, in accordance with the guidelines, instructions, manuals, rules of diagnosis, prevention and treatment.; PC-5 ID-8 To know the ways of drug injections, used both for animals enteral (oral, sublingual and rectal administration) and parenteral (injections, inhalations and skin applications) methods.	6	-	4	-	4
7.	Biological and ecological foundations of beekeeping	**PC-3** To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods: ID-3 PC-3 To possess skills to document the results of clinical animal studies, using digital technologies.;	6	2	2	-	2

8.	Non-infectious diseases of bees	**PC-3** To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods: ID-1 PC-3 To possess skills to make a diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases; ID-2 PC-3 To possess skills to use specialized information databases for the diagnosis of animal diseases; ID-3 PC-3 To possess skills to document the results of clinical animal studies, using digital technologies.; ID-4 PC-3 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination.; ID-5 PC-3 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms; ID-6 PC-3 To know the etiology and pathogenesis of animal diseases of various species.; ID-7 PC-3 To know the generally accepted criteria and classifications of animal diseases, approved lists of animals diseases **PC-5** To carry out plan of animal treatment, based on the stated diagnosis and animals individual character ristics, signature of necessary remedies of chemical and biological nature for the treatment, taking into account combination of its pharmacological effect on the animal body: PC-5 ID-1 To be able to use specialized information databases at a choice of animal treatment methods.; PC-5 ID-2 To be able to calculate the amount of remedies for the treatment of animals and the prevention of diseases with the receipts signature for a certain period.; PC-5 ID-3 To be able to calculate the amount of remedies for the treatment of animals and for the prevention of diseases with the receipts signature for a certain period, using digital technologies as well; PC-5 ID-4 To be able to administer drugs to the animals body in various techniques; PC-5 ID-5 To know the methods of pharmacological treatment of sick animals and indications for its administration, in accordance with the guidelines, instructions, manuals, rules of diagnosis, prevention and treatment.; PC-5 ID-8 To know the ways of drug injections, used both for animals enteral (oral, sublingual and rectal administration) and parenteral (injections, inhalations and skin applications) methods.	6	-	2	-	4

9.	Infectious diseases of bees	**PC-3** To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods: ID-1 PC-3 To possess skills to make a diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases; ID-2 PC-3 To possess skills to use specialized information databases for the diagnosis of animal diseases; ID-3 PC-3 To possess skills to document the results of clinical animal studies, using digital technologies.; ID-4 PC-3 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination.; ID-5 PC-3 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms; ID-6 PC-3 To know the etiology and pathogenesis of animal diseases of various species.; ID-7 PC-3 To know the generally accepted criteria and classifications of animal diseases, approved lists of animals diseases **PC-5** To carry out plan of animal treatment, based on the stated diagnosis and animals individual character ristics, signature of necessary remedies of chemical and biological nature for the treatment, taking into account combination of its pharmacological effect on the animal body: PC-5 ID-1 To be able to use specialized information databases at a choice of animal treatment methods.; PC-5 ID-2 To be able to calculate the amount of remedies for the treatment of animals and the prevention of diseases with the receipts signature for a certain period.; PC-5 ID-3 To be able to calculate the amount of remedies for the treatment of animals and for the prevention of diseases with the receipts signature for a certain period, using digital technologies as well; PC-5 ID-4 To be able to administer drugs to the animals body in various techniques; PC-5 ID-5 To know the methods of pharmacological treatment of sick animals and indications for its administration, in accordance with the guidelines, instructions, manuals, rules of diagnosis, prevention and treatment.; PC-5 ID-8 To know the ways of drug injections, used both for animals enteral (oral, sublingual and rectal administration) and parenteral (injections, inhalations and skin applications) methods.	6	-	4	-	4

10.	Invasive bee diseases	**PC-3** To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods: ID-1 PC-3 To possess skills to make a diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases; ID-2 PC-3 To possess skills to use specialized information databases for the diagnosis of animal diseases; ID-3 PC-3 To possess skills to document the results of clinical animal studies, using digital technologies.; ID-4 PC-3 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination.; ID-5 PC-3 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms; ID-6 PC-3 To know the etiology and pathogenesis of animal diseases of various species.; ID-7 PC-3 To know the generally accepted criteria and classifications of animal diseases, approved lists of animals diseases **PC-5** To carry out plan of animal treatment, based on the stated diagnosis and animals individual character ristics, signature of necessary remedies of chemical and biological nature for the treatment, taking into account combination of its pharmacological effect on the animal body: PC-5 ID-1 To be able to use specialized information databases at a choice of animal treatment methods.; PC-5 ID-2 To be able to calculate the amount of remedies for the treatment of animals and the prevention of diseases with the receipts signature for a certain period.; PC-5 ID-3 To be able to calculate the amount of remedies for the treatment of animals and for the prevention of diseases with the receipts signature for a certain period, using digital technologies as well; PC-5 ID-4 To be able to administer drugs to the animals body in various techniques; PC-5 ID-5 To know the methods of pharmacological treatment of sick animals and indications for its administration, in accordance with the guidelines, instructions, manuals, rules of diagnosis, prevention and treatment.; PC-5 ID-8 To know the ways of drug injections, used both for animals enteral (oral, sublingual and rectal administration) and parenteral (injections, inhalations and skin applications) methods.	6	-	4	-	4

11.	Theoretical foundations of preventive and curative work in beekeeping.	**PC-5** To carry out plan of animal treatment, based on the stated diagnosis and animals individual character ristics, signature of necessary remedies of chemical and biological nature for the treatment, taking into account combination of its pharmacological effect on the animal body: PC-5 ID-1 To be able to use specialized information databases at a choice of animal treatment methods.; PC-5 ID-2 To be able to calculate the amount of remedies for the treatment of animals and the prevention of diseases with the receipts signature for a certain period.; PC-5 ID-3 To be able to calculate the amount of remedies for the treatment of animals and for the prevention of diseases with the receipts signature for a certain period, using digital technologies as well; PC-5 ID-4 To be able to administer drugs to the animals body in various techniques; PC-5 ID-5 To know the methods of pharmacological treatment of sick animals and indications for its administration, in accordance with the guidelines, instructions, manuals, rules of diagnosis, prevention and treatment.; PC-5 ID-8 To know the ways of drug injections, used both for animals enteral (oral, sublingual and rectal administration) and parenteral (injections, inhalations and skin applications) methods.	6	2	-	-	4
TOTAL FOR THE 6TH SEMESTER:				16	28	6	58

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

6.1. Guidelines for self-work

1. Voronin, V. N. Methodological recommendations for the implementation of independent work in the discipline "Diseases of fish, bees, fur–bearing animals", training area 36.05.01 - "Veterinary Medicine", higher education level - specialty / Voronin Vladimir Nikolaevich, Pechenkina Alla Alekseevna ; Ministry of Agriculture of the Russian Federation, SPbGAVM. - St. Petersburg : SPbGAVM, 2016. - 15 p.

6.2. Literature for self-work

1. Ichthyopathology / N.A. Golovina, Yu.A. Strelkov, V.N. Voronin [et al.]; edited by N.A. Golovina, O.N. Bauer. — Moscow: Mir, 2007. — 448 p. : ill. — (Textbooks and studies. manuals for students of higher educational institutions). - Text (visual) : direct.
2. The determinant of parasites of freshwater fish of the fauna of the USSR: [in 3 volumes] / edited by O.N. Bauer. – Leningrad : Nauka, 1984-1987. - Text (visual) : direct.

7. THE LIST OF BASIC AND ADDITIONAL LITERATURE NECESSARY FOR THE EDUCATION OF THE DISCIPLINE «DISEASES OF BEES AND FISH»

a) basic literature:

1. Bauer, O. N. Diseases of pond fish / O. N. Bauer, V. A. Musselius, Yu. A. Strelkov. - 2nd ed., reprint. and add. - Moscow : Light and food industry, 1981. - 320 p. – URL : https://clck.ru/dngre (accessed: 06/24/2025). - Access mode: for authorization. users of EB SPbGUVM.
2. Poltev, V.And. Painful and pest bee with basic microbiology : educational tool; add. MSF RF / V.And. Poltev, It Is.V. Neshataeva. - St. Petersburg: Quadro, 2010. - 184 p.

б) additional literature:

1. Doronin, M.V. Diagnostics of fish diseases: textbook. the manual / M.V. Doronin ; SPbGAVM. – St. Petersburg : Publishing House of SPbGAVM, 2012. – 21 p.
2. Doronin, M.V. Parasitic diseases of fish in aquaculture : a textbook / M.V. Doronin ; SPbGAVM. – St. Petersburg : Publishing House of SPbGAVM, 2011. – 28 p.

8. THE LIST OF RESOURCES OF THE INFORMATION AND TELECOMMUNICATION NETWORK "INTERNET" NECESSARY FOR EDUCATION OF THE DISCIPLINE «DISEASES OF BEES AND FISH»

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

1. https://meduniver.com - Medical information site.
2. http://www.zin.ru/journals/parazitologiya/parazit_main.asp - the journal "Parasitology"
3. http://www.infectology.ru - Bulletin of Parasitology

Electronic library systems:

1. ELS "SPBGUVM"
2. Legal reference system "ConsultantPlus"
3. University information system "RUSSIA"
4. Full-text database POLPRED.COM
5. Scientific electronic Library ELIBRARY.RU
6. Russian Scientific Network

7. Full-text interdisciplinary database on agricultural and environmental sciences ProQuest AGRICULTURAL AND ENVIRONMENTAL SCIENCE DATABASE

8. Electronic books of the publishing house "Prospekt Nauki" http://prospektnauki.ru/ebooks/

9. Collection "Agriculture. Veterinary medicine" publishing house "Quadro" ELS "Elibris" publishing house "Quadro" https://elibrica.com/

9. METHODOLOGICAL GUIDELINES FOR STUDENTS ON EDUCATION OF THE DISCIPLINE « «DISEASES OF BEES AND FISH»

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

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

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

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

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

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

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

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

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

• Recommendations for preparing for practical classes

Practical (seminar) classes are an important part of the professional training of students. The main purpose of conducting practical (seminar) classes is to form students' analytical, creative thinking through the acquisition of practical skills. Practical classes are also conducted in order to deepen and consolidate the knowledge gained in lectures and in the process of independent work on normative documents, educational and scientific literature. For student, it is necessary, to study or repeat theoretical material on a given topic when preparing for a practical lesson for students.

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

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

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

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

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

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

• Practical (seminar) classes perform the following tasks:

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

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

• Recommendations for working with literature.

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

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

assessments. On the back of the card, you can make your own notes about this book or article, its content, structure, on which sources it is written, etc.

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

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

10. EDUCATIONAL WORK

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

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

11.1. Information technologies

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

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

11.2. Software

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

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

12. THE MATERIAL AND TECHNICAL BASE NECESSARY FOR THE IMPLEMENTATION OF THE EDUCATIONAL PROCESS IN THE DISCIPLINE «DISEASES OF BEES AND FISH»

The title of the discipline (module), practice in accordance with the curriculum	The title of special rooms and rooms for self-work	Equipment of special rooms and rooms for self-work
Diseases of bees and fish	28 (196084, St. Petersburg, Chernihiv str., 5) Classroom for conducting seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification	*Specialized furniture: classroom tables, blackboard.* *Technical training tools: multimedia projector, screen, laptop, microscopes MBS-1, MBS-10, Biolam.* *Visual aids and educational materials: macro- and micro-preparations, posters on biology and diseases of bees and fish, photographs.*
	129 (196084, St. Petersburg, Chernihiv str., 5) Classroom for conducting seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification	*Specialized furniture: classroom tables, blackboard.* *Technical training tools: multimedia projector, screen, laptop, microscopes MBS-1, MBS-10, Biolam.* *Visual aids and educational materials: macro- and micro-preparations, posters on biology and diseases of bees and fish, photographs.*
	132 (196084, St. Petersburg, Chernihiv str., house 5) Educational laboratory of the department	*Specialized furniture: laboratory tables, laboratory cabinets.* *Technical training tools: table scales, microscopes (MBS-1, MBS-10, micromed 3, Biolam), scissors, tweezers, dissecting needles, slide and cover glasses,* *buckets, Schifferdecker tank, aquariums, refractometer, homogenizer, thermostat, laboratory centrifuge CLN-2, drying cabinet.* *Visual aids and educational materials: macro- and micro-preparations; wet preparations, posters on biology and diseases of bees and fish.*

	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*

Developers:

Senior Lecturer of the Department of Aquaculture and Fish Diseases _____ A.A. Pechenkina

Abstract for the work program of the discipline
B1.V.06 "Diseases of bees and fish"
specialty 36.05.01 Veterinary Medicine
Profile: «General clinical veterinary medicine»

The purpose of the discipline: The purpose of the discipline is to study diseases of bees and fish that cause significant economic damage, as well as diseases and parasites transmitted through fish to humans and animals. Familiarization with various types of fish farms, peculiarities of biology and the most important fish species of Russia and neighboring countries. A historical sketch. Assessment of the damage caused by diseases to fish and bee farms.

The place of discipline in the curriculum: B1.V.06, the part formed by the participants of educational relations is mastered in the 6th semester – full-time study.

Requirements for the results of mastering the discipline: as a result of mastering the discipline, the following professional competencies are formed: PC-3, PC-5.

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

ID-1 PC-3 To possess skills to make a diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases;

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

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

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

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

ID-6 PC-3 To know the etiology and pathogenesis of animal diseases of various species.;

ID-7 PC-3 To know the generally accepted criteria and classifications of animal diseases, approved lists of animal disease.

PC-5 To carry out plan of animal treatment, based on the stated diagnosis and animal individual characteristics, signature of necessary remedies of chemical and biological nature for the treatment, taking into account combination of its pharmacological effect on the animal body:

ID-1 PC-5 To be able to use specialized information databases at a choice of animal treatment methods.;

ID-2 PC-5 To be able to calculate the number of remedies for the treatment of animals and the prevention of diseases with the receipts signature for a certain period.;

ID-3 PC-5 To be able to calculate the number of remedies for the treatment of animals and for the prevention of diseases with the receipts signature for a certain period, using digital technologies as well;

PC-5 To be able to administer drugs to the animal's body in various techniques;

ID-4 PC-5 ID-5 To know the methods of pharmacological treatment of sick animals and indications for its administration, in accordance with the guidelines, instructions, manuals, rules of diagnosis, prevention and treatment;

ID-8 PC-5 To know the ways of drug injections, used both for animals enteral (oral, sublingual and rectal administration) and parenteral (injections, inhalations and skin applications) methods.

Summary of the discipline: Mastering by students the biological foundations of fish farming and beekeeping, existing common and especially dangerous diseases of fish and bees, their etiology, clinic, pathology, diagnosis, treatment, prevention and implementation of veterinary and sanitary, antiepizootic measures.

The total labor intensity of the discipline is: 3 credits (108 hours).

Final control of the discipline: test.

Annex 1

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

Department of Aquaculture and Fish Diseases

FUND OF ASSESMENT TOOLS

for the discipline
«DISEASES OF BEES AND FISH»

The level of higher education
SPECIALTY
Specialty 36.05.01 Veterinary medicine
Profile: «General clinical veterinary medicine»
Full-time education

Education starts in 2026

Saint Petersburg
2026

1. PASSPORT OF THE FUND OF ASSESMENT TOOLS

Table 1

№	Acquired competence	Assessed modules of a discipline	Assesment tool
1.	**PC-3** To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods: ID-1 PC-3 To possess skills to make a diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases; ID-2 PC-3 To possess skills to use specialized information databases for the diagnosis of animal diseases; ID-3 PC-3 To possess skills to document the results of clinical animal studies, using digital technologies.; ID-4 PC-3 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination.; ID-5 PC-3 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms; ID-6 PC-3 To know the etiology and pathogenesis of animal diseases of various species.; ID-7 PC-3 To know the generally accepted criteria and classifications of animal diseases, approved lists of animals diseases **PC-5** To carry out plan of animal treatment, based on the stated diagnosis and animals individual character ristics, signature of necessary remedies of chemical and biological nature for the treatment, taking into account combination of its pharmacological effect on the animal body: PC-5 ID-1 To be able to use specialized information databases at a choice of animal treatment methods.; PC-5 ID-2 To be able to calculate the amount of remedies for the treatment of animals and the prevention of diseases with the receipts signature for a certain period.; PC-5 ID-3 To be able to calculate the amount of remedies for the treatment of animals and for the prevention of diseases with the receipts signature for a certain period, using digital technologies as well;	Section 1. Organization of industrial fish farming. Theoretical foundations of preventive and curative work.	Seminar Test
2.		Раздел 2. Биологические особенности гидробионтов	Seminar Test
3.		Section 3. Aquatic toxicology	Seminar Test
4.		Section 4. Non-infectious diseases of fish	Seminar Test
5.		Section 5. Invasive fish diseases	Seminar Test
6.		Section 6. Infectious diseases of fish	Seminar Test, Report
7.		Section 7. Biological and ecological foundations of beekeeping	Seminar Test
8.		Section 8. Non-infectious diseases of bees	Seminar Test
9.		Section 9. Infectious diseases of bees	Seminar Test

10.	PC-5 ID-4 To be able to administer drugs to the animals body in various techniques; PC-5 ID-5 To know the methods of pharmacological treatment of sick animals and indications for its administration, in accordance with the guidelines, instructions, manuals, rules of diagnosis, prevention and treatment.; PC-5 ID-8 To know the ways of drug injections, used both for animals enteral (oral, sublingual and rectal administration) and parenteral (injections, inhalations and skin applications) methods.	Section 10. Invasive bee diseases	Seminar Test
11		Section 11. Theoretical foundations of preventive and curative work in beekeeping.	Seminar Test

List of assessment tools

№	Name of the assessment tool	Brief description of the assesment tool	Presentation of the assessment tool in the fund
1.	Seminar	A means of control is organized as a conversation between the teacher and the student on topics related to the discipline, and designed to clarify the amount of knowledge that students have on a certain module, topic, problem, etc. May be conducted in written form.	Questions on topics/modules of the discipline presented in relation to the competencies provided by the work program of the discipline
2.	Test	A system of standardized tasks, which allows to automate the assessment of students knowledge and skills	A fund of test assignments
3.	Report	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 subject under study	Topics of the essays

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

Table 3

Planned results of competency acquaired	The level of development				Assesment tool
	Unsatisfactory	Satisfactory	Good	Exellent	
PC-3 To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods:					
ID-1 PC-3 To possess skills to make a diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases;	The level of knowledge is below the minimum requirements, gross errors have occurred	Basic skills have been demonstrated, typical problems have been solved with minor errors, all tasks have been completed, but not in full	All the basic skills have been demonstrated, all the main tasks have been solved with minor errors, all the tasks have been completed in full, but some with flaws	All basic skills have been demonstrated, all main tasks have been solved with some minor flaws, all tasks have been completed in full	Seminar, Test, Report,
ID-2 PC-3 To possess skills to use specialized information databases for the diagnosis of animal diseases;	The level of knowledge is below the minimum requirements, gross errors have occurred	Basic skills have been demonstrated, typical problems have been solved with minor errors, all tasks have been completed, but not in full	All the basic skills have been demonstrated, all the main tasks have been solved with minor errors, all the tasks have been completed in full, but some with flaws	All basic skills have been demonstrated, all main tasks have been solved with some minor flaws, all tasks have been completed in full	Seminar, Test, Report,

ID-3 PC-3 To possess skills to document the results of clinical animal studies, using digital technologies.;	The level of knowledge is below the minimum requirements, gross errors have occurred	Basic skills have been demonstrated, typical problems have been solved with minor errors, all tasks have been completed, but not in full	All the basic skills have been demonstrated, all the main tasks have been solved with minor errors, all the tasks have been completed in full, but some with flaws	All basic skills have been demonstrated, all main tasks have been solved with some minor flaws, all tasks have been completed in full	Seminar, Test, Report
ID-4 PC-3 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination.;	The level of knowledge is below the minimum requirements, gross errors have occurred	There is a minimum set of skills to solve standard tasks with some shortcomings	The level of knowledge corresponds to the training program, several minor errors have been made	The level of knowledge corresponds to the training program, no errors have been made	Seminar, Test, Report
ID-5 PC-3 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms;	The level of knowledge is below the minimum requirements, gross errors have occurred	There is a minimum set of skills to solve standard tasks with some shortcomings	The level of knowledge corresponds to the training program, several minor errors have been made	The level of knowledge corresponds to the training program, no errors have been made	Seminar, Test, Report

ID-6 PC-3 To know the etiology and pathogenesis of animal diseases of various species.;	The level of knowledge is below the minimum requirements, gross errors have occurred	There is a minimum set of skills to solve standard tasks with some shortcomings	The level of knowledge corresponds to the training program, several minor errors have been made	The level of knowledge corresponds to the training program, no errors have been made	Seminar, Test, Report
ID-7 PC-3 To know the generally accepted criteria and classifications of animal diseases, approved lists of animals diseases	The level of knowledge is below the minimum requirements, gross errors have occurred	There is a minimum set of skills to solve standard tasks with some shortcomings	The level of knowledge corresponds to the training program, several minor errors have been made	The level of knowledge corresponds to the training program, no errors have been made	Seminar, Test, Report
PC-5 To carry out plan of animal treatment, based on the stated diagnosis and animals individual character ristics, signature of necessary remedies of chemical and biological nature for the treatment, taking into account combination of its pharmacological effect on the animal body:					
PC-5 ID-1 To be able to use specialized information databases at a choice of animal treatment methods.;	When solving standard problems basic skills were not demonstrated, gross errors occurred	Basic skills have been demonstrated, typical problems have been solved with minor errors, all tasks have been completed, but not in full	All the basic skills have been demonstrated, all the main tasks have been solved with minor errors, all the tasks have been completed in full, but some with flaws	All basic skills have been demonstrated, all main tasks have been solved with some minor flaws, all tasks have been completed in full	Seminar, Test, Report

PC-5 ID-2 To be able to calculate the amount of remedies for the treatment of animals and the prevention of diseases with the receipts signature for a certain period.;	When solving standard problems basic skills were not demonstrated, gross errors occurred	Basic skills have been demonstrated, typical problems have been solved with minor errors, all tasks have been completed, but not in full	All the basic skills have been demonstrated, all the main tasks have been solved with minor errors, all the tasks have been completed in full, but some with flaws	All basic skills have been demonstrated, all main tasks have been solved with some minor flaws, all tasks have been completed in full	Seminar, Test, Report
PC-5 ID-3 To be able to calculate the amount of remedies for the treatment of animals and for the prevention of diseases with the receipts signature for a certain period, using digital technologies as well;	When solving standard problems basic skills were not demonstrated, gross errors occurred	Basic skills have been demonstrated, typical problems have been solved with minor errors, all tasks have been completed, but not in full	All the basic skills have been demonstrated, all the main tasks have been solved with minor errors, all the tasks have been completed in full, but some with flaws	All basic skills have been demonstrated, all main tasks have been solved with some minor flaws, all tasks have been completed in full	Seminar, Test, Report
PC-5 ID-4 To be able to administer drugs to the animals body in various techniques;	When solving standard problems basic skills were not demonstrated, gross errors occurred	Basic skills have been demonstrated, typical problems have been solved with minor errors, all tasks have been completed, but not in full	All the basic skills have been demonstrated, all the main tasks have been solved with minor errors, all the tasks have been completed in full, but some with flaws	All basic skills have been demonstrated, all main tasks have been solved with some minor flaws, all tasks have been completed in full	Seminar, Test, Report

PC-5 ID-5 To know the methods of pharmacological treatment of sick animals and indications for its administration, in accordance with the guidelines, instructions, manuals, rules of diagnosis, prevention and treatment.;	The level of knowledge is below the minimum requirements, gross errors have occurred	There is a minimum set of skills to solve standard tasks with some shortcomings	The level of knowledge corresponds to the training program, several minor errors have been made	The level of knowledge corresponds to the training program, no errors have been made	Seminar, Test, Report
PC-5 ID-8 To know the ways of drug injections, used both for animals enteral (oral, sublingual and rectal administration) and parenteral (injections, inhalations and skin applications) methods.	The level of knowledge is below the minimum requirements, gross errors have occurred	There is a minimum set of skills to solve standard tasks with some shortcomings	The level of knowledge corresponds to the training program, several minor errors have been made	The level of knowledge corresponds to the training program, no errors have been made	Seminar, Test, Report

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

3.1. Typical tasks for the current control of academic progress

3.1.1. Questions for control work

Competency assessment tests

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

D-1 PC-3 To possess skills to make a diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases;;

1. Diagnosis of diphyllobothriosis.
2. Diagnosis of trematode diseases of fish dangerous to humans.
3. Diagnosis of opisthorchiasis.
4. Diagnosis of corinosomiasis.
5. Diagnosis of anisakidosis.

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

6. The concept of the epizootic process. Forms of manifestation.
7. The dynamics of epizootics.
8. The concept of a natural source of diseases.
9. European rotten.
10. American rotten.
11. Mycoses of bees.
12. Bee aspergillosis..
13. Ascospherosis of bees.
14. Melanosis.
15. Acarapidosis of bees.
16. Bee disease.
17. Varroosis of bees.
18. Nosematosis of bees.

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

19. Clinical signs of aquatic toxicosis.
20. Clinical signs in fish affected by parasitic infusoria.

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

21. How is the counting of infusoria on the body of fish?
22. How is the respiratory rate of fish determined?

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

23. What types of scales do fish have?
24. The location of the mouth in fish.
25. The role of the swim bladder in the life of fish.

26. The importance of the sideline in the life of pisces.
27. Which fish have an adipose fin.
28. Requirements for the placement and arrangement of apiaries.
29. Requirements for the maintenance, feeding and breeding of bees.
30. Obtaining bee products, their physico-chemical properties.
31. The main products of beekeeping.
32. Features of the structure and physiology of bees

ID-6 PC-3 To know the etiology and pathogenesis of animal diseases of various species;

33. Protozoal diseases of fish caused by infusoria.
34. Ichthyophthyosis.
35. Ichthyobodosis of fish.
36. Cryptobioses of fish.
37. Salmon myxozomiasis
38. Karpov's runway.
39. The structure of monogenes.
40. Monogenoidosis of fish.
41. The cycle of trematode development.
42. Trematodoses of fish that are not dangerous to humans.
43. The development cycle of cestodes.
44. Cestodoses of fish that are not dangerous to humans.
45. Nematodes of fish that are not dangerous to humans.
46. Metechinorhinosis of salmon.
47. Argulez.
48. Crustaceosis of fish caused by oar-footed crustaceans.
49. The development cycle of Opisthorchis felineus.
50. Opisthorchiasis.
51. Trematodoses of fish are dangerous to humans.
52. The development cycle of Diphyllobothrium latum.
53. Diphyllobothriosis.
54. Anisakidosis of fish.
55. Corynosomiasis.
56. Cycles of development of fish parasites.
57. Specificity of fish parasites, forms of manifestation.

ID-7 PC-3 To know the generally accepted criteria and classifications of animal diseases, approved lists of animals disease

58. The importance of ichthyopathology in the development of fish farming and nature conservation.
59. The role and importance of ichthyopathology for aquatic bioresources and aquaculture.
60. Methods of diagnosis of fish diseases.
61. Classification of fish diseases.
62. The main pathological processes in the body of fish.
63. The protective reactions of the fish body.
64. Classification of non-infectious diseases of fish.
65. Alimentary diseases of fish, causes of development.
66. Fish diseases that occur when the environment deteriorates.
67. Functional diseases of fish. Causes of development.

Competency assessment tests

PC-5 To carry out plan of animal treatment, based on the stated diagnosis and animals individual character ristics, signature of necessary remedies of chemical and biological nature for the treatment, taking into account combination of its pharmacological effect on the animal body:

PC-5 ID-1 To be able to use specialized information databases at a choice of animal treatment methods.;

68. The basic principles of combating fish diseases caused by ectoparasites.
69. The basic principles of combating fish diseases caused by endoparasites
70. Preventive measures for case of bee toxicosis.
71. Carrying out recreational activities for non-infectious diseases of bees.
72. Carrying out recreational activities for bee toxicosis.
73. Carrying out health-improving measures against infectious diseases of bees.

PC-5 ID-2 To be able to calculate the amount of remedies for the treatment of animals and the prevention of diseases with the receipts signature for a certain period;

74. The use of antibiotics in bacterial diseases of fish.
75. Medications for saprolegniosis of fish.

PC-5 ID-3 To be able to calculate the amount of remedies for the treatment of animals and for the prevention of diseases with the receipts signature for a certain period, using digital technologies as well;

76. Drugs used in the treatment of rotten bee diseases.
77. Drugs used in the treatment of bee mycoses.
78. Drugs used for arachnosis of bees.

PC-5 ID-4 To be able to administer drugs to the animals body in various techniques;

79. Where pituitary drugs are injected before fish spawning.

PC-5 ID-5 To know the methods of pharmacological treatment of sick animals and indications for its administration, in accordance with the guidelines, instructions, manuals, rules of diagnosis, prevention and treatment;

80. Prevention of diseases of infectious etiology.
81. Prevention of diseases of non-infectious etiology.
82. Measures for fish toxicosis.
83. Measures to prevent feed toxicosis of fish.

PC-5 ID-8 To know the ways of drug injections, used both for animals enteral (oral, sublingual and rectal administration) and parenteral (injections, inhalations and skin applications) methods.

84. Methods of fish vaccination.
85. Vitamin premixes used in fish farming
86. Carrying out health measures against invasive diseases and pests of bees.
87. Carrying out health measures against infectious, invasive, non-infectious diseases and pests of bees.
88. Drugs used in the treatment of rotten bee diseases.
89. Drugs used in the treatment of bee mycoses.
90. Drugs used for arachnosis of bees.
91. Preventive measures for case of bee toxicosis.

3.1.2. Approximate topics of the essays:

Topics of abstracts for competence assessment:

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

ID-1 PC-3 To possess skills to make a diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases;
ID-2 PC-3 To possess skills to use specialized information databases for the diagnosis of animal diseases;
ID-3 PC-3 To possess skills to document the results of clinical animal studies, using digital technologies.;
ID-4 PC-3 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination.;
ID-5 PC-3 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms;
ID-6 PC-3 To know the etiology and pathogenesis of animal diseases of various species.;
ID-7 PC-3 To know the generally accepted criteria and classifications of animal diseases, approved lists of animals disease.

PC-5 To carry out plan of animal treatment, based on the stated diagnosis and animals individual character ristics, signature of necessary remedies of chemical and biological nature for the treatment, taking into account combination of its pharmacological effect on the animal body:

PC-5 ID-1 To be able to use specialized information databases at a choice of animal treatment methods.;
PC-5 ID-2 To be able to calculate the amount of remedies for the treatment of animals and the prevention of diseases with the receipts signature for a certain period.;
PC-5 ID-3 To be able to calculate the amount of remedies for the treatment of animals and for the prevention of diseases with the receipts signature for a certain period, using digital technologies as well;
PC-5 ID-4 To be able to administer drugs to the animals body in various techniques;
PC-5 ID-5 To know the methods of pharmacological treatment of sick animals and indications for its administration, in accordance with the guidelines, instructions, manuals, rules of diagnosis, prevention and treatment.;
PC-5 ID-8 To know the ways of drug injections, used both for animals enteral (oral, sublingual and rectal administration) and parenteral (injections, inhalations and skin applications) methods

1. Viral hemorrhagic septicemia.
2. Carp pox.
3. Infectious necrosis of hematopoietic tissue.
4. Infectious necrosis of the pancreas
5. Spring viremia of carp
6. Furunculosis.
7. A plague of pike.
8. Mycobacteriosis.
9. Ulcerative necrosis of salmon skin.
10. Branchiomycosis.

11. Saprolegniosis.
12. Aeromonosis.
13. Pseudomonosis.
14. Saprolegniosis.
15. Ichthyophonosis.
16. Vibriosis.
17. Viral diseases of sturgeon.
18. Herpesvirus infections of salmon.
19. Viral necrosis of red blood cells.
20. Yersiniosis.
21. Bacterial hemorrhagic septicemia.
22. Flexibacteriosis.
23. Stomatopapilloma of acne.
24. Candidomycosis.
25. Softening of the shell of salmon roe.

3.1.3. Tests

Competency assessment tests: **PC-3** To set the diagnose based on the analysis of anamnesis, general, special (instrumental) and laboratory research methods:
D-1 PC-3 To possess skills to make a diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases;
ID-2 PC-3 To possess skills to use specialized information databases for the diagnosis of animal diseases;
ID-3 PC-3 To possess skills to document the results of clinical animal studies, using digital technologies;
ID-4 PC-3 To know the methods of interpretation and data analysis of special (instrumental) methods of animal examination;
ID-5 PC-3 To know the norms of indicators of the status of animals' biological material of different species and the reasons that cause deviations from the norms;
ID-6 PC-3 To know the etiology and pathogenesis of animal diseases of various species;
ID-7 PC-3 To know the generally accepted criteria and classifications of animal diseases, approved lists of animals disease

CLOSED-TYPE ASSIGNMENTS
Tasks of a combined type with the selection of one correct answer from the proposed options

Competency assessment tests
Task 1.
The form of manifestation of single outbreaks of infectious diseases:
1. epizootic;
2. panzootic;
3. sporadic;
4. enzootic.
Answer: 3.

Task 2.

Nutritional diseases of fish:
1. non-contagious branchiocnecrosis;

2. gas bubble disease;
3. hypovitaminosis;
4. asphyxia.
Answer: 3.

Task 3.

What disease causes cotton-like growths of the fungus:
1. Saprolegniosis;
2. Carp pox;
3. Ichthyophonosis;
4. Mycobacteriosis.
Answer: 1.

Task 4.

Blood from fish can be taken for research from:
1. fins and heart;
2. abdominal cavity and gill vein;
3. heart and tail vein;
4. vessels of the tail.
Answer: 3.

Task 5.

Which family of trematodes has a dark secretory bladder in the metacercaria, which occupies 1/3 of the cyst:
1. family *Opisthorchiidae;*
2. family *Sanguinicolidae;*
3. family *Diplostomidae;*
4. family *Strigeidae.*
Answer:1.

Closed-type compliance assignments

Task 6.

Match the helminths with their class

A	*Triaenophorus nodulosus*	1	class *Monogenea*
B	*Argulus foliaceus*	2	class *Crustacea*
C	*Dactylogyrus vastator*	3	*class Cestoidea,*
D	*Posthodiplostomum cuticola*	4	*class Trematoda.*

. Write the selected numbers in the table under the corresponding letters.

A	B	C	D	E	F	G

Answer: A3, B2, C1, D4.

Task 7.

Establish a correspondence between diseases and the main clinical signs of fish

A	Saprolegniosis	1	Black spots on the fish's body
B	Ichthyophthiriosis	2	Cotton-like growths
C	Carp pox	3	White nodules on the fish's body
D	Posthodiplostomosis	4	Epitheliomas

. Write the selected numbers in the table under the corresponding letters.

A	B	C	D	E	F

Answer: A2, B3, C4, D1.

Task 8.

Establish a correspondence between dystrophies and metabolic disorders in cells and intercellular substances

A	Chromoproteins-	1	protein is bound to carbohydrates
B	Nucleoproteins	2	protein is bound to nucleic acids
C	Lipoproteins	3	compounds in which protein is bound to coloring agents
D	Glycoproteins -	4	protein is bound to lipids

. Write the selected numbers in the table under the corresponding letters.

A	B	C	D	E	F

Answer: A3, B2, C4, D1.

Task 9.

Match the fish diseases with their pathogens

A	The causative agent of ichthyophoriosis	1	*Ligula intestinalis*
B	The causative agent of mixosomiasis	2	*Opisthorchis felineus*
C	The causative agent of opisthorchiasis	3	*Ichthyophthirius multifiliis*
D	The causative agent of ligulosis	4	*Myxosoma cerebralis*

. Write the selected numbers in the table under the corresponding letters.

A	B	C	D	E	F

Answer: A3, B4 C2, D1.

Task 10.

Match the fish diseases with their classification:

A	Gas-bubble disease	1	Bacterial disease
B	Caviosis	2	Viral disease
C	Trout furunculosis	3	Non-contagious disease
D	Infectious pancreatic necrosisподжелудочной железы	4	Invasive disease

. Write the selected numbers in the table under the corresponding letters.

A	B	C	D	E	F

Answer: A3, B4, C1, D2.

Closed-type tasks for establishing the sequence

Task 11.

Arrange the stages of making a diagnosis for a contagious disease in the following order:
1. clinical signs;
2. epizootic data;
3. pathological changes;
4. laboratory tests.
Answer: 2,1,3,4.

Task 12.

Arrange the stages of development of cestodes with one intermediate host (the final host is a fish) in order:

1. mature helminth;
2. procercoid;
3. coracidium;
4. egg.
Answer: 1, 4, 3, 2 (4,3, 2,1).

Task 13.

Arrange the stages of fish development in order:
1. yearling;
2. fry;
3. eggs;
4. larva.
Answer: 3, 4, 2, 1.

Task 14.

Arrange the stages of development of trematodes with two intermediate hosts (the additional host is a fish) in order:
1. marita;
2. egg;
3. metacercaria;
4. cercaria;
5. miracidium.
Answer: 1, 2, 5, 4, 3 (2, 5, 4, 3, 1).

Task 15.

Name the diseases in the following order: protozoal, trematode, cestode, and cestode:
1. opisthorchiasis;
2. diphyllobothriasis;
3. ichthyophthiriasis;
4. lernaeiasis.
Answer: 3, 1, 2, 4.

OPEN-TYPE ASSIGNMENTS

Task 16.

This is an invasive disease of adult worker bees, queens, and drones caused by the parasite in the tracheal system (front thoracic tracheae) (write the correct answer)_____.
The correct answer is Acarapis woodi.

Task 17.

When the American foulbrood is diagnosed, the apiary and the area around it within a radius of 5-7 km are placed under (write the correct answer _____.
The correct answer is quarantine.

Task 18.

This is an invasive disease of freshwater fish, characterized by damage to the submucosal layer of the skin and gills, caused by an infusoria. It is the most common protozoan parasite of fish. Adult infusoria vary in shape from oval to circular, and are 0.5 to 1 mm in size, covered with bristles and containing a nucleus in the shape of a horse's hoof. The disease itself is translated as

"white dot" or "manna," as the affected fish develop white dots on their sides and fins. (Write the correct answer)_____
The correct answer is ichthyophytria.

Task 19.

_____ (write the correct answer)— the death of individual cells or their groups, tissue areas, and organs that occurs during the life of an organism.
The correct answer is necrosis.

Task 20.

The female pathogen of philometriosis is localized in (write the correct answer)_____ .
The correct answer is in the scale pockets

Competency assessment tests: PC-5 To carry out plan of animal treatment, based on the stated diagnosis and animals individual character ristics, signature of necessary remedies of chemical and biological nature for the treatment, taking into account combination of its pharmacological effect on the animal body:
PC-5 ID-1 To be able to use specialized information databases at a choice of animal treatment methods.;
PC-5 ID-2 To be able to calculate the amount of remedies for the treatment of animals and the prevention of diseases with the receipts signature for a certain period;
PC-5 ID-3 To be able to calculate the amount of remedies for the treatment of animals and for the prevention of diseases with the receipts signature for a certain period, using digital technologies as well;
PC-5 ID-4 To be able to administer drugs to the animals body in various techniques;
PC-5 ID-5 To know the methods of pharmacological treatment of sick animals and indications for its administration, in accordance with the guidelines, instructions, manuals, rules of diagnosis, prevention and treatment.;
PC-5 ID-8 To know the ways of drug injections, used both for animals enteral (oral, sublingual and rectal administration) and parenteral (injections, inhalations and skin applications) methods

CLOSED-TYPE ASSIGNMENTS
Tasks of a combined type with the selection of one correct answer from the proposed options

Task 1.

How is the natural focus of disease maintained in a fish farm:
1. by the fish bred in the farm;
2. by local wild fish;
3. by imported planting material;
4. by imported eggs.
Answer: 2

Task 2.

What diseases of fish impose quarantine on farms:
1. botriocephalosis;
2. ichthyophthiriosis;
3. argulosis;
4. trichinosis.
Answer:1

Task 3.

What is the concentration of ammonia baths used against dactylogyrosis:
1. 0.2%;
2. 05%;
3. 00.1%;
4. 1%.
Answer: 1.

Task 4.

Method of administering pituitary drugs to fish in the pre-spawning period:
1. intramuscularly;
2. with feed;
3. in the form of baths;
4. subconjunctivally.
Answer: 1.Task 5.

Task 5.

Which parasites are treated with therapeutic baths:
1. ciliates;
2. nematodes;
3. myxosporidia;
4. tapeworms.
Answer: 1.

Closed-type compliance assignments

Task 6.

Match the fish diseases with the medications used to treat them:

A	Carp philometrosis	1	Krustatsid
B	Caviose	2	Antibak-100
C	Infectious dropsy in carp	3	Phenomix
D	Argulosis	4	Filomed

. Write the selected numbers in the table under the corresponding letters.

A	B	C	D	E	F

Answer: A4, B3; C2; D1.

Task 7.

Установите соответствие между препаратами и способами их применения

A	vaccines	1	with feed
B	Hypophyseal drugs	2	in the form of baths
C	Anthelmintic drugs	3	intramuscularly

D	Salt solution	4	intraperitoneally

. Write the selected numbers in the table under the corresponding letters.

A	B	C	D	E	F

Answer: A4, B3, C1, D2.

Task 8.

Establish a correlation between drugs and bee diseases

A	Bactopol	1	nosematosis
B	Bipin-T	2	aspergillosis
C	Metronidazole	3	American rot
D	Mycosol	4	varroosis

. Write the selected numbers in the table under the corresponding letters.

A	B	C	D	E	F

Answer: A3, B4, C1, D2.

Task 9.

Establish a correspondence between drugs and their forms of release.

A	Bipin-T	1	gel
B	Apigel	2	cord
C	TEDA	3	solution
D	Varrosal	4	4 plates

. Write the selected numbers in the table under the corresponding letters.

A	B	C	D	E	F

Answer: A3, B1, C2, D4.

Task 10.

Match the vitamins with their names.

A	Vitamin A	1	ascorbic acid
B	Vitamin C	2	riboflavin
C	Vitamin B2	3	retinol
D	Vitamin Д	4	calciferolол

. Write the selected numbers in the table under the corresponding letters.

A	Б	C	D	E	F

Answer: A3, B1, C2, D4.

Closed-type tasks for establishing the sequence

Task 11

Arrange the names of the drugs in order of their effectiveness against bee diseases: parasitic, bacterial, mycosis, and honeydew toxicosis:
1. Mycazole;
2. Varrosan;
3. No treatment;
4. Bactopol.
Answer: 2, 4, 1, 3.

Task 12

Arrange the drugs in order of their administration: intramuscular, with feed, therapeutic baths, and intraperitoneal:
1. vaccines;
2. anthelmintic drugs;
3. hypophyseal drugs;
4. salt solution.
Answer:3, 2, 4, 1.

Task 13

Arrange the names of the drugs in order of their use for the following fish diseases: Argulosis, Aeromonosis, Caviosis, and Non-contagious diseases:
1. Vitamins;
2. Antibac-100;
3. Krustatsid;
4. Fenomix.
Answer: 3, 2, 4, 1.

Task 14

Arrange the name of fat-soluble vitamins D, A, E, K in order:

1. retinol;
2. tocopherol;
3. calciferol;
4. menadione.

Answer: 3, 1, 2, 4.

Task 15.

Arrange the names of the drugs and their forms of release in the following order: Antibac-100, Coliflox, Alben, and Devastin:

1. Powder for external use;
2. Granules;
3. Powder for oral administration;
4. Solution for oral administration.

Answer: 3, 4, 2, 1.

OPEN-TYPE ASSIGNMENTS

Task 16.

Opisthorchiasis is an anthropozoonotic disease of humans, carnivorous animals, and fish caused by the parasitism of various stages of helminths from the *Trematoda* class. In fish, the disease is subclinical, but they are the main source of infection for humans and carnivorous animals. How is the sick fish treated? (write the correct answer) _____.

Correct answer: There is no treatment for fish in opisthorchiasis.

Task 17.

Calculate the amount of antibac 100 per 1 ton of fish for a therapeutic purpose for 7 days if 0.1g per kg of fish weight per day is required. (Write the correct answer)_____.

The correct answer is 0.7 kg (700g).

Task 18.

Calculate the amount of Devastin per 1 m^3 of water if 2 g/l is required. (Write the correct answer)_____.

The correct answer is 2 kg.

Task 19.

The drug nozemacid is used for the treatment of nozematosis of bees. In what period of the life of bees can it be used. (Write the correct answer_____.

The correct answer: it is used for therapeutic and preventive purposes in the spring period before the main honey harvest or in the summer, after the extraction of commercial honey.

Task 20.

Akarasan has a fumigant acaricidal contact effect on Acarapis woodi and *Varroa jacobsoni* mites, affecting them through _____(write the correct answer), but it is practically safe for bees.

The correct answer is a smoke aerosol generated by burning the plates.

3.2 Standard tasks for intermediate certification

3.2.1. List of questions for the test

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

ID-1 PC-3 To possess skills to make a diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases;

1. The importance of ichthyopathology in the development of fish farming and nature conservation.
2. The role and importance of ichthyopathology for aquatic bioresources and aquaculture.
3. The history of ichthyopathology.
4. Bacterial diseases of cyprinid fish.
5. Bacterial diseases of salmon fish.
6. Viral diseases of salmon fish.
7. Viral diseases of cyprinid fish.

D-2 PC-3 To possess skills to use specialized information databases for the diagnosis of animal diseasesx;

8. Classification of toxins dangerous to fish.
9. Differences between acute and chronic aquatic toxicosis.
10. Sources of aquatic toxicosis.
11. Clinical signs of aquatic toxicosis.
12. . Methods of diagnosis of fish diseases.
13. Ways of spreading pathogenic agents.
14. The dynamics of epizootics.
15. The concept of a natural source of diseases.
16. Features of the formation of disease foci in aquaculture.

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

17. European rotten.
18. American rotten.
19. Mycoses of bees.
20. Bee aspergillosis..
21. Ascospherosis of bees.
22. Melanosis.
23. Acarapidosis of bees.
24. Bee disease.
25. Varroosis of bees.
26. Nosematosis of bees.

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

27. Rules for the selection of sick fish, pathological material, blood, feed and shipment for laboratory testing

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

28. Obtaining bee products, their physico-chemical properties.
29. The main products of beekeeping.
30. Features of the structure and physiology of bees.

ID-6 PC-3 To know the etiology and pathogenesis of animal diseases of various species.;

31. Cycles of development of fish parasites.
32. Specificity of fish parasites, forms of manifestation.
33. Myxosporidiosis of fish. Forms of existence, features of the life cycle. Pathogenic effects on the host.

34. Parasitic infusoria of fish. Features of biology. Pathogenic effects on the host
35. Monogenoidosis of fish. The structure and biology of monogenes. Pathogenic effects on the host.
36. Cestodoses of fish. Development cycles. Pathogenic effects on the host.
37. Trematodes of fish. Features of the structure, biology. Development cycles. Pathogenic effects on the host.
38. Acanthocephalosis of fish. Features of the structure, biology. Development cycles.
39. Nematodes of fish. Features of biology. Development cycles. Pathogenic effects on the host.
40. Parasitic crustaceans. Representatives of the copepod squad. Features of biology. The development cycle.
41. Parasitic gill-tailed crustaceans.. Features of biology. The development cycle. Pathogenic effects on the host.

ID-7 PC-3 To know the generally accepted criteria and classifications of animal diseases, approved lists of animals disease.

42. Classification of non-infectious diseases of fish.
43. Alimentary diseases of fish, causes of development.
44. Fish diseases that occur when the environment deteriorates.
45. Classification of fish diseases.
46. Classification of invasive fish diseases.

PC-5 To carry out plan of animal treatment, based on the stated diagnosis and animals individual character ristics, signature of necessary remedies of chemical and biological nature for the treatment, taking into account combination of its pharmacological effect on the animal body:

PC-5 ID-1 To be able to use specialized information databases at a choice of animal treatment methods.;

47. Organization of the fight against fish diseases in Russia.

PC-5 ID-2 To be able to calculate the amount of remedies for the treatment of animals and the prevention of diseases with the receipts signature for a certain period.;

48. In which diseases of non-infectious etiology are quarantined on the farm.
49. Assessment of economic damage caused by fish diseases.
50. Carrying out preventive measures for putrefactive diseases of bees.
51. For which infectious diseases bees are quarantined.
52. Health-improving measures for infectious diseases of bees

PC-5 ID-3 To be able to calculate the amount of remedies for the treatment of animals and for the prevention of diseases with the receipts signature for a certain period, using digital technologies as well;

53. Measures to prevent feed toxicosis of fish.
54. Vitamin premixes used in fish farming.

PC-5 ID-4 To be able to administer drugs to the animals body in various techniques;

55. Methods of fish vaccination.
56. Methods of administration of vitamins.

PC-5 ID-5 To know the methods of pharmacological treatment of sick animals and indications for its administration, in accordance with the guidelines, instructions, manuals, rules of diagnosis, prevention and treatment.;

57. The basic principles of preventive work in diseases of non-infectious etiology.
58. The basic principles of preventive work in diseases of non-infectious etiology.
59. The basic principles of the elimination of bee diseases of infectious etiology.

PC-5 ID-8 To know the ways of drug injections, used both for animals enteral (oral, sublingual and rectal administration) and parenteral (injections, inhalations and skin applications) methods.
60. Drugs used for arachnosis of bees.
61. Carrying out health measures against invasive diseases and pests of bees.

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

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

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

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

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

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

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 40 questions:

• The mark "**excellent**" is 40-36 correct answers.

• The mark "**good**" is 35-30 correct answers.

• The mark "**satisfactory**" is 29-24 correct answers.

• The mark "**unsatisfactory**" is less than 24 correct answers

Criteria for evaluating students' knowledge in the preparation of reports:

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

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

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

• The mark "**unsatisfactory**" - there is a significant misunderstanding of the problem or the report is not submitted.

Criteria for evaluating students' knowledge when checking control papers:

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

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

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

• The mark "**unsatisfactory**" - there is a significant misunderstanding of the problem or the abstract is not presented at all.

Criteria of knowledge during the examination:

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

• **The mark "good"** – all types of educational work provided for in the curriculum have been completed. The student demonstrates the compliance of knowledge, skills, and abilities with the indicators given in the tables, operates with acquired knowledge, skills, and applies them in standard situations. At the same time, minor errors, inaccuracies, difficulties in analytical operations, transfer of knowledge and skills to new, non-standard situations can be made.

• **Mark "satisfactory"** – one or more types of educational work provided for in the curriculum have not been completed. The student demonstrates incomplete compliance of knowledge, skills, and abilities with the indicators given in the tables, significant errors are made, a partial lack of knowledge, skills, and skills are manifested in a number of indicators, the student experiences significant difficulties in operating with knowledge and skills when transferring them to new situations.

• **The mark "unsatisfactory"** – the types of educational work provided for in the curriculum have not been completed. demonstrate incomplete compliance of knowledge, skills, and abilities given in the tables of indicators, significant errors are made, a lack of knowledge, skills, and skills are manifested for a large number of indicators, the student experiences significant difficulties in operating with knowledge and skills when transferring them to new situations.

5. ACCESSIBILITY AND QUALITY OF EDUCATION FOR DISABLED PEOPLE

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

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

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

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

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

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

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

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

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