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**Federal State Autonomous Educational Institution of Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
RUDN University**

Agrarian and Technological Institute

educational division (faculty/institute/academy) as higher education programme developer

COURSE SYLLABUS

Fish pathology and aquaculture

course title

Recommended by the Didactic Council for the Education Field of:

36.05.01 Veterinary

field of studies / speciality code and title

The course instruction is implemented within the professional education programme of higher education:

Veterinary

higher education programme profile/specialisation title

1. GOALS AND OBJECTIVES OF THE COURSE

The aim of mastering the course "**Fish pathology and aquaculture**" is to prepare graduates for professional veterinary activities in the field of fish farming, to carry out work in veterinary laboratories, fish farms and specialized research institutes.

2. REQUIREMENTS FOR LEARNING OUTCOMES

The implementation of the course "**Fish pathology and aquaculture**" is aimed at creating the following competencies (parts of competencies) for students:

Table 2.1. List of competencies formed by students during the development of the course (results of the development of the discipline)

Competence code	Competence descriptor	Indicators of competence accomplishment (within the discipline)
PC-1	Ability to collect the anamnesis of the animal's life and health to further establish a diagnosis and plan therapeutic and preventive measures.	PC-1.1 Collects the animal's life history, information about scheduled vaccinations, deworming, and other preventive treatments.
		PC-1.2 Collects information about past diseases, surgical interventions, ongoing chronic diseases, and therapy for these conditions.
		PC-1.3 Collects information about changes in the animal's condition during the illness, conducted diagnostic and therapeutic procedures, and used medications and physiotherapy methods.
PC-2	Ability to perform a complete initial clinical examination of an animal to establish a preliminary clinical diagnosis (diagnoses) and repeat examinations to monitor the patient's condition.	PC-2.1 Follows the technique and procedure for clinical examination, taking into account the type and condition of the animal.
		PC-2.2 Identifies signs (symptoms) of deviations from normal function, recognizes standard combinations of signs (syndromes).
		PC-2.3 Records the results of the examination in the patient's chart or other medical documents.
		PC-2.4 Able to assess the initial degree of clinical symptom manifestation and its changes during patient management.
PC-10	Ability to analyze and adjust animal feeding to improve the effectiveness of treatment and to prescribe therapeutic	PC-10.1 Able to analyze the patient's diet to identify factors predisposing to disease development.

	diets.	PC-10.2 Able to justify the prescription of special therapeutic feeding for animals with various diseases.
		PC-10.3 Able to recommend an approximate composition of therapeutic diets, the desirable ratio of nutrients, and the presence of special additives and components that enhance the therapeutic effect of the diet.
		PC-10.4 Able to use specialized programs and databases to select commercial therapeutic diets and supplements, as well as to develop individual therapeutic diets for animals of various species.

3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The course "**Fish pathology and aquaculture**" belongs to the part formed by the participants of educational relations of the block B1 of the Educational Program of Higher Education.

As part of the Educational Program of Higher Education, students also master other disciplines and /or practices that contribute to achieving the planned results of mastering the course "**Fish pathology and aquaculture**".

Table 3.1. List of Higher Education Program components disciplines that contribute to expected learning outcomes

Competence code	Competence descriptor	Previous courses/modules, internships*	Subsequent courses/modules, internships*
PC-1	Ability to collect the anamnesis of the animal's life and health to further establish a diagnosis and plan therapeutic and preventive measures.	Clinical Diagnostics / Клиническая диагностика	Equine Diseases / Болезни лошадей Diseases of Farm Animals / Болезни продуктивных животных Small Animal Diseases / Болезни мелких домашних животных Bee Diseases and Entomophages / Болезни пчел и энтомофаги

			<p>Exotic Animal Diseases / Болезни экзотических животных</p> <p>Base component / Базовая компонента</p> <p>Educational Practice / Учебная практика</p> <p>Variable component / Вариативная компонента</p> <p>Clinical Industrial Practice / Клиническая производственная практика</p> <p>Clinical Internship</p> <p>Industrial Research Practice / Производственно-исследовательская практика</p> <p>Preparation for Passing and Passing the State Exam / Подготовка к сдаче и сдача государственного экзамена</p> <p>Preparing and Passing the State Exam / Подготовка и сдача государственного экзамена</p> <p>Design, Preparation for Defense Procedure and Defense of the</p>
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			Graduation Thesis / Оформление, подготовка к процедуре защиты и защита выпускной квалификационной работы
PC-2	Ability to perform a complete initial clinical examination of an animal to establish a preliminary clinical diagnosis (diagnoses) and repeat examinations to monitor the patient's condition.		Equine Diseases / Болезни лошадей Diseases of Farm Animals / Болезни продуктивных животных Small Animal Diseases / Болезни мелких домашних животных Bee Diseases and Entomophages / Болезни пчел и энтомофаги Exotic Animal Diseases / Болезни экзотических животных Base component / Базовая компонента Educational Practice / Учебная практика Variable component / Вариативная компонента Clinical Industrial Practice / Клиническая производственная практика

			<p>Clinical Internship</p> <p>Industrial Research Practice / Производственно-исследовательская практика</p> <p>Preparation for Passing and Passing the State Exam / Подготовка к сдаче и сдача государственного экзамена</p> <p>Preparing and Passing the State Exam / Подготовка и сдача государственного экзамена</p> <p>Design, Preparation for Defense Procedure and Defense of the Graduation Thesis / Оформление, подготовка к процедуре защиты и защита выпускной квалификационной работы</p>
PC-10	Ability to analyze and adjust animal feeding to improve the effectiveness of treatment and to prescribe therapeutic diets.	<p>Animal Nutrition and Feeding with Basics of Feed Production / Кормление животных с основами кормопроизводства</p> <p>Medicinal and Poisonous Plants / Лекарственные и ядовитые растения</p> <p>Fodder Plants /</p>	<p>Equine Diseases / Болезни лошадей</p> <p>Diseases of Farm Animals / Болезни продуктивных животных</p> <p>Small Animal Diseases / Болезни мелких домашних животных</p> <p>Bee Diseases and</p>

		<p>Кормовые растения</p> <p>Fish Pathology and Aquaculture / Патология рыб и аквакультура</p>	<p>Entomophages / Болезни пчел и энтомофаги</p> <p>Exotic Animal Diseases / Болезни экзотических животных</p> <p>Variable component / Вариативная компонента</p> <p>Clinical Industrial Practice / Клиническая производственная практика</p> <p>Clinical Internship</p> <p>Industrial Research Practice / Производственно-исследовательская практика</p> <p>Preparation for Passing and Passing the State Exam / Подготовка к сдаче и сдача государственного экзамена</p> <p>Preparing and Passing the State Exam / Подготовка и сдача государственного экзамена</p> <p>Design, Preparation for Defense Procedure and Defense of the Graduation Thesis / Оформление, подготовка к</p>
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			процедуре защиты и защита выпускной квалификационной работы
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4. COURSE WORKLOAD AND TRAINING ACTIVITIES

Course workload of the course "**Fish pathology and aquaculture**" is 2 credits.

*Table 4.1. Types of academic activities during the period of the HE program mastering for **full-time** study*

Type of academic activities		Total academic hours	Semesters/training modules			
			9	-	-	-
Contact academic hours		34	34	-	-	-
including						
Lectures		-	-	-	-	-
Lab work		-	-	-	-	-
Seminars (workshops/tutorials)		34	34	-	-	-
Self-study		29	29	-	-	-
Evaluation and assessment (exam/pass/fail grading)		9	9	-	-	-
Course workload	academic hours	72	72	-	-	-
	credits	2	2	-	-	-

5. COURSE CONTENTS

Table 5.1 Content of the course (module) by type of academic work

Modules	Content of the modules (topics)	Types of academic activities
Module 1. General regulatory documents on fish diseases	Topic 1.1 General regulatory documents on fish diseases.	Seminars
	Topic 1.2 Significance for the State.	Seminars
Module 2. Viral diseases of fish	Topic 2.1 Fish vibriosis.	Seminars
	Topic 2.2 Spring viremia of carp (VVC).	Seminars
Module 3. Bacterial diseases of fish	Topic 3.1 Infectious necrosis of hematopoietic tissue of salmon.	Seminars

	Topic 3.2 Infectious necrosis of the salmon pancreas (VHS).	Seminars
Module 4. Mycoses of fish	Topic 4.1 Viral hemorrhagic septicemia of salmon.	Seminars
	Topic 4.2 Infectious anemia of salmon.	Seminars
Module 5. Protozoal diseases of fish	Topic 5.1 Inflammation of the carp swim bladder (RUNWAY).	Seminars
	Topic 5.2 Smallpox (papillomatosis, epithelioma) of carp.	Seminars
Module 6. Helminthiasis of fish. Monogenoidosis. Cestodoses	Topic 6.1 Aeromonosis.	Seminars
	Topic 6.2 Bacterial renal disease of salmon.	Seminars
Module 7. Helminthiasis of fish. Trematodoses. Nematodes	Topic 7.1 Yersiniosis.	Seminars
	Topic 7.2 Myxobacterioses.	Seminars
Module 8. Crustaceoses and other parasitoses	Topic 8.1 Pseudomonosis.	Seminars
Module 9. Non-communicable diseases of fish	Topic 9.1 Saprolegniosis.	Seminars
	Topic 9.2 Furunculosis.	Seminars
	Topic 9.3 Erythrodermatitis.	Seminars
Module 10. Veterinary-sanitary and preventive measures at fish farms.	Topic 10.1 Branchiomycosis. Deep mycosis.	Seminars

6. COURSE EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Table 6.1. Material and technical support of the discipline

<i>Classroom for Academic Activity Type</i>	<i>Equipping the classroom</i>	Specialized educational/laboratory equipment, software and materials for the development of the course (if necessary)
Lecture	An auditorium for conducting lecture-type classes, equipped with a set of specialized furniture; a board (screen) and technical means of multimedia presentations.	-
Laboratory	An auditorium for laboratory work, individual consultations, routine	-

	monitoring and interim certification, equipped with a set of specialized furniture and equipment.	
Self-studies	An auditorium for independent work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to an electronic information and educational environment.	-

7. RESOURCES RECOMMENDED FOR COURSE STUDIES

Main readings:

1. Schislenko, S. A. Infectious diseases of fish: a textbook for universities / S. A. Schislenko. — Moscow : Yurayt Publishing House, 2021. - 225 p. — (Higher education). — ISBN 978-5-534-13787-3. — Text: electronic // EBS Yurayt [website]. — URL: <https://urait.ru/bcode/466888>
2. Fish farming : textbook / V.I. Komlatsky, G.V. Komlatsky, V.A. Velichko. - 2nd ed., ispr. - St. Petersburg : Publishing House "Lan", 2018. - 200 p. : <https://lib.rudn.ru/MegaPro/Web/SearchResult/ToPage/464877>

Additional Readings:

1. Ichthyopathology : textbook / A.M. Ataev, M.M. Zubairova. - Electronic text data. - St. Petersburg : Lan, 2015. - 352 p. : <https://lib.rudn.ru/MegaPro/Download/MObject/5650>
2. Diagnostics of diseases and veterinary examination of fish: an educational and methodical manual / K.S. Malovastyy. - St. Petersburg : Publishing House "Lan", 2013. - 512 p. : <https://lib.rudn.ru/MegaPro/Web/SearchResult/ToPage/465226>
3. Ichthyology. Basic course : textbook / V.P. Ivanov, V.I. Egorova, T.S. Ershova. - 3rd ed., reprint. - St. Petersburg : Publishing House "Lan", 2017. - 360 p. : <https://lib.rudn.ru/MegaPro/Web/SearchResult/ToPage/464992>
4. Physiology of fish : an educational and methodological guide. Book 2 : Nutrition and digestion / V.G. Skopichev, L.Y. Karpenko, I.O. Bogolyubova [and others] ; under the total. edited by V.G. Skopichev. - Electronic text data. - St. Petersburg : Quadro, 2017. - 344 p.
5. Physiology of fish : a textbook. Book 1 : Physiology of blood and blood circulation of fish. Immune system of fish / L.V. Zhichkina, L.Y. Karpenko, M.K. Kasumov, V.G. Skopichev. - Electronic text data. - St. Petersburg : Quadro, 2017. - 200 p.

Internet sources

1. Electronic libraries (EL) of RUDN University and other institutions, to which university students have access on the basis of concluded agreements:
 - RUDN Electronic Library System (RUDN ELS) <http://lib.rudn.ru/MegaPro/Web>
 - EL "University Library Online" <http://www.biblioclub.ru>
 - EL "Yurayt" <http://www.biblio-online.ru>

- EL "Student Consultant" www.studentlibrary.ru
- EL "Lan" <http://e.lanbook.com/>
- EL "Trinity Bridge"

2. Databases and search engines:

- electronic foundation of legal and normative-technical documentation <http://docs.cntd.ru/>
- Yandex search engine [https:// www.yandex.ru/](https://www.yandex.ru/)
- Google search engine <https://www.google.ru/>
- Scopus abstract database <http://www.elsevierscience.ru/products/scopus/>

Educational and methodological materials for independent work of students during the development of the discipline/ module*:

1. A course of lectures on the course "**Fish pathology and aquaculture**".
2. Laboratory workshop on the course "**Fish pathology and aquaculture**".

* - The training toolkit and guidelines for the internship are placed on the internship page in the university telecommunication training and information system under the set procedure.

8. ASSESSMENT TOOLKIT AND GRADING SYSTEM* FOR EVALUATION OF STUDENTS' COMPETENCES LEVEL AS COURSE RESULTS

The assessment toolkit and the grading system* to evaluate the level of competences (competences in part) formation as the course results are specified in the Appendix to the course syllabus.

* The assessment toolkit and the grading system are formed on the basis of the requirements of the relevant local normative act of RUDN University (regulations / order).

DEVELOPER:

Associate Professor of the Department of Veterinary

Medicine

Position, Basic curriculum

Signature

Drukovsky S.G.

Full name.

HEAD OF EDUCATIONAL DEPARTMENT:

Department of Veterinary Medicine

Name Basic Curriculum

Signature

Vatnikov Yu.A.

Full name.

HEAD OF HIGHER EDUCATION PROGRAMME:

Director of the Department of Veterinary Medicine

Position, Basic curriculum

Signature

Vatnikov Yu.A.

Full name