

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SUMY NATIONAL AGRARIAN UNIVERSITY
Faculty of Veterinary Medicine
Department of Virology, Pathanatomy and Poultry Diseases named after
Prof. I.I. Panikara


MODULE SYLLABUS

Cytology, histology, embryology
_ required _

Implemented in the “Veterinary Medicine” Academic Program
Area of specialization 211 “ Veterinary Medicine”
at the second (master 's) level of higher education

Sumy- 2024

Author:  Pivarsenko Alexander Ph.D. associate
(signature) (surname, initials) (academic degree and title, position)


Considered, approved and approved at the meeting of the department of Virology, Pathanatomy and Poultry Diseases named after Prof. I.I. Panikara	protocol from <u>5.06</u> № <u>17</u>
	The head departments  <u>Petrov Roman</u>

Approved by:

Guarantor of the Academic program  (R. Petrov)

Dean of the Faculty  (O. Nechyporenko)

Work program review (attached) provided:


V.M. Zorin, A

Methodist of the Department of Education Quality,
licensing and accreditation F. Ivan

(signature)

Vadyslav Baranik
(Full name)

Registered in the electronic database: date: 5.06.2024

Syllabus review data:

Academic year in which changes are made	The number of the application to the work program with a description of the changes	The changes have been reviewed and approved		
		Date and number of the minutes of the meeting of the department	Head of Department	Guarantor of the educational program

1. MODULE OVERVIEW

1.	Title	OK 13. Cytology, histology, embryology			
2.	Faculty/Department	Veterinary medicine / virology, pathoanatomy and poultry diseases. prof. Panikara II			
3.	Type (obligatory or optional)	Obligatory			
4.	Program(s) to which module is attached	Veterinary medicine / 211 Veterinary medicine			
5.	Level of the National Qualifications Framework	-			
6.	Semester and duration of module	NRC of Ukraine - level 7, QF-EHEA - second cycle, EQF-LLL - level 7			
7.	ECTS credits number	2 semester, 15 weeks			
8.	Total workload and time allotment	5.0			
9.	The total number of hours and their distribution Language of instruction	Contact work (classes)			Individual work
		Lectures	Practical / seminar	Laboratory	
	3 semester	2		2	146
10.	Module leader	English			
11.	Module leader contact information	Panasenko Alexander Sergeevich			
11.1		mob. tel. +380667103234, e-mail- alpanas@ukr.net			
12.	Module description	<p>"Cytology, histology, embryology" is the basis for training, studying not only the tissues but also the cells of which they are composed, as well as the structure of organs and systems of the body. The subject of study of the discipline is the microscopic and ultramicroscopic structure of cells, tissues and organs of the animal body. The study of the course "Cytology, histology, embryology" is an analysis of the structure and development of the animal at the subcellular, cellular, tissue levels, and taking into account the histological structure - at the level of organ structure. Knowledge of submicroscopic and microscopic structures of organs in connection with different conditions of an organism is basic for veterinarians at research of morphological changes of bodies in the conditions of pathology at treatment of animals.</p>			
13.	Module aim	<p>The purpose of the educational component is to form in higher education competencies the use of the ability to establish the structure and functioning of cells, tissues, organs, their systems and apparatus of animals, understanding the structure of organs, their systems and apparatus and the whole organism in general submicroscopic levels, functions, topography, determination of species and age of organs, their systems and devices. The student must know the importance of cytology, histology and embryology for veterinary medicine, the structure and function of somatic and germ cells and their development, the structure, function and sources of</p>			

		development of tissues and organs, their devices and systems. Must be able to use a light microscope, select material for histological examination, record it,
14.	Module Dependencies (prerequisites, co-requisites, incompatible modules)	The educational component, as a basis for clinical subjects, is based on the foundation of general theoretical disciplines: zoology, microbiology, anatomy and physiology of humans and animals, plant physiology, genetics, molecular biology, biology of individual development and integrates with these disciplines; this involves the formation of skills to apply the acquired knowledge and practical skills from the course in the process of further study and in future professional activities.
15.	The policy of academic integrity	<p>Applicants are explained the value of acquiring new knowledge; value and functions of academic integrity; report the inadmissibility of plagiarism, encourage independent performance of educational tasks, correct reference to sources of information in the case of borrowing scientific materials. Write-offs during tests and exams are prohibited (including the use of mobile devices). Written works must have correct textual references to the used literature.</p> <p>For violation of academic integrity, students may be held subject to the following academic liability:</p> <p>Academic plagiarism - grade 0, re-completion of the task.</p> <p>Academic fraud (writing off, cheating, publishing someone's work for their own) - cancellation of points; re-evaluation of re-execution of non-independently performed work with new source data;</p> <p>Use of electronic devices during the final control of knowledge - removal from work, grade 0, re-passing the final control</p>
16.	Link to the course in the Moodle system	https://cdn.snau.edu.ua/moodle/course/view.php?id=4191

2. CORRELATION BETWEEN MODULE LEARNING OUTCOMES (MLOs) AND PROGRAM LEARNING OUTCOMES (PLOs)

MLOs: On successful completion of the module the learner will be able to:	As estimated by RND	
	PLOs 1	
DRN 1. Carry out analysis of cytological and histological preparations using a light microscope. Analyze intracellular structures on electrograms. Differentiate the constituent parts of the cell on histopreparations and electronograms. To differentiate, with the help of a light microscope, methods of cell reproduction on tissue preparations.	+	Oral control (participation in a discussion on the topic of the lecture) Written control (fulfillment of tasks from independent work, independent study of the topic as a whole or individual questions of independent work) Laboratory-practical control (fulfillment of tasks in laboratory works)
DRN 2. Differentiate blastula and gastrula varieties using a light microscope on histopreparations. Differentiate germ leaves and axial organs using a light microscope on tissue preparations. Differentiate extra-embryonic organs of mammals and birds on histo- and macropreparations.	+	Oral control (participation in a discussion on the topic of the lecture) Written control (fulfillment of tasks from independent work, independent study of the topic as a whole or individual questions of independent work) Laboratory-practical control (fulfillment of tasks in laboratory works)
DRN 3. Differentiate types of epithelial tissue on histopreparations. Differentiate blood cells of amphibians, fish, birds, and mammals on imprint preparations. Differentiate loose and dense fibrous connective tissue and varieties of the latter, as well as tissue with special properties.	+	Oral control (participation in a discussion on the topic of the lecture) Written control (fulfillment of tasks from independent work, independent study of the topic as a whole or individual questions of independent work) Laboratory-practical control (fulfillment of tasks in laboratory works)
DRN 4. Know the peculiarities of the structure and function and classification of skeletal and muscle tissues. Differentiate types of bone and cartilage tissue, heart, skeletal and smooth muscle tissue on histopreparations. Differentiate nerve cells, nerve fibers and endings and neuroglia cells.	+	Oral control (participation in a discussion on the topic of the lecture) Written control (fulfillment of tasks from independent work, independent study of the topic as a whole or individual questions of independent work) Laboratory-practical control (fulfillment of tasks in laboratory works)
DRN 5. Differentiate the heart, types of arteries, veins and microcirculatory vessels. Know the composition and general characteristics of the lymphatic system, the classification of organs of hematopoiesis and immune protection, their development, structure and functions. Differentiate central, peripheral organs of hematopoiesis and immune protection and endocrine glands.	+	Oral control (participation in a discussion on the topic of the lecture) Written control (fulfillment of tasks from independent work, independent study of the topic as a whole or individual questions of independent work) Laboratory-practical control (fulfillment of tasks in laboratory works)

<p>DRN 6. To know the composition of the general covering of the body, functions, structure and development of the skin and its derivatives. Differentiate the skin, its glandular and horny derivatives. Differentiate the components and stages of tooth development, mechanical and taste papillae of the tongue and types of parietal salivary glands, esophagus, single-chambered and multi-chambered stomachs, small and large intestines and parietal digestive glands on histopreparations. With the help of a light microscope, differentiate the components of the airways and the respiratory department of the lungs on histopreparations. To distinguish the cells of the alveolar walls on electronograms. Differentiate organs of the urinary system.</p>	+	<p>Oral control (participation in a discussion on the topic of the lecture) Written control (fulfillment of tasks from independent work, independent study of the topic as a whole or individual questions of independent work Laboratory-practical control (fulfillment of tasks in laboratory works)</p>
<p>DRN 7. With the help of a light microscope, differentiate the organs of the male and female reproductive system on histopreparations. Differentiate the brain and spinal cord, nerve nodes and nerves. To be able to differentiate the spiral organ and its constituent elements on tissue preparations using a light microscope.</p>	+	<p>Oral control (participation in a discussion on the topic of the lecture) Written control (fulfillment of tasks from independent work, independent study of the topic as a whole or individual questions of independent work Laboratory-practical control (fulfillment of tasks in laboratory works)</p>

3. MODULE INDICATIVE CONTENT

Topic. List of issues to be addressed within the topic	Distribution within the total time budget			Recommended Books ¹	
	Classroom work		Individual work		
	Luk e	P.z / semin. with	Lab. with .		
3th semester					
<p>Topic 1 Nervous system</p> <ul style="list-style-type: none"> • The role of the nervous system in the vital functions of the organism and ensuring its integrity. • Embryogenesis of the nervous system. • Mophological and functional division of the nervous system • Central nervous system: the structure of the brain and spinal cord • Microscopic structure and functions of the cerebellum, spinal ganglia • Meninges 	2			20	[1, 4, 10, 14, 23]
<p>Topic 2. Cardiovascular system</p> <ul style="list-style-type: none"> • The value of the cardiovascular system and its components • Arteries, their types and structure • Veins, their classification and structure 				20	[2, 8, 14, 16, 24]

¹ Specific source from the main or additional recommended literature

<ul style="list-style-type: none"> The structure of the heart wall, the conduction system of the heart 					
<p>Topic 3. Hematopoietic organs and immune defense</p> <ul style="list-style-type: none"> General structural and functional characteristics of hematopoietic organs Central organs of the hematopoietic system Peripheral hematopoietic organs: lymph nodes, spleen, lymphoid formations The role of lymphocytes in the development of immune responses 			2	20	[1, 6, 13, 18, 22]
<p>Topic 4. Endocrine system</p> <ul style="list-style-type: none"> General morphological and functional characteristics of the central endocrine organs: hypothalamic nuclei; pituitary and pineal gland Peripheral endocrine organs. Development, structure and function of the thyroid, thyroid and adrenal glands Dissociated endocrine system 				20	[2, 7, 15, 19, 27]
<p>Topic 5. General morphofunctional characteristics of the digestive system</p> <ul style="list-style-type: none"> Embryogenesis of the digestive system Diagram of the structure of the digestive tract, mucous membrane Oropharyngeal organs: lips, cheeks, tongue, teeth, etc. Histological structure of the esophagus. The structure of the single-chamber stomach, small and large intestine 	2			20	[3, 9, 12, 17, 28]
<p>Topic 6. Respiratory organs</p> <ul style="list-style-type: none"> Development and functions of the respiratory system Airways. The structure of the mucous membrane of different parts of the nasal cavity The structure of the larynx, trachea, bronchi and terminal bronchioles Respiratory lungs Airtight barrier Structure and functions of the pleura 				22	[1, 5, 16, 19, 26]
<p>Topic 7. Urinary organs. Reproductive system</p> <ul style="list-style-type: none"> General morphofunctional characteristics of urinary organs The structure of the kidneys and their blood vessels Ultrastructural characteristics of the nephron Urinary tract, bladder and urethra Endocrine complex of the kidney 			2	24	[2, 7, 12, 16, 24]

<ul style="list-style-type: none"> • Significance and embryonic development of male genitals • The structure of the testicle (testis) • Female genitals, significance and embryogenesis • The structure of the ovary • Endocrine function of the genital system • The structure of the fallopian tube, uterus, vagina, genitourinary tract, cyclic changes in the genitals of females 					
Total	2		2	146	

4. METHODS OF TEACHING AND TEACHING

DRN	Teaching methods (work to be carried out by the teacher during classes, consultations)	Number of hours	Teaching methods (what types of educational activities the student must perform independently)	Number of hours
DRN 1	Survey of students with clarification of key issues of the subject, answers to students' questions, acquisition of practical skills, methods of performing laboratory work. Interactive discussion of the topic in the form of a discussion, which includes information presented in diagrams and pictures, description of the histopreparation, demonstration of individual morphological structures in the provided histopreparations and photographs. Solving situational problems that have a clinical direction and are based on knowledge and the ability to interpret morpho-functional relationships in the animal body	2	Independent processing of materials for the topic. Memorization of theoretical material, observation. On the basis of the studied and processed material, the preparation of a synopsis of independent work; registration of independent work with a histological preparation in the form of a protocol. Acquaintance with the information of official sites on the subject of the lesson or a separate question.	18
DRN 2	Survey of students with clarification of key issues of the subject, answers to students' questions, acquisition of practical skills, methods of performing laboratory work. Interactive discussion of the topic in the form of a discussion, which includes information presented in diagrams and pictures, description of the histopreparation, demonstration of individual morphological structures in the provided histopreparations and photographs. Solving situational problems that have a clinical direction and are		Independent processing of materials for the topic. Memorization of theoretical material, observation. On the basis of the studied and processed material, the preparation of a synopsis of independent work; registration of independent work with a histological preparation in the form of a protocol. Acquaintance with the information of official sites on the subject of the lesson or a separate question.	22

	based on knowledge and the ability to interpret morpho-functional relationships in the animal body			
DRN 3	Survey of students with clarification of key issues of the subject, answers to students' questions, acquisition of practical skills, methods of performing laboratory work. Interactive discussion of the topic in the form of a discussion, which includes information presented in diagrams and pictures, description of the histopreparation, demonstration of individual morphological structures in the provided histopreparations and photographs. Solving situational problems that have a clinical direction and are based on knowledge and the ability to interpret morpho-functional relationships in the animal body		Independent processing of materials for the topic. Memorization of theoretical material, observation. On the basis of the studied and processed material, the preparation of a synopsis of independent work; registration of independent work with a histological preparation in the form of a protocol. Acquaintance with the information of official sites on the subject of the lesson or a separate question.	22
DRN 4	Survey of students with clarification of key issues of the subject, answers to students' questions, acquisition of practical skills, methods of performing laboratory work. Interactive discussion of the topic in the form of a discussion, which includes information presented in diagrams and pictures, description of the histopreparation, demonstration of individual morphological structures in the provided histopreparations and photographs. Solving situational problems that have a clinical direction and are based on knowledge and the ability to interpret morpho-functional relationships in the animal body	2	Independent processing of materials for the topic. Memorization of theoretical material, observation. On the basis of the studied and processed material, the preparation of a synopsis of independent work; registration of independent work with a histological preparation in the form of a protocol. Acquaintance with the information of official sites on the subject of the lesson or a separate question.	18
DRN 5	Survey of students with clarification of key issues of the subject, answers to students' questions, acquisition of practical skills, methods of performing laboratory work. Interactive discussion of the topic in the form of a discussion, which includes information presented in diagrams and pictures, description of the histopreparation, demonstration of individual morphological structures in the provided		Independent processing of materials for the topic. Memorization of theoretical material, observation. On the basis of the studied and processed material, the preparation of a synopsis of independent work; registration of independent work with a histological preparation in the form of a protocol. Acquaintance with the information of official sites on	22

	histopreparations and photographs. Solving situational problems that have a clinical direction and are based on knowledge and the ability to interpret morpho-functional relationships in the animal body		the subject of the lesson or a separate question.	
DRN 6	Survey of students with clarification of key issues of the subject, answers to students' questions, acquisition of practical skills, methods of performing laboratory work. Interactive discussion of the topic in the form of a discussion, which includes information presented in diagrams and pictures, description of the histopreparation, demonstration of individual morphological structures in the provided histopreparations and photographs. Solving situational problems that have a clinical direction and are based on knowledge and the ability to interpret morpho-functional relationships in the animal body		Independent processing of materials for the topic. Memorization of theoretical material, observation. On the basis of the studied and processed material, the preparation of a synopsis of independent work; registration of independent work with a histological preparation in the form of a protocol. Acquaintance with the information of official sites on the subject of the lesson or a separate question.	22
DRN 7	Survey of students with clarification of key issues of the subject, answers to students' questions, acquisition of practical skills, methods of performing laboratory work. Interactive discussion of the topic in the form of a discussion, which includes information presented in diagrams and pictures, description of the histopreparation, demonstration of individual morphological structures in the provided histopreparations and photographs. Solving situational problems that have a clinical direction and are based on knowledge and the ability to interpret morpho-functional relationships in the animal body		Independent processing of materials for the topic. Memorization of theoretical material, observation. On the basis of the studied and processed material, the preparation of a synopsis of independent work; registration of independent work with a histological preparation in the form of a protocol. Acquaintance with the information of official sites on the subject of the lesson or a separate question.	22

5. ASSESSMENT

5.1. Diagnostic assessment

5.2. Summative assessment

5.2.1. Intended learning outcomes methods:

№	Methods of summative evaluation	Points / Weight in the overall score	Date of compilation
1.	Oral control (participation in a discussion on the topic of the lecture)	30 points / 30%	Weekly

2.	Written control (performance of tasks on independent work)	20 points / 20%	According to the schedule
3.	Laboratory-practical control (performance of tasks on laboratory works)	20 points / 20%	According to the schedule of the hospital
4.	Exam	30 points / 30%	15 week

5.2.2. Grading criteria

Component ²	Unsatisfactorily	Satisfactorily	Okay	Perfectly ³
	<i><15 points</i>	<i>15-20 points</i>	<i>21-26 points</i>	<i>27-30 points</i>
Thematic survey. Oral control	The student can play only individual fragments of the course.	The student has certain knowledge provided in the program of the discipline, has the basic provisions studied at a level that is defined as the minimum allowable	The student in general is well versed in the material, knows the basic provisions of the material, makes an analysis of possible situations based on them and is able to apply in solving typical practical problems, but admits some inaccuracies	The student demonstrates complete and solid knowledge of the educational material in the amount that corresponds to the program of the discipline, correctly and reasonably makes the necessary decisions in various non-standard situations.
	<i><7 points</i>	<i>8-13 points</i>	<i>14-19 points</i>	<i>20 points</i>
Laboratory-practical control (performance of tasks on laboratory works) Solution of situational tasks	The student is not prepared to solve problems, the answer is incomplete, some components are missing or insufficient to disclose	Most requirements are met, but some components are missing or insufficiently disclosed, there is no analysis of other approaches to the issue Using the basic theoretical provisions, the student has difficulty performing the task. Tasks are significantly formalized: there is a correspondence of the algorithm, but there is no deep understanding of the work	The student has mastered the basic material, and understands the solution of problems, has suggestions on the direction of their solutions. All the requirements of the task are met, but in violation of the methods	The task is performed methodically correctly and qualitatively. The student is able to implement the theoretical provisions of the discipline in practice When performing tasks, he showed the ability to solve tasks independently
	<i><7 points</i>	<i>8-13 points</i>	<i>14-19 points</i>	<i>20 points</i>

² Indicate the component of summative assessment

³ Indicate the distribution of points and the criteria that determine the level of evaluation

Written control (performance of tasks on independent work). Protection of the abstract from independent work	The student does not have a complete understanding of the material on the discipline. The student is not prepared to independently solve problems that outline the purpose and objectives of the discipline	Despite the fact that the student completed the program of the discipline, he worked passively, his answers during the registration of works are mostly incorrect, unfounded	Knows the characteristics of the main provisions that are crucial in performance of registration of tasks and explanation of the accepted decisions, within the discipline studied. Errors in the answers are not systemic.	When performing tasks, he showed the ability to solve tasks independently. The synopsis is designed flawlessly, logically arranged material with an understanding of the relationships of the processes disclosed on this topic.
Exam	<i><15 points</i>	<i>15-20 points</i>	<i>21-26 points</i>	<i>27-30 points</i>
	The issues of the exam ticket are not disclosed	2 questions are solved	3 questions are solved	Three issues are revealed and the own solution of the problem is offered

6. LEARNING RESOURCES

6.1. 1. Key resources

1. Horalsky L. P. and others. Histology of domestic animals: teaching. manual. Zhytomyr: ZhNAEU, 2020. 296 p.
2. Novak V.P., Bychkov Yu.P., Pylypenko M.Yu. Cytology, histology, embryology: teaching. manual. K.: Dakor, 2008. 522 p.
3. Novak V.P., Pylypenko M.Yu., Bychkov Y.P. Cytology, histology, embryology: teaching. manual. K.: VIRA-R, 2001. 288 p.
4. Khomych V.T. Lectures on cytology, embryology and histology of domestic animals. K: AgrarMediaGroup, 2012. 296 p.
5. Novak V.P., Melnychenko A.P., Bevs O.S. Workshop on laboratory-practical classes in cytology, embryology and general histology for students of the faculties of veterinary medicine and biological technology. Bila Tserkva, 2006. 57 p.
6. Lutsik O. D., Tchaikovskyy Yu. B. Histology. Cytology. Embryology: a textbook. Vinnytsia: Nova Kniga, 2018. 592 p

6.1.2. Methodical support

7. Panikar I.I., Garkava V.V. Cytology, histology, embryology: Methodological instructions for conducting laboratory classes. Sumy, 2006. 68p.
8. Zon G.A., Harkava V.V. Cytology, histology, embryology: Basics of cytology: Methodical instructions for conducting laboratory classes. Sumy, 2010. 32p.
9. Harkava V.V., Baydevlyatova Yu.V. Cytology, histology, embryology: Basics of embryology: Methodical instructions for conducting laboratory classes. Sumy, 2011. 34p.
10. Harkava V.V., Baydevlyatova Yu.V. Cytology, histology, embryology: Tissues of the internal environment. Blood: Methodological instructions for conducting laboratory classes. Sumy, 2012. 28p.
11. Zon G.A., Harkava V.V. Cytology, histology, embryology: Muscle tissue: Methodical instructions for conducting laboratory classes. Sumy, 2011. 28p.
12. Zon G.A., Garkava V.V., Baydevlyatova Yu.V. Cytology, histology, embryology: Nervous system: Methodical instructions for conducting laboratory classes. Sumy, 2012. 48p.

13. Zon G.A., Garkava V.V., Baydevlyatova Yu.V. Cytology, histology, embryology: Nervous tissue: Methodical instructions for conducting laboratory classes. Sumy, 2011. 24 p.
14. Panikar I.I., Garagulya G.I., Garkava V.V. Cytology, histology, embryology: Organs of blood formation and immune protection. Sumy, 2012. 46p.
15. Zone G.A., Harkava V.V. Cytology, histology, embryology: Loose connective tissue: Methodical instructions for conducting laboratory classes. Sumy, 2010. 18p.
16. Harkava V.V., Panasenko O.S. Cytology, histology, embryology: Endocrine system: Methodical instructions for conducting laboratory classes. Sumy, 2012. 44p.
17. Zon G.A., Harkava V.V. Cytology, histology, embryology: Stomachs of ruminants: Methodical instructions for conducting laboratory classes. Sumy, 2009. 12 p.

6.1.3. Other sources

18. <http://veterinarua.ru/1gistologiya/118-gistologiya.html>
19. <http://veterinarua.ru/embriologiya1/115-embriologiya.html>
20. <http://vseslova.com.ua/word/Цитологія-119567u>
21. <http://www.ivyroses.com/HumanBody/Histology/What-is-Histology.php>
22. <http://www.wisegeek.org/what-is-cytology.htm>
23. <http://www.wisegeek.com/what-is-embryology.htm>

6.2. Additional sources

24. Horalsky L. P. and others. Handbook of cytology, embryology and histology of domestic animals: study guide. Zhytomyr: ZhNAEU, 2018. 260 p.
25. Goralskyi L.P., Khomych V.T., Kononskyi O.I. Basics of histological technique and morphofunctional research methods in normal and pathological conditions Zhytomyr: Polissya, 2015. 288 p.
26. Dzerzhynskyi M.E. etc. General cytology and histology: textbook. Kyiv: Kyiv University Publishing and Printing Center, 2010. 575 p.
27. Novak V.P., Melnychenko A.P. Basics of general embryology. Methodological guidelines for students of the Faculty of Veterinary Medicine and the Faculty of Animal Engineering. Bila Tserkva, 2003. 58 p.

6.3. Software

Lecture classes are held in classrooms equipped with multimedia facilities and involve the use of presentations.

Light microscopes, tissue preparations, atlases, models, multimedia projector, interactive board.