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WORKING COURSE SYLLABUS

Laboratory diagnostics of infectious and invasive diseases

Recommended by the Methodological Council for the Education Field:

36.05.01 Veterinary medicine

1. GOALS AND OBJECTIVES OF THE DISCIPLINE

The aim of mastering the discipline "Laboratory diagnostics of infectious and invasive diseases" is the development by students of theoretical, methodological and practical knowledge that forms the modern chemical basis for the development of core academic disciplines and the implementation of the main professional tasks: prevention and treatment of animal diseases, increasing the production of high-quality products and raw materials of animal origin, environmental protection from pollution, etc.

2. REQUIREMENTS FOR THE RESULTS OF MASTERING THE DISCIPLINE

The development of the discipline "Laboratory diagnostics of infectious and invasive diseases" 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 discipline (results of the development of the discipline)

Code	Competence	Indicators of competence
Cour	Competence	▲
UK -8	The ability to create and maintain safe living conditions in everyday life and in professional activities for the preservation of the natural environment, ensuring the sustainable development of society, including in the event of a threat and occurrence of emergencies and military conflicts.	 accomplishment (within the discipline) UK-8.1 Analyzes the factors of harmful influence on the vital activity of elements of the habitat. (technical means, technological processes, materials, buildings and structures, natural and social phenomena); UK -8.2 Identifies dangerous and harmful factors within the scope of the task being performed; UK-8.3 Identifies and eliminates problems related to safety violations in the workplace; UK -8.4 Explains measures to prevent emergencies; UK -8.5 "Explains the rules of conduct in the event of emergencies of natural and man-made origin, as well as in the event of military conflicts;"
UK -12	The ability to search for the	recovery activities. UK -12.1 Searches for the necessary
01 - 12	necessary sources of information and data, to perceive, analyze, memorize and transmit information using digital means, as well as using algorithms when working with	sources of information and data, perceives, analyzes, remembers and transmits information using digital means, as well as using algorithms when working with data obtained from various sources in order to effectively use the information

	data obtained from various	received to solve problems
	sources in order to effectively use the information received to solve problems; to evaluate information, its reliability, build logical conclusions based on incoming information and data	UK-12.2 Evaluates information, its reliability, builds logical conclusions based on incoming information and data
GPC -1	The ability to determine the biological status and normative clinical indicators of organs and systems of the animal body.	GPC-1.1 Knows the structure and functions of the main systems of the animal body, taking into account the specific features GPC-1.2 He s able to predict the expected violations of the biological status in case of suspected development of diseases GPC-1.3 He is able to determine the main indicators of the activity of individual body systems and draw conclusions about the presence of deviations from the standard values GPC-1.4 Has the skills of sampling biological fluids and tissues for research,
GPC-3	The ability to carry out and improve professional activities in accordance with regulatory legal acts in the field of agro- industrial complex.	performing laboratory tests, interpreting research results. GPC-3.1 He knows modern legal norms, both state and international, regulating activities in the field of veterinary medicine, veterinary and sanitary expertise and agro-industrial complex.
		GPC-3.2 Has the skills of updating legal information, including in the field of agro- industrial complex of professional orientation. GPC-3.3 Carries out activities in accordance with regulatory legal acts in the field of agriculture, as well as in the field of veterinary medicine and veterinary and sanitary expertise.
GPC -4	The ability to use methods of solving problems using modern equipment in the development of new technologies in professional activity and to use	GPC-4.1 Possesses the conceptual and methodological apparatus of basic natural sciences at a level sufficient for full- fledged professional activity at the modern level.

	modern professional methodology for conducting experimental research and interpreting their results.	GPC-4.2 He knows the methods of solving problems using modern equipment. GPC-4.3 He is ready to use modern methodology in the development and conduct of experimental research. GPC-4.4 Uses modern professional methodology in interpreting research results.	
GPC -5	The ability to draw up special documentation, analyze the results of professional activity and submit accounting documents using specialized databases.	results.GPC-5.1 Has the skills to search for thnecessary forms of documentation orofficial websites and in specializeddatabases.GPC-5.2 Possesses professionaterminology and skills in filling outanalytical and reporting documents ofprofessional orientation.GPC-5.3 He is able to use specializedsoftware to analyze the results ofprofessional activity and compilaccounting documentation.	
GPC -6	The ability to analyze, identify and assess the risk of the risk of the occurrence and spread of diseases.	 GPC-6.1 Has knowledge in the field of etiology and pathogenesis of animal diseases of different species. GPC-6.2 Has the skills to diagnose non-infectious, infectious and invasive diseases, identify pathogens of infectious and invasive diseases in animals. GPC-6.3 He knows the patterns of the occurrence and spread of diseases in 	
GPC -7	He is able to understand the principles of modern information technologies and use them to solve the tasks of professional activity.	 animal populations, factors predisposing to diseases and the causes of possible complications. GPC-7.1 Understands the principles of modern computer technology and telecommunications and is able to use them to solve professional problems; GPC-7.2 Uses modern special software and specialized databases to solve professional tasks and perform official duties; GPC-7.3 Has the skills to work on modern medical diagnostic and therapeutic equipment with software; 	

		GPC-7.4 Uses specialized databases to solve professional problems in the field of diagnostics and treatment of animals of various species;
		GPC-7.5 Uses geoinformation systems and software complexes when collecting and analyzing information related to the assessment of the spread of infectious diseases, epizootic situations, planning and evaluating the effectiveness of anti- epizootic measures.
PC -3	Ability to develop animal research programs using special (instrumental) and laboratory methods.	PC-3.1 He is able to develop individual animal research programs, including the use of special (instrumental) and laboratory methods to detect deviations from the physiological norm of the state of a living organism, conduct differential diagnosis of the detected pathology or control the course of the disease and the effectiveness of the prescribed treatment. PC-3.2 Capable of developing mass comprehensive animal research programs (medical examination programs) of animals, taking into account their type and purpose, both general and special.
PC -4	The ability to conduct clinical studies of animals using special (instrumental) and laboratory methods to clarify the	PC-4.1 Able to conduct additional animal studies using laboratory methods to clarify the diagnosis.
	diagnosis.	PC-4.2 Able to conduct additional animal studies using special (instrumental) methods to clarify the diagnosis.
PC -19	The ability to perform post- mortem diagnostic examination of animals in order to establish pathological processes, diseases, causes of death.	 PC-19.1 Able to conduct a general examination of animal corpses before autopsy. PC-19.2 He is capable of performing autopsy of animal corpses using special tools and compliance with safety requirements. PC -19.3 He is able to establish the cause of death and a pathoanatomic diagnosis in accordance with generally accepted criteria and classifications, lists of animal diseases. PC-19.4 He is able to formalize the results
		of a postmortem diagnostic examination of an animal in the autopsy protocol.

PC -22	protect the organization from the introduction of infectious and invasive diseases in	PC -22.1 He is able to assess the epizootic state of an organization (territory), identify risks and possible causes of epizootic foci, as well as factors affecting their spread in specific organizations, territories.
		PC-22.2 Able to choose and apply the most effective measures to protect the organization from the introduction of infectious and invasive diseases.PC-22.3 He is able to carry out operational control of the effectiveness of the activities carried out.

3. COURSE IN HIGHER EDUCATION

The discipline "Laboratory diagnostics of infectious and invasive diseases" 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 discipline "Laboratory diagnostics of infectious and invasive diseases".

Competence code	Competence	Previous Disciplines (Modules)	Subsequent Disciplines (Modules)
UK -8	The ability to create and maintain safe living conditions in everyday life and in professional activities for the preservation of the natural environment, ensuring the sustainable development of society, including in the event of a threat and occurrence of emergencies and military conflicts.	Inorganic and analytical chemistry Organic Chemistry Biological physics Physical and colloidal chemistry Life safety Biological chemistry Veterinary microbiology and mycology	Organization of state veterinary supervision

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

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UK -12	The ability to search for the necessary sources of information and data, to perceive, analyze, memorize and transmit information using digital means, as well as using algorithms when working with data obtained from various sources in order to effectively use the information received to solve problems; to evaluate information, its reliability, build logical conclusions based on incoming information and data	veterinary business Forensic veterinary examination and autopsy of animals Mathematics Veterinary deontology Medicinal and poisonous plants	Organization of state veterinary supervision Veterinary and industrial laboratories with the basics of design Biometrics in veterinary medicine Fundamentals of social and legal knowledge Space technologies in the service of the agro-industrial complex
GPC -1	The ability to determine the biological status and normative clinical indicators of organs and systems of the animal body.	diagnostics Animal anatomy Cytology, histology and embryology Physiology and ethology of animals Pathological physiology Clinical diagnosis Pathological anatomy Instrumental diagnostic methods Obstetrics, gynecology and andrology Immunology Clinical laboratory diagnostics	Veterinary and industrial laboratories with the basics of design Bee diseases and entomophages Fish pathology and aquaculture Anesthesiology, intensive care and intensive care
GPC-3	The ability to carry out and improve professional activities in accordance with regulatory legal acts	Jurisprudence Life safety Breeding with the basics of private animal	Organization of state veterinary supervision Veterinary and

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	in the field of agro-	husbandry	industrial
	industrial complex.	Veterinary	laboratories with
		Pharmacology	the basics of design
		Toxicology	Career
		Parasitology and	Management
		invasive diseases	Fundamentals of
		Epizootology and	social and legal
		infectious diseases	knowledge
		Organization of	
		veterinary business	
		General and veterinary	
		ecology	
		Veterinary sanitation	
		Technology of	
		processing livestock	
		products	
		Veterinary deontology	
		Economics and	
		organization of	
		agricultural production	
GPC -4	The ability to use	Inorganic and analytical	Diseases of horses
	methods of solving	chemistry	Diseases of
	problems using modern	Organic Chemistry	productive animals
	equipment in the	Biological physics	Diseases of small
	development of new	Computer science	pets
	technologies in	Physical and colloidal	Diseases of small
	professional activity and	chemistry	pets
	to use modern	Cytology, histology and	Bee diseases and
	professional	embryology	entomophages
	methodology for	Biological chemistry	Fish pathology and
	conducting experimental	Veterinary microbiology	aquaculture
	research and interpreting	and mycology	Diseases of exotic
	their results.	Virology and	animals
		biotechnology	Anesthesiology,
		Physiology and	intensive care and
		ethology of animals	intensive care
		Breeding with the basics	Dermatology
		of private animal	Cardiology
		husbandry	Endocrinology
		Pathological physiology	Nephrology
		Veterinary	Reconstructive and
		Radiobiology	reconstructive
		Clinical diagnosis	surgery
		Pathological anatomy	Veterinary
		Operative surgery with	Ophthalmology
		topographic anatomy	Animal Dentistry
		Instrumental diagnostic	
		methods	
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		Toxicology	
		Obstetrics, gynecology	
		and andrology	
		Internal non-infectious	
		diseases	
		General surgery	
		Private Veterinary	
		surgery	
		Parasitology and	
		invasive diseases	
		Epizootology and	
		infectious diseases	
		Mathematics	
		Immunology	
		Veterinary sanitation	
		Technology of	
		processing livestock	
		products	
		Medicinal and	
		poisonous plants	
		Forage plants	
		Fundamentals of	
		intellectual work	
		Personality psychology	
		and professional self-	
		determination	
		Clinical laboratory	
		diagnostics	
GPC -5	The ability to draw up	Veterinary genetics	Organization of
	special documentation,	Computer science	state veterinary
	analyze the results of	-	supervision
	professional activity and	-	Veterinary and
	submit accounting	1	industrial
	documents using	•	laboratories with
	specialized databases.	Pathological anatomy	the basics of design
		Operative surgery with	Anesthesiology,
		topographic anatomy	intensive care and
		Instrumental diagnostic	intensive care
		methods	Dermatology
		Obstetrics, gynecology	Cardiology
		and andrology	Endocrinology
		Internal non-infectious	Nephrology
		diseases	r opinology
		Parasitology and	
		invasive diseases	
		Epizootology and	
		infactions discourses	
		infectious diseases Veterinary and sanitary	

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veterinary business			-	
			•	
Forensic veterinary			•	
examination and			examination and	

		autopsy of animals Introduction to the specialty General and veterinary ecology	
		Veterinary sanitation Technology of processing livestock products Medicinal and poisonous plants Forage plants	
		Animal Health Clinical laboratory diagnostics	
GPC -7	He is able to understand the principles of modern information technologies and use them to solve the tasks of professional activity.	Computer science Instrumental diagnostic methods Organization of veterinary business Mathematics Fundamentals of intellectual work Clinical laboratory diagnostics	Veterinary and industrial laboratories with the basics of design Anesthesiology, intensive care and intensive care Dermatology Cardiology Endocrinology Nephrology Reconstructive and reconstructive surgery
PC -3	Ability to develop animal research programs using special (instrumental) and laboratory methods.		Veterinary and industrial laboratories with the basics of design Diseases of horses Diseases of horses Diseases of small pets Diseases of small pets Bee diseases and entomophages Fish pathology and aquaculture Diseases of exotic animals Anesthesiology, intensive care and

			· · ·
		and andrology Internal non-infectious diseases General surgery Private Veterinary surgery Parasitology and invasive diseases Epizootology and infectious diseases Immunology Veterinary deontology Clinical laboratory diagnostics	intensive care Dermatology Cardiology Endocrinology Nephrology Reconstructive and reconstructive surgery Veterinary Ophthalmology Animal Dentistry
PC -4	The ability to conduct clinical studies of animals using special (instrumental) and laboratory methods to clarify the diagnosis.	Animal anatomy	Diseases of horses Diseases of productive animals Diseases of small pets Diseases of small pets Diseases of exotic animals Anesthesiology, intensive care and intensive care Dermatology Cardiology Endocrinology Nephrology Veterinary Ophthalmology Animal Dentistry
PC -19	The ability to perform post-mortem diagnostic examination of animals in order to establish pathological processes,	Animal anatomy Cytology, histology and embryology Life safety Pathological anatomy	Diseases of horses Diseases of productive animals Diseases of small pets

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	diseases, causes of death.	Toxicology	Bee diseases and
		Obstetrics, gynecology	entomophages
		and andrology	Fish pathology and
		Internal non-infectious	aquaculture
		diseases	Diseases of exotic
		General surgery	animals
		Private Veterinary	Dermatology
		surgery	Cardiology
		Parasitology and	Endocrinology
		invasive diseases	Nephrology
		Epizootology and	Veterinary
		infectious diseases	Ophthalmology
		Veterinary and sanitary	Animal Dentistry
		examination	
		Forensic veterinary	
		examination and	
		autopsy of animals	
		Clinical laboratory	
		diagnostics	
PC -22	Ability to organize	Life safety	Organization of
	measures to protect the	Veterinary microbiology	state veterinary
	organization from the	and mycology	supervision
	introduction of infectious	Virology and	Bee diseases and
	and invasive diseases in	biotechnology	entomophages
	accordance with the plan	Animal health and	Fish pathology and
	of antiepizootic	welfare	aquaculture
	measures.	Veterinary	aquaeurare
	incusures.	Pharmacology	
		Private Veterinary	
		surgery	
		Parasitology and	
		invasive diseases	
		Epizootology and	
		infectious diseases	
		Organization of	
		veterinary business	
		•	
		General and veterinary	
		ecology Votoringry conjugation	
		Veterinary sanitation	
		Technology of	
		processing livestock	
		products	
		Animal Health	

4. COURSE WORKLOAD AND TRAINING ACTIVITIES

Course workload of the discipline "Laboratory diagnostics of infectious and invasive diseases" is 2 credits.

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

Types of academic activities		HOURS	Semester			
			7	-	-	-
Contact academic hours		36	36	-	-	-
including						
Lectures		-	-	-	-	-
Lab work		36	36	-	-	-
Seminars (workshops/tutorials)		-	-	-	-	-
Self-study		28	28	-	-	-
Evaluation and assessment (exam/pass/fail		8	8	-	-	-
grading)						
	Academic	72	72	-	-	-
Course workload	hour					
Course workload	Credit	2	2	-	-	-
	unit					

Table 4.2. Types of academic activities during the period of the HE program mastering for **part-time** study

Types of academic activities		HOURS	S Semesters			
			7	-	-	-
Contact academic hours		18	18	-	-	-
including	including					
Lectures		-	-	-	-	-
Lab work		-	-	-	-	-
Seminars (workshops/tutorials)		18	18	-	-	-
Self-study		80	80	-	-	-
Evaluation and assessment (exam/pass/fail		10	10	-	-	-
grading)						
	Academic	108	108	-	-	-
Course workload	hour					
Course workload	Credit	3	3	-	-	-
	unit					

5. CONTENT OF THE DISCIPLINE

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

Name of the discipline section	Content of the section (topics)	Types of academic activities
Section 1. Introduction	Topic 1.1. Objects and methods of	Lab work.
	laboratory research.	
Section 2. Blood testing		Lab work.
	from different types of animals.	

	Topic 2.2. Principles of construction of the scheme and algorithm of research. General clinical blood test.	Lab work.
	Topic 2.3. General principles of calculus of shaped blood elements. Counting red blood cells.	Lab work.
	Topic 2.4. White blood cell count. Elimination of the leukocyte formula.	Lab work.
	Topic 2.5. Methods for determining hemoglobin.	Lab work.
	Topic 2.6. Obtaining defibrinated blood plasma, serum.	Lab work.
	Topic 2.7. Determination of erythrocyte sedimentation rate (ESR).	Lab work.
	Topic 2.8. Biochemical blood analysis.	Lab work.
Section 3. Laboratory diagnostics of the	Topic 3.1. Rules for collecting material from different types of animals.	Lab work.
isolation system. Urine analysis.	Topic 3.2. Principles of construction of the scheme and algorithm of research.	Lab work.
	Topic 3.3. Research of kidney functions, physico-chemical properties of urine.	Lab work.
	Topic 3.4. General clinical analysis of urine.	Lab work.
	Topic 3.5. Biochemical analysis of urine.	Lab work.
	Topic 3.6. Preparation of a smear.	Lab work.
	Topic 3.7. Microscopy of urinary sediment. Uroliths.	Lab work.
Section 4. Laboratory diagnostics of the endocrine system.	Topic 4.1. Diagnosis of pathology of the endocrine glands (biochemical blood analysis).	Lab work.
Section 5. Laboratory diagnostics of the	Topic 5.1. Principles of sampling of punctate and biopsy.	Lab work.
respiratory system.	Topic 5.2. Laboratory examination of the material.	Lab work.
Section 6. Laboratory diagnostics of the	Topic 6.1. Determination of the enzymatic activity of saliva.	Lab work.
digestive system.	Topic 6.2. Study of gastric secretion.	Lab work.
	Topic 6.3. Determination of acidity and enzymatic activity of gastric juice.	Lab work.
	Topic 6.4. Coprology. Rules of sampling and laboratory examination of feces.	Lab work.

6. CLASSROOM INFRASTRUCTURE AND TECHNOLOGY SUPPORT REQUIREMENTS

Table 6.1. Material and technical support of the discipline

Classroom for Academic Activity Type	Equipping the classroom	Specialized educational/laboratory equipment, software and materials for the development of the discipline (if necessary)
Laboratory	An auditorium for laboratory work, individual consultations, routine monitoring and interim certification, equipped with a set of specialized furniture and equipment.	- Biochemical analyzer of blood, urine and hematological analyzer of blood (ILAB 650, PCE 90VET, etc.).
Seminary	An auditorium for conducting seminar-type classes, group and individual consultations, ongoing monitoring and interim certification, equipped with a set of specialized furniture and multimedia presentation equipment.	- Biochemical analyzer of blood, urine and hematological analyzer of blood (ILAB 650, PCE 90VET, etc.).
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. RECOMMENDED SOURCES FOR COURSE STUDIES

Main reading:

- 1. Usha Boris Veniaminovich. Clinical diagnostics of internal non-infectious animal diseases / B.V. Usha, I.M. Belyakov, R.P. Pushkarev. Electronic text data. St. Petersburg : Quadro, 2020. 487 p.
- 2. Fundamentals of infectious diagnostics: textbook / V.V. Makarov, D.A. Lozovoy, V.I. Belousov, A.K. Petrov. Vladimir : FGBI "VNIIZH", 2019. 137 p.

Additional Reading:

- 1. Handbook of veterinary therapist [Electronic resource] / G.G. Shcherbakov [et al.]; Under the general ed. of G.G. Shcherbakov. - 5th ed., ispr. and add. - St. Petersburg : Publishing House "Lan", 2009. - 656 p. http://lib.rudn.ru/MegaPro/UserEntry?Action=Rudn FindDoc&id=465300&idb=0
- 2. Korobov Alexander Vasilyevich. New instruments, devices and scientific and technological developments in the field of clinical veterinary therapy by Professor Korobov. Internal non-infectious diseases of animals [Text] : Textbook (monograph) / A.V. Korobov. M. : Greenlight, 2008. 48 p.
- 3. Methods of veterinary clinical laboratory diagnostics [Text] : Handbook / I.P. Kondrakhin [et al.]; Edited by I.P.Kondrakhin. M. : KolosS, 2004. 520 p.

Resources of the Internet information and telecommunication network:

1. Electronic library system of RUDN and third-party Electronic library systems to which university students have access on the basis of concluded contracts:

- Electronic library system of RUDN - ELS RUDN http://lib.rudn.ru/MegaPro/Web

- ELS "University Library online"<u>http://www.biblioclub.ru</u>

- ELS Yurayt http://www.biblio-online.ru
- ELS "Student Consultant"<u>www.studentlibrary.ru</u>
- ELS "Lan"<u>http://eZlanbook.com/</u>
- ELS "Trinity Bridge"<u>http://www.trmost.com/</u>
- 2. Databases and search engines:
- electronic fund of legal and regulatory and technical documentation http://docs.cntd.ru/
- search engine Yandex <u>https://www.yandex.ru/</u>
- search engine Google <u>https://www.google.ru/</u>
- abstract database SCOPUS 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 discipline "Laboratory diagnostics of infectious and invasive diseases".
- 2. Laboratory workshop on the discipline "Laboratory diagnostics of infectious and invasive diseases".

* - All educational and methodological materials for independent work of students are placed in accordance with the current procedure on the discipline page in the <u>Telecommunication educational and Information System!</u>

8. MID-TERM ASSESSMENT

Evaluation materials and a point-rating system^{*} for assessing the level of competence formation (part of competencies) based on the results of mastering the discipline "Laboratory diagnostics of infectious and invasive diseases" are presented in the Appendix to this Work Program of the discipline.

* - Assessment Materials and a Point Rating System are formed based on the requirements of the relevant local regulatory act of the RUDN.

DEVELOPER:

Professor of the Department of Veterinary Medicine

Vatnikov Yu.A.

Signature

HEAD OF THE DEPARTMENT:

Vatnikov Yu.A. Full name.

HEAD OF THE HIGHER EDUCATION PROGRAM:

Director of the Department of Veterinary Medicine Position, Basic curriculum

Signature

Signature

Vatnikov Yu.A.