

**NATIONAL UNIVERSITY OF
LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE
Department of Vertebrate Biomorphology named after Academician
V. H. Kasianenko**

“ APPROVED ”
Faculty of Veterinary Medicine
June 1, 2026

**CURRICULUM OF ACADEMIC DISCIPLINE
“CYTOLOGY, HISTOLOGY, EMBRYOLOGY”**

Field of knowledge **H – Agriculture, forestry, fisheries and veterinary medicine**

Specialty **H 6 – Veterinary Medicine**

Academic programme **Veterinary Medicine**

Faculty of Veterinary Medicine

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Kyiv – 2026

Description of the discipline “Cytology, Histology, Embryology”

The academic discipline Cytology, Histology, Embryology is compiled in accordance with the educational and professional training program for the ED Master of the specialty H 6 Veterinary Medicine of the full term of study. It is fundamental in the training of a veterinarian. Together with anatomy, physiology and biochemistry, they form the necessary basis for students to successfully master paraclinical and clinical disciplines. The discipline Cytology, Histology, Embryology includes four sections: Cytology, Embryology, General Histology and Special Histology. Each of them has its own subject of study. Cytology studies the structure and function of cells, Embryology – the development and structure of germ cells and embryo development, General Histology – the development, structure and function of tissues, Special Histology – the structure of organs of their systems and apparatus. The subject of study of this discipline is the micro- and submicroscopic structure of the structural components of the organism, and their formation in the process of embryonic development.

Academic degree, specialty, academic programme	
Academic degree	<i>Master's</i>
Specialty	<i>H 6 Veterinary Medicine</i>
Academic programme	<i>Veterinary Medicine</i>
Characteristics of the discipline	
Type	Compulsory
Total number of hours	300
Number of ECTS credits	10
Number of modules	8
Form of assessment	Credit, Credit, Exam
Indicators of discipline for full-time form of study	
	Full-time education
Year of study	1, 2
Semester	1, 2, 3
Lectures	75 hrs.
Laboratory classes	105 hrs.
Independent work	120 hrs.
Self-study	-
Number of hours per week for full-time students	5, 5, 2 hrs.

1. Aim, objectives, competences and expected learning outcomes of the discipline

The discipline "Cytology, Histology, Embryology" **aim** is the students' cognition of the patterns of the structure of the animal organism at the cellular, tissue and organ levels of the structural organization and its individual development.

The discipline "Cytology, Histology, Embryology" **objectives** (outcomes):

Students will be able to use light microscopes and will learn some histological techniques.

Students will be able to describe general ultrastructural features and functions of cells and their extracellular matrix.

Students will be able to describe the characteristic structural features and functions of each of the basic tissues.

Students will be able to describe the characteristic structural features and function of the animals' organs.

Students will know the ultrastructure of germ cells, histophysiology of fertilization, early embryonic development of vertebrates, differentiation of germ layers and axial organs.

Students will be able to identify the basic tissues and the most important organs when shown glass slides.

Students will be able to apply the information described above to successfully complete the clinical discipline that follow.

As a result of studying the discipline, the student should

know: some histological techniques, micro- and ultrastructure and histophysiology of eukaryotic cells, structure and functions of epithelial, connective, muscle and nervous tissues, microstructure and function of systems and apparatuses of animal organs, micro- and ultrastructure of germ cells, histophysiology of fertilization, early stages of vertebrate animals' embryogenesis, differentiation of germ layers and axial organs;

able: master the light microscopy technique, have the skills of "reading" micrographs, determine the compartments of eukaryotic cell, determine the types of tissues and their varieties, determine the organs from which histological slides are made.

Acquisition of competencies:

Integral competence (IC):

The ability to solve complex tasks and problems in the field of veterinary medicine, which involves research and/or implementing innovations and is characterized by uncertainty of conditions and requirements;

General competences (GC):

GC 1. Ability to abstract thinking, analysis and synthesis;

GC 2. Ability to apply knowledge in practical situations;

GC 3. Knowledge and understanding of the subject area and profession;

GC 8. Ability to learn and master modern knowledge;

GC 13. Ability to make decisions and act in accordance with the principle of non-acceptance of corruption and any other manifestations of dishonesty.

Special (professional) competencies (SC):

SC 1. The ability to establish the features of the structure and functioning of cells, tissues, organs, their systems and apparatus of the animals' organism of different classes and species - mammals, birds, fish and other vertebrates;

Expected Learning Outcomes (ELO):

ELO 1. Know and correctly use the terminology of veterinary medicine.

ELO 3. To determine the essence of the physicochemical and biological processes that occur in animals' organism in normal and pathological conditions.

First day competencies:

1. Demonstrate an understanding of the ethical and legal framework within which a veterinarian must work, including professional, animal welfare and owner aspects.

2. Understand research methods, the contribution of basic and applied research to science and the implementation of the 3R principle (Replace, Reduce, Refine).

4. Promote and monitor the health and safety of self, patients, animal owners, colleagues and the environment when performing professional activities; demonstrate knowledge of quality assurance principles; apply risk management principles in practice.

7. Prepare clinical documentation and documents for animal owners correctly, as well as, where necessary, clinical case reports in a format that satisfies the appropriate audience.

8. Work effectively as part of a multidisciplinary team when providing veterinary services and recognize the contribution of all team members.

9. Be able to think critically, review and evaluate literature and presentations.

10. Understand and apply the principles of the One Health concept to ensure good clinical practice in veterinary medicine, as well as evidence-based and evidence-based veterinary medicine.

12. Use professional skills to contribute to the development of veterinary knowledge and the implementation of the One Health concept to promote the health, safety and well-being of animals, people and the environment, as well as to achieve the UN Sustainable Development Goals.

2. Program and structure of the discipline for:
– full-time form of study

Modules and topics	Hours				
	weeks	total	including		
			lectures	lab	self.st.
SEMESTER I					
Content Module 1. Cytology					
Topic 1. Insight into Histology.	1-2	5	2	3	-
Topic 2. Cell theory. Chemical composition and general characteristics of cells	2-3	7	2	3	2
Topic 3. Structure and Functions of Eukaryotic Cell (plasmolemma)	3-4	7	2	3	2
Topic 4. Structure and Functions of Eukaryotic Cell (membranous organelles)	4-5	7	2	3	2
Topic 5. Structure and Functions of Eukaryotic Cell (non-membranous organelles, specialized organelles)	5-6	7	2	3	2
Topic 6. Structure and Functions of Eukaryotic Cell (nucleus)	6-7	7	2	3	2
Topic 7. Cellular life	7-8	5	2	3	-
<i>Quiz 1</i>	8				
Total for content module 1		45	14	21	10
Content Module 2. Embryology					
Topic 8. The structure and function of germ cells	8-9	5	2	3	-
Topic 9. Development of germ cells	9-10	5	2	3	-
Topic 10. General characteristics of embryogenesis	10-11	7	2	3	2
Topic 11. Differentiation of Germ Layers and Axial Organs. Embryogenesis of vertebrates	11-12	8	2	3	3
Topic 12. Embryogenesis of birds and mammals	12-13	5	2	3	-
<i>Quiz 2</i>	12				-
Total for content module 2		30	10	15	5
Content Module 3. General Histology I					
Topic 13. General characteristics of tissues. Epithelia	13-14	10	2	3	5
Topic 14. Connective tissue. Body fluids	14-15	10	2	3	5
Topic 15. Proper Connective Tissue	15	10	2	3	5
<i>Quiz 3</i>	15				
Total for content module 3		30	6	9	15
SEMESTER II					
Content Module 4. General Histology II					
Topic 16. Supportive tissues (cartilage)	1-2	8	2	3	3
Topic 17. Supportive tissues (bone)	2-3	8	2	3	3
Topic 18. Muscle Tissue	3-4	7	2	3	2

Topic 19. Nervous tissue	4-5	7	2	3	2
<i>Quiz 4</i>	5				
Total for content module 4		30	8	12	10
Content Module 5. Special Histology (Comparative Organology). Cardiovascular System. Lymphoid Organs. Endocrine System					
Topic 20. Cardiovascular System	5-6	6	2	3	1
Topic 21. Lymphoid Organs (Central organs)	6-7	6	2	3	1
Topic 22. Lymphoid Organs (Peripheral organs)	7-8	6	2	3	1
Topic 23. Endocrine System (Central organs)	8-9	6	2	3	1
Topic 24. Endocrine System (Peripheral organs)	9-10	6	2	3	1
<i>Quiz 5</i>	10				
Total for content module 5		30	10	15	5
Content Module 6. Special Histology (Comparative Organology). Integumentary System. Digestive System.					
Topic 25. Integumentary System. Skin	10-11	8	2	3	3
Topic 26. Integumentary System. Skin derivatives	11-12	7	2	3	2
Topic 27. Digestive System (head gut)	12-13	8	2	3	3
Topic 28. Digestive System (anterior gut)	13-14	7	2	3	7
Topic 29. Digestive System (middle and posterior gut)	14-15	8	2	3	3
Topic 30. Digestive System (digestive glands)	15	7	2	3	2
<i>Quiz 6</i>	15				
Total for content module 6		45	12	18	15
Semester III					
Content Module 7. Special Histology (Comparative Organology). Respiratory System. Urinary System. Reproductive System.					
Topic 31. Respiratory System	1	12	2	2	8
Topic 32. Urinary System	2-3	11	2	2	7
Topic 33. Female Reproductive System	4-5	11	2	2	7
Topic 34. Male Reproductive System	6-7	11	2	2	7
<i>Quiz 7</i>	7				
Total for content module 7		45	8	8	29
Content Module 8. Special Histology (Comparative Organology). Nervous System. Sense organs					
Topic 35. Nervous System	8-9	12	2	2	8
Topic 36. Sense organs (eye)	10-11	12	2	2	8
Topic 37. Sense organs (cochlea)	12-13	12	2	2	8
Topic 38. Sense organs (vestibular apparatus)	14-15	9	1	1	7
<i>Quiz 8</i>	15				
Total for content module 8		45	7	7	31
Total hours		300	75	105	120

3. Topics of lectures

№	Topic titles	Hours
1.	Insight into Histology.	2
2.	Cytology. Cell theory. Chemical composition and general characteristics of cells	2
3.	Cytology. Structure and Functions of Eukaryotic Cell (plasmolemma)	2
4.	Cytology. Structure and Functions of Eukaryotic Cell (membranous organelles)	2
5.	Cytology. Structure and Functions of Eukaryotic Cell (non-membranous organelles, specialized organelles)	2
6.	Cytology. Structure and Functions of Eukaryotic Cell (nucleus)	2
7.	Cytology. Cell life	2
8.	Embryology. The structure, function germ cells	2
9.	Embryology. Development of germ cells	2
10.	Embryology. General characteristics of embryogenesis	2
11.	Embryology. Differentiation of Germ Layers and Axial Organs. Embryogenesis of vertebrates	2
12.	Embryology. Embryogenesis of birds and mammals	2
13.	General Histology. General characteristics of tissues. Epithelia	2
14.	General Histology. Connective tissue. Body fluids	2
15.	General Histology. Proper Connective Tissue	2
16.	General Histology. Supportive tissues (cartilage)	2
17.	General Histology. Supportive tissues (bone)	2
18.	General Histology. Muscle Tissue	2
19.	General Histology. Nervous tissue	2
20.	Special Histology (Comparative Organology). Cardiovascular System	2
21.	Special Histology (Comparative Organology). Lymphoid Organs (Central organs)	2
22.	Special Histology (Comparative Organology). Lymphoid Organs (Peripheral organs)	2
23.	Special Histology (Comparative Organology). Endocrine System (Central organs)	2
24.	Special Histology (Comparative Organology). Endocrine System (Peripheral organs)	2
25.	Special Histology (Comparative Organology). Integumentary System. Skin	2
26.	Special Histology (Comparative Organology). Integumentary System. Skin derivatives	2
27.	Special Histology (Comparative Organology). Digestive System (head gut)	2
28.	Special Histology (Comparative Organology). Digestive System (anterior gut)	2
29.	Special Histology (Comparative Organology). Digestive System (middle and posterior gut)	2
30.	Special Histology (Comparative Organology). Digestive System (digestive glands)	2
31.	Special Histology (Comparative Organology). Respiratory System	2
32.	Special Histology (Comparative Organology). Urinary System	2
33.	Special Histology (Comparative Organology). Female Reproductive System	2

34.	Special Histology (Comparative Organology). Male Reproductive System	2
35.	Special Histology (Comparative Organology). Nervous System	2
36.	Special Histology (Comparative Organology). Sense organs (eye)	2
37.	Special Histology (Comparative Organology). Sense organs (hear)	3

4. Topics of laboratory classes

№	Topic titles	Hours
1.	Microscope. How to use microscope. Histological laboratory	2
2.	Paraffin technique	2
3.	Hematoxylin and eosin staining	2
4.	General morphology of eukaryotic cells. Mitochondria. Endoplasmic reticulum	2
5.	Golgi complex. Centrioles.	2
6.	Cytoplasmic inclusions (nutritive, secretory, pigment)	2
7.	Nucleus. Mitosis. Amitosis	2
8.	Structure of spermatozoa in mammals and bird. Structure of mammal oocyte	2
9.	Fertilization. Synkaryon. Zygote cleavage in Lancet, Fish and Amphibia	2
10.	Unequal cleavage. Blastula	2
11.	Frog neurula. Gastrulation in birds	2
12.	Germ layers and axial organs of chick embryo	2
13.	Fetal membranes of birds	2
14.	Fetal membranes of mammals. Placenta	2
15.	Surface epithelia. Simple epithelia	2
16.	Surface epithelia. Stratified epithelia	2
17.	Blood of mammals, birds, amphibians	2
18.	Mesenchyme and mucous connective tissue. Reticular tissue. Adipose tissue	2
19.	Loose connective tissue. Dense connective tissue	2
20.	Cartilage	2
21.	Bone	2
22.	Smooth muscle tissue	2
23.	Skeletal muscle tissue	2
24.	Cardiac muscle tissue	2
25.	Neurons. Chromatophilic substance. Neurofibrils	2
26.	Neuroglia. Nerve fibers (unmyelinated and myelinated). Synapses	2
27.	Heart. Elastic and muscular arteries	2
28.	Muscular vein. Blood capillaries	2
29.	Central organs of hematopoiesis. Red bone marrow. Thymus. Bursa of Fabricius	2
30.	Peripheral organs of hematopoiesis. Lymph node. Spleen. Palatine tonsils	2
31.	Central endocrine organs. Hypophysis. Epiphysis	2
32.	Peripheral endocrine organs. Adrenal glands. Thyroid gland. Parathyroid gland	2
33.	Skin with hair. Skin without hair. Eyelid	2
34.	Mammary gland (lactating and non-lactating). Hooves	2
35.	Tooth crown and root	2
36.	Development of tooth	2
37.	Tongue (filiform and foliate papilla).	2
38.	Salivary glands	2
39.	Esophagus	2
40.	Glandular stomach	2
41.	Avian stomach	2
42.	Compound stomach (rumen, reticulum, omasum)	2

43.	Duodenum, jejunum, colon	2
44.	Liver	2
45.	Pancreas	2
46.	Trachea. Mammal's and bird's lungs. Blood/air barrier (scheme)	2
47.	Kidney. Ureter. Scheme of nephron. Ureter. Urinary bladder	2
48.	Ovary. Corpus luteum. Uterine tube (oviduct). Uterus	2
49.	Testes. Epididymis. Prostate	2
50.	Spinal cord. Cerebral cortex. Cerebellum	2
51.	Dorsal root ganglia. Nerve	2
52.	Posterior wall of eyeball. Cornea. Organ of Corti	3

5. Topics for self-study

№	Topic titles	Hours
1.	Histological techniques	6
2.	Chemical properties of cell membrane	6
3.	Cell contacts, peroxisomes, microtubules, microfilaments	6
4.	Non-cellular structures of organism	6
5.	Structure of amphibian and fish oocytes	6
6.	Postembryonic hematopoiesis	6
7.	Ultrastructure of collagen fibers	6
8.	Ultrastructure of actin and myosin myofilaments	6
9.	Macroglia and microglia	6
10.	Reflex arc. Regeneration of nerve tissue.	6
11.	Structure of arterioles and venules	6
12.	Structural features of the avian immune organs	6
13.	Structure of tonsils and aggregated lymphoid nodules	6
14.	Diffuse neuroendocrine system. APUD system	6
15.	Structural features of skin in different species of domestic animals	6
16.	Development of liver and pancreas. Endocrine part of pancreas	6
17.	Outer and Inner breathing. The structure of birds' lung	6
18.	Histophysiology of the kidney	6
19.	Structural features of bird's ovary and oviduct	6
20.	Structural and functional features of autonomic nervous system	6

6. Tools for assessing expected learning outcomes:

- exam;
- credit;
- module tests;
- presentation of laboratory works.

7. Teaching methods

- verbal method (lecture, discussion, interview, etc.);
- practical method (laboratory, practical classes);
- visual method (illustration, demonstration);
- work with educational and methodological literature (note-taking, annotating);
- video method (remote, multimedia, web-based, etc.);
- self-study (completing assignments);

- providing additional weekly consultations for students;
- individual research work.

8. Distribution of points received by students.

The assessment of students' knowledge and skills is conducted by means of a 100-point scale and is converted into national grades according to Table 1 of the current *Exam and Credit Regulations at NULES of Ukraine*.

8.1. Distribution of points according to types of educational activity

Type of educational activity	Learning outcomes	Evaluation
Module 1. Cytology		
Laboratory class 1.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 2.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 3.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 4.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 5.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 6.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 7.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Modular test work 1.		30
Total by Module 1		100
Module 2. Embryology		
Laboratory class 1.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 2.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 3.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 4.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 5.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 6.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 7.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Modular test work 2.		30
Total by Module 2		100
Module 3. General Histology I		
Laboratory class 1.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	14
Laboratory class 2.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	14

Laboratory class 3.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	14
Laboratory class 4.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	14
Laboratory class 5.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	14
Modular test work 3.		30
Total by Module 3		100
Module 4. General Histology II		
Laboratory class 1.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	8
Laboratory class 2.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	9
Laboratory class 3.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	9
Laboratory class 4.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	9
Laboratory class 5.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	9
Laboratory class 6.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	8
Laboratory class 7.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	8
Self-study	Completion of the task “Differentiation of histological tissues” in the EEC	10
Modular test work 4.		30
Total by Module 4		100
Module 5. Special Histology. Cardiovascular, Lymphatic and Endocrine systems		
Laboratory class 1.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 2.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 3.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 4.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 5.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Laboratory class 6.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	10
Self-study	Completion of the task “Differentiation of histological specimens (I)” in the EEC	10
Modular test work 5.		70
Total by Module 5		100
Module 6. Special Histology. Integumentary system. Digestive systems		
Laboratory class 1.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	5
Laboratory class 2.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	5
Laboratory class 3.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	5
Laboratory class 4.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	5

Laboratory class 5.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	5
Laboratory class 6.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	5
Laboratory class 7.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	5
Laboratory class 8.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	5
Laboratory class 9.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	5
Laboratory class 10.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	5
Laboratory class 11.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	5
Laboratory class 12.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	5
Laboratory class 13.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	5
Self-study	Completion of the task “Differentiation of histological specimens (II)” in the EEC	5
Modular test work 6.		30
Total by Module 6		100
Module 7. Special Histology. Respiratory, urinary and reproductive systems		
Laboratory class 1.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	17
Laboratory class 2.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	18
Laboratory class 3.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	17
Laboratory class 4.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	18
Modular test work 7.		30
Total by Module 7		100
Module 8. Special Histology. Nervous system and sense organs		
Laboratory class 1.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	17
Laboratory class 2.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	18
Laboratory class 3.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	17
Laboratory class 4.	Working with a microscope and histological specimens. General conclusions. Preparation and submission of work	18
Modular test work 8.		30
Total by Module 8		100
Study work (by semester)	$(M1 + M2+M3)/3 \cdot 0,7 \leq 70$	
Test/Exam	30	
Total by course	$(\text{Study work} + \text{Test/Exam}) \leq 100$	

8.2. Scale of Assessment of Student Knowledge

Student's rating, points	National grading of exams and credits
90-100	excellent
74-89	good
60-73	satisfactorily
0-59	unsatisfactorily

8.3. Evaluation Policy

Deadlines and Exam Retaking Policy	Laboratory, independent and modular works must be submitted at the planned time before the end of the study of the current module. Violation of the deadlines without a good reason entitles the teacher to lower the grade. Reassignment of modular control work occurs in the presence of valid reasons (for example, hospital) and is allowed in the term before the end of the following module.
Academic Integrity Policy	Copying, use of mobile devices, and additional literature when writing modular tests, tests and exams are strictly prohibited.
Attendance Policy	Attendance at lectures and laboratory classes is mandatory for all students in the group. Late classes are not allowed. A lab coat is a must in laboratory classes. For objective reasons (for example, illness, international internship) training can take place according to an individual curriculum approved in a certain order. Missed lectures, after their processing by the applicant of higher education, are worked out in the form of an interview with the teacher. Missed laboratory classes are worked out by students in the laboratory of the department, information about the practice is entered into the departmental journal of the practice of missed classes.

9. Educational and methodological support:

- e-learning courses of discipline

<https://elearn.nubip.edu.ua/course/view.php?id=1330>

<https://elearn.nubip.edu.ua/course/view.php?id=1680> ;

- Workbook «Cytology, Histology, Embryology» Part I. Special Histology (methods of microscopy, histological techniques, cytology, general embryology, general histology) for students ED «Master» Faculty of Veterinary Medicine specialty 211 «Veterinary Medicine». К.: НУБіП України, 2026. 88 p.;
- Workbook «Cytology, Histology, Embryology» Part II. Special Histology (Comparative Organology) for students ED «Master» Faculty of Veterinary Medicine specialty 211 «Veterinary Medicine». К.: НУБіП України, 2026. 78 p.

10. Recommended sources of information

Basic literature

1. Хомич В. Т. Лекції з цитології, ембріології та гістології свійських тварин: Навчальний посібник. К.: ТОВ «Аграр Медіа Груп», 2020. 296 с.
2. Новак В. П., Бевз О. С., Мельниченко А. П. Цитологія, гістологія, ембріологія: підручник за заг. ред. В. П. Новака (3-е вид., змін. і доп.) Львів: «Магнолія 2006», 2024. 436 с.

3. Хомич В. Т., Мазуркевич Т. А., Дишлюк Н. В., Стегней Ж. Г. Практикум з цитології, гістології та ембріології свійських тварин: Навчальний посібник /За редакцією В. Т. Хомича. К.: ЦП Компринт, 2019. 228 с.
4. Хомич В. Т., Мазуркевич Т. А., Дишлюк Н. В., Стегней Ж. Г. Цитологія, ембріологія і гістологія свійських тварин у запитаннях і відповідях. Навчальний посібник К.: Аграр Медіа Груп, 2019. 232 с.
5. Melnyk N. Histology, cytology and embryology. К., 2020. 370 с.
6. Ulrich D. Color atlas of embryology. Thieme, 1995. 383 p.
7. Hyttel P., Sinowatz F., Vejlsted M. Domestic Animal Embryology. Saunders Elsevier, 2010. 455 p.

Supporting literature

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2. Гістологія, цитологія, ембріологія. Національний підручник // Луцик О. Д., Чайковський Ю. Б. (за ред.) Вінниця: Нова Книга, 2024. 592 с.
3. Banks W.J. Applied Veterinary Histology. 1993. 527 p.
4. Dellmann H.-D., Carithers J.R. Cytology and Microscopic Anatomy. 1996. 406 p.
5. Vacha W.J., Wood L.M. Color Atlas of Veterinary Histology. 1990. 269 p.

Information Resources

1. « LUMEN Histology from Loyola. Excellent slides plus explanatory text.
*** http://www.meddean.luc.edu/lumen/MedEd/Histo/frames/histo_frames.html
2. <http://lecannabiculteur.free.fr/SITES/UNIV%20W.AUSTRALIA/mb140/Lectures.htm>
3. <https://histologyguide.com/>
4. <https://ohiostate.pressbooks.pub/vethisto/>