Federal State Autonomous Educational Institution for Higher Education PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA

Agrarian and Technological Institute

WORKING COURSE SYLLABUS

Animal anatomy

Recommended by the Methodological Council for the Education Field:

36.05.01 Veterinary medicine

2022

1. GOALS AND OBJECTIVES OF THE DISCIPLINE

The aim of mastering the discipline "**Animal Anatomy**" is the formation of professional knowledge and skills for the student to use morphological knowledge about a functioning, developing and adapting organism in practice. This is necessary for the veterinarian to correctly apply his knowledge during the appointment and treatment of animals.

2. REQUIREMENTS FOR THE RESULTS OF MASTERING THE DISCIPLINE

The development of the discipline "**Animal Anatomy**" 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 accomplishment** (within the discipline)
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, performing laboratory tests, interpreting research results.
PC -2	The ability to conduct a general clinical study of animals in order to establish a preliminary diagnosis and determine the further research program, as well as in accordance with the plan of antiepizootic measures, the plan of prevention of non-infectious animal diseases	PC-2.1 He is able to conduct a general clinical study of animals of different species in order to establish a preliminary diagnosis and determine the further research program
		PC-2.2 He is able to conduct mass clinical studies of animals in accordance with the plan of antiepizootic measures, the plan of prevention of non-infectious animal diseases

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 diagnosis.	PC-4.1 Able to conduct additional animal studies using laboratory methods to clarify the diagnosis.
		PC-4.2 Able to conduct additional animal studies using special (instrumental) methods to clarify the diagnosis.
PC -9	The ability to carry out therapeutic, including physiotherapy procedures using special equipment in compliance with safety rules.	PC-9.1 Able to carry out therapeutic, including physiotherapy, procedures using special equipment in compliance with safety rules;
		PC -9.2 He is able to take into account the species, age and individual characteristics of animals undergoing treatment using special equipment, choose acceptable methods of fixing the patient during the procedure, the conditions of the procedures and their duration.
PC -11	Ability to develop a surgical operation plan, including the choice of analgesia method	PC-11.1 Able to develop a surgical operation plan;
		PC-11.2 He is able to choose and justify the optimal variant of anesthesia of the patient during surgery and in the postoperative period.
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.	

3. COURSE IN HIGHER EDUCATION

The discipline "**Animal Anatomy**" refers to the mandatory part of 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 "**Animal Anatomy**".

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

Competence code	**Competence**	**Previous Disciplines (Modules)**	**Subsequent Disciplines (Modules)**
GPC -1	The ability to determine the biological status and normative clinical indicators of organs and systems of the animal body.	-	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 Laboratory diagnostics of infectious and invasive diseases Veterinary and industrial laboratories with the basics of design Bee diseases and

			entomophages Fish pathology and aquaculture Anesthesiology, intensive care and intensive care
PC -2	The ability to conduct a general clinical study of animals in order to establish a preliminary diagnosis and determine the further research program, as well as in accordance with the plan of antiepizootic measures, the plan of prevention of non-infectious animal diseases	-	Physiology and ethology of animals Pathological physiology Clinical diagnosis Pathological anatomy Obstetrics, gynecology and andrology Bee diseases and entomophages Fish pathology and aquaculture Anesthesiology, intensive care and intensive care
PC -3	Ability to develop animal research programs using special (instrumental) and laboratory methods	-	Organic Chemistry Biological physics Physical and colloidal chemistry Biological chemistry Veterinary microbiology and mycology Virology and biotechnology Physiology and ethology of animals Pathological physiology Clinical diagnosis Pathological anatomy Instrumental diagnostic methods Toxicology Obstetrics, gynecology 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 Laboratory diagnostics of infectious and invasive diseases Veterinary and industrial laboratories with the basics of design Diseases of horses Diseases of productive animals Diseases of small pets Diseases of small pets Bee diseases and entomophages Fish pathology and aquaculture Diseases of exotic animals Anesthesiology, intensive care and intensive care Dermatology Cardiology Endocrinology Nephrology Reconstructive and reconstructive surgery Veterinary Ophthalmology Animal Dentistry
PC -4	The ability to conduct clinical studies of animals	-	Biological physics Cytology, histology

	using special (instrumental) and laboratory methods to clarify the diagnosis		and embryology Biological chemistry Veterinary microbiology and mycology Virology and biotechnology Physiology and ethology of animals Pathological physiology Clinical diagnosis Pathological anatomy Instrumental diagnostic methods Obstetrics, gynecology and andrology Internal non-infectious diseases General surgery Private Veterinary surgery Parasitology and invasive diseases Epizootology and infectious diseases Clinical laboratory diagnostics Laboratory diagnostics of infectious and invasive diseases 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 -9	The ability to carry out therapeutic, including physiotherapy procedures using special equipment in compliance with safety rules	-	Life safety Veterinary microbiology and mycology Virology and biotechnology Physiology and ethology of animals Pathological physiology Veterinary Radiobiology General surgery Private Veterinary surgery 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 Reconstructive and reconstructive surgery Veterinary Ophthalmology Animal Dentistry
PC -11	Ability to develop a surgical operation plan, including the choice of analgesia method	-	Veterinary microbiology and mycology Physiology and ethology of animals Pathological

			physiology Veterinary Pharmacology Pathological anatomy Operative surgery with topographic anatomy Obstetrics, gynecology and andrology General surgery Private Veterinary surgery Anesthesiology, intensive care and intensive care Dermatology Cardiology Endocrinology Nephrology Reconstructive and reconstructive surgery
PC -19	Ability to perform post-mortem diagnostic examination of animals in order to establish pathological processes, diseases, causes of death	-	Cytology, histology and embryology Life safety Pathological anatomy Toxicology Obstetrics, gynecology and andrology Internal non-infectious diseases General surgery Private Veterinary surgery Parasitology and invasive diseases Epizootology and infectious diseases Veterinary and sanitary examination Forensic veterinary examination and autopsy of animals Clinical laboratory

			diagnostics Laboratory diagnostics of infectious and invasive diseases Diseases of horses Diseases of productive animals Diseases of small pets Bee diseases and entomophages Fish pathology and aquaculture Diseases of exotic animals Dermatology Cardiology Endocrinology Nephrology Veterinary Ophthalmology Animal Dentistry

4. COURSE WORKLOAD AND TRAINING ACTIVITIES

Course workload of the discipline "**Animal Anatomy**" is 12 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**	**Semesters**			
			1	**2**	**3**	**-**
Contact academic hours		198	72	72	54	-
including						
Lectures		54	18	18	18	-
Lab work		144	54	54	36	-
Seminars (workshops/tutorials)		-	-	-	-	-
Self-study		186	92	20	74	-
Evaluation and assessment (exam/pass/fail grading)		48	16	16	16	-
Course workload	Academic hour	**432**	**180**	**108**	**144**	-
	Credit unit	**12**	**5**	**3**	**4**	-

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

Types of academic activities		HOURS	Semesters			
			1	**2**	**3**	**-**
Contact academic hours		98	26	36	36	-
including						
Lectures		49	13	18	18	-
Lab work		49	13	18	18	-
Seminars (workshops/tutorials)		-	-	-	-	-
Self-study		287	127	98	62	-
Evaluation and assessment (exam/pass/fail grading)		47	27	10	10	-
Course workload	Academic hour	**432**	**180**	**144**	**108**	-
	Credit unit	**12**	**5**	**4**	**3**	-

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. Discipline is a system of knowledge about the internal and external structure of the body.	Lectures, Lab work.
Section 2. Bone system or skeleton (osteology)	Topic 2.1. Characteristics of the skeleton, the principles of its division into departments. The role of the skeleton in the vital activity of the body.	Lectures, Lab work.
	Topic 2.2. Axial skeleton.	Lectures, Lab work.
	Topic 2.3. The skeleton of the head. - The facial part of the skull. - The cerebral part of the skull.	Lectures, Lab work.
	Topic 2.4. Musculoskeletal system. - Thoracic limbs and their girdle. - Pelvic limbs and their girdle.	Lectures, Lab work.
	Topic 2.5. Bone connection (arthrosyndesmology) - Morphofunctional characteristics of bone junctions, their classification and morphogenesis.	Lectures, Lab work.

Section 3. Muscular system (myology)	Topic 3.1. Muscle as an organ, morphogenesis of the muscular system.	Lectures, Lab work.
	Topic 3.2. Classification of muscles. - By origin, form, internal architectonics, function, topographical feature.	Lectures, Lab work.
	Topic 3.3. Muscles of the axial skeleton. - Filo- and ontogenesis of the muscles of the axial department. Muscles and fascia of the neck, trunk and tail.	Lectures, Lab work.
	Topic 3.4. Muscles of the shoulder girdle and spinal column. - Dorsal muscles of the shoulder girdle and vertebral column. Ventral muscles of the neck, lower back, tail.	Lectures, Lab work.
	Topic 3.5. Chest muscles. - Inhaler muscles, exhalator muscles and diaphragm.	Lectures, Lab work.
	Topic 3.6. Abdominal wall muscles.	Lectures, Lab work.
	Topic 3.7. Head muscles. - Philo- and ontogenesis. Facial and masticatory muscles. Muscles of the sublingual apparatus.	Lectures, Lab work.
	Topic 3.8. Limb muscles. - Philo and ontogenesis.	Lectures, Lab work.
	Topic 3.9. Muscles of the thoracic limb. The muscles of the shoulder joint, elbow joint, wrist joint, finger joints and short finger muscles.	Lectures, Lab work.
	Topic 3.10. Pelvic limb muscles. - The muscles of the hip joint, knee joint and the metatarsal joint.	Lectures, Lab work.
	Topic 3.11. Muscles of the finger joints.	Lectures, Lab work.
Section 4. General (skin) cover.	Topic 4.1. General morphofunctional characteristics of the skin and its derivatives.	Lectures, Lab work.
Section 5. Nervous system (neurology).	Topic 5.1. Morphofunctional characteristics, anatomical composition and structural elements, the principle of the nervous system.	Lectures, Lab work.
	Topic 5.2. The central part of the nervous system. - Structure and development of the central nervous system. The structure of the spinal cord and brain, functional	Lectures, Lab work.

	characteristics. Conductor apparatus	
	Topic 5.3. Peripheral part of the nervous system. Morphofunctional characteristics of cranial and spinal nerves. General and species-specific signs of structure, branching and location.	Lectures, Lab work.
	Topic 5.4. The autonomic part of the nervous system. - Anatomical, functional and topographic characteristics. Regularities of the structure, formation and distribution of sympathetic, para- and metasympathetic nervous structures.	Lectures, Lab work.
Section 6. Analyzers.	Topic 6.1. Classification, anatomical structure and morphofunctional characteristics of analyzers. The study of the phylogeny and ontogenesis of analyzers. General data on intero-, proprio- and exteroreceptors.	Lectures, Lab work.
Section 7. The endocrine system.	Topic 7.1. Morphofunctional characteristics and anatomical composition of the endocrine apparatus. Morphogenetic, topographic and functional characteristics of the glands of internal and mixed secretion. Specific and age-related features of the structure and location of the glands.	Lectures, Lab work.
Section 8. Cardiovascular system.	Topic 8.1. Anatomical composition, morphogenesis and structural and functional characteristics of the cardiovascular system and its relationship with other body systems.	Lectures, Lab work.
	Topic 8.2. Circulatory system. - Structure, development, species and age characteristics. Specific features, basic patterns of the structure, branching and location of blood vessels. Circulatory circles.	Lectures, Lab work.
	Topic 8.3. Lymphatic system. - General morphofunctional characteristics and anatomical composition of the system. Its development. General patterns and specific features of the location of the	Lectures, Lab work.

	lymphatic system.	
	Topic 8.4. organs of hemo- and immunopoiesis. Morphofunctional characteristics, anatomical composition and classification of organs. The structure, location and specific features of hematopoietic organs and organs of the immune system.	Lectures, Lab work.
Section 9. Splanchnology.	Topic 9.1. Morphofunctional characteristics of internal organs, their classification, features of structure and development. Body cavities, their development, serous integuments and their derivatives. The relationship of internal organs with other body systems and the external environment.	Lectures, Lab work.
	Topic 9.2. Digestive system. - Anatomical composition of the apparatus, division into departments, classification of glands. Species and age features. Anatomical and topographic features of the digestive apparatus in the X-ray image.	Lectures, Lab work.
	Topic 9.2.1. Head department (oral cavity and pharynx). - Specific and functional features of the structure of the organs of the vestibule of the mouth. Glandular apparatus of the head intestine.	Lectures, Lab work.
	Topic 9.2.2. Anterior section (esophageal-gastric) - Structure, topography, species and age features. Morphogenesis of the stomach and omentum. Classification of stomachs. Structure and functions of the mesh gutter in ruminants.	Lectures, Lab work.
	Topic 9.2.3. Middle section (small intestine) - Structure, topography, species and age features. Morphogenesis of the stomach and omentum. Classification of stomachs. Structure and functions of the mesh gutter in ruminants.	Lectures, Lab work.

	Topic 9.2.4. Posterior section (large intestine). - Anatomical and topographic characteristics of the structure, morphogenesis, species and age features, functional purpose.	Lectures, Lab work.
	Topic 9.3. Breathing apparatus. - General structure, morphogenesis of respiratory organs in connection with other body systems and the external environment. Anatomical features of the respiratory organs in the X-ray image.	Lectures, Lab work.
	Topic 9.4. The urinary apparatus. - Morphogenetic relationship and functional difference of organs of urination and reproduction. Morphofunctional characteristics of the device. X-ray-anatomy of the genitourinary apparatus.	Lectures, Lab work.
	Topic 9.4.1. Urinary organs. - Anatomical composition of the urinary system, the structure of the kidneys and urinary tract, their connection with other body systems. Species, age and topographical features of urinary organs.	Lectures, Lab work.
	Topic 9.4.2. Organs of reproduction. - Anatomical composition and structure of reproductive organs. Species, age and topographical features of the genitals and the causes of their appearance.	Lectures, Lab work.
Section 10. Features of the anatomy of domestic birds.	Topic 10.1. Analysis of the structure of organs and systems of various types of domestic birds related to flight, nutrition and industrial maintenance.	Lectures, 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)
Lecture	An auditorium for conducting lecture-type classes, equipped with a set of specialized furniture; a board (screen) and technical means of multimedia presentations.	- *Anatomical preparations.* - *Wet anatomical preparations.* - *Anatomical models.*
Laboratory	An auditorium for laboratory work, individual consultations, routine monitoring and interim certification, equipped with a set of specialized furniture and equipment.	- *Anatomical preparations.* - *Wet anatomical preparations.* - *Anatomical models.*
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. Akaevsky A.I., Yudichev Yu.Yu., Seleznev S.B. ANATOMY OF DOMESTIC ANIMALS - 6th ed. - Moscow: Aquarium-Print, 2020. - 638 p.
2. Maksimov V.I., Slesarenko N.A., Seleznev S.B., Vetoshkina G.A. ANATOMY AND PHYSIOLOGY OF DOMESTIC ANIMALS. - 2nd ed. - Moscow: Gryph UMO SPO, 2020. – 600 p.

Additional Reading:

1. Zelenevsky N.V. International veterinary anatomical nomenclature in Latin and Russian. Nomnia Anatomica Veterinaria: textbook – St. Petersburg: Lan, 2013 – 400p. – http://e.lanbook.com/books/element.php?pl1_id=5706
2. Popesco P. Atlas of the anatomy of domestic animals. - In 3 t. M.: design of YOYO Media, digitization , 2013. - Vol.1. -210 p. t.2. -183. T.3. – 196.
3. Slesarenko N.A., Seleznev S.B., Vetoshkina G.A. Introduction to animal pathology: integrating systems. Practical guide.-Moscow:LLC "ArtServisLtd", 2019.-268 p.
4. Seleznev S.B., Vetoshkina G.A., Krotova E.A. Anatomy of domestic animals: osteoarthrosyndesmology.-Moscow:OOO ArtServisLtd, 2017.-66 p.
5. Seleznev S.B., Vetoshkina G.A., Krotova E.A. Myology of domestic animals.-Moscow:PFUR, 2020.-28 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"http://www.biblioclub.ru
- ELS Yurayt http://www.biblio-online.ru
- ELS "Student Consultant"www.studentlibrary.ru
- ELS "Lan"http://eZlanbook.com/
- ELS "Trinity Bridge"http://www.trmost.com/

2. Databases and search engines:
- electronic fund of legal and regulatory and technical documentation http://docs.cntd.ru/
- search engine Yandex https://www.yandex.ru/
- search engine Google https://www.google.ru/
- 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 "**Animal Anatomy**".
2. Laboratory workshop on the discipline "**Animal Anatomy**".

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

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 "**Animal Anatomy**" 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		Seleznev S.B.
Position, Basic curriculum	Signature	Full name.

HEAD OF THE DEPARTMENT:

Department of Veterinary Medicine		Vatnikov Yu.A.
Name Basic Curriculum	Signature	Full name.

HEAD OF THE HIGHER EDUCATION PROGRAM:

Director of the Department of Veterinary Medicine		Vatnikov Yu.A.
Position, Basic curriculum	Signature	Full name