HISTOLOGICAL TECHNIQUE AND METHODS OF MORPHOLOGICAL RESEARCH

SYLLABUS OF THE EDUCATIONAL COMPONENT

Speciality	**211 – Veterinary medicine**	**Mandatory discipline**	**optional**
Educational program	**Veterinary medicine**	**Faculty**	**veterinary Medicine**
Educational level	**Master's degree**	**Department of**	**normal and pathological morphology**

TEACHER

Byrka Olena Viktorovna

Higher education – specialty veterinary medicine
Scientific degree - Candidate of Veterinary Sciences in the specialty 16.00.02 - pathology, oncology and morphology of animals
Academic title – Associate Professor
Work experience – 16 years
Indicators of professional activity on the subject of the course:

- author of 10 methodological developments;
- 19 years of scientific work experience;
- participant of scientific and methodological conferences.

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Attached to the teaching of the discipline: Doctor of Veterinary Sciences, Professor Kushch Mykola Mykolayovych

GENERAL INFORMATION ABOUT THE EDUCATIONAL COMPONENT

Purpose	**formation of applicants' competencies in conducting clinical and laboratory studies using the main methods of histological technique, morphometric methods and interpretation of results. Mastering the discipline will allow you to form skills regarding safety rules when working in a histological laboratory, familiarize with the methods of histological examinations, consolidate the skills of determining different types of tissues in organs, histological elements in tissues, structural components of cells, as well as signs of violation of the microstructure of histological objects at the cellular and tissue levels.**
Format	**lectures, practical classes, independent work, writing tests, written test work or oral questioning, practical skills and abilities.**
Detailing the learning outcomes and forms	• **the ability to establish the features of the structure and functioning of cells, tissues, organs, their systems and**

of their control	**apparatuses of the body of animals of different classes and species – mammals, birds, insects (bees), fish and other vertebrates (GC1, GC3, PLO1, PLO3) / control during practical classes, in extracurricular hours, at consultations and tests;** • **ability to use tools, special devices, devices, laboratory equipment and other technical means to carry out the necessary manipulations during professional activities (GC1, GC3, GC7, SC1, SC2, PLO1, PLO2) / control during practical classes, in extracurricular hours, at consultations and tests;** • **The building is compatible with the rules of practicing, asepsis and antiseptics during the hour of factory activity (GC3, GC7, SC2, SC3, SC6, PLO1, PLO2,) / control during practical classes, in extracurricular hours, at consultations and tests;** • **ability to select, pack, fix and send samples of biological material for laboratory research (GC1, GC2, GC3, GC6, GC7, SC2, SC3, SC6, PLO1, PLO3,) / control during practical classes, in extracurricular hours, at consultations and tests;** • **ability to organize, conduct laboratory and special diagnostic studies and analyze their results (GC1, GC2, GC3, GC6, GC7, GC8, SC1, SC2, SC3, SC7, PLO1, PLO2, PLO3, PLO17) / control during practical classes, in extracurricular time, at consultations and tests.**
Scope and forms of control	**3 ECTS credits (90 hours): 14 hours of lecture, 30 hours of practical lessons, 46 hours of self-study, current control (2 chapters); Final control - differentiated credit.**
Teacher Requirements	**timely completion of tasks, activity, demonstration of knowledge, skills and abilities**
Enrollment conditions	**"Free enrollment"**

COMPLEMENTS THE STANDARD OF EDUCATION AND THE EDUCATIONAL PROGRAM

Competence	**GC1. Ability to think abstractly, analyze and synthesize, search, and process information from various sources.** **GC3. Knowledge and understanding of the subject area and profession.** **GC7. Ability to conduct research at the appropriate level.** **SC1. The ability to establish the features of the structure and functioning of cells, tissues, organs, their systems and apparatuses of the body of animals of different classes and species - mammals, birds, insects (bees), fish and other vertebrates.** **SC2. Ability to use tools, special devices, instruments, laboratory equipment and other technical means to perform the necessary manipulations during professional activities.** **SC6. Ability to select, package, fix and ship samples of biological material for laboratory research**	**Program learning outcomes**	**PLO1. Know and correctly use the terminology of veterinary medicine.** **PLO3. Determine the essence of physicochemical and biological processes that occur in the body of animals in normal and pathological conditions.**

STRUCTURE OF THE EDUCATIONAL COMPONENT

Chapter 1. Basics of histotechnics and general methods of histological examination of tissues and organs of animals.

Lecture 1 (L 1)	Introduction. Methodology of histological research, technique of making histological preparations.	**Practical lesson 1 (PI 1)**	Histological laboratory equipment. Safety rules when working in a histological laboratory. Rules of safety and humane treatment of laboratory and research animals.	**Independent work**	1.1. Types of fixators for histological examination. Features of preparation and use. 1.2. Methods of preparation of hematoxylin and eosin according to various prescriptions and features of their use.
		PI 2	Preparation of material for histological examination.		
L 2	The technique of making	**PI 3**	The technique of making histological preparations for light microscopy: embedding in paraffin.		

	histological preparations.	**PI 4**	The technique of making histological preparations for light microscopy: making paraffin tissue sections.		1.3. Methods of research of connective and muscle tissues. Methods using silver nitrate. 1.4. Independent description of the histopreparation of a parenchymal organ. 1.5. Independent description of the histopreparation of a tubular organ. 1.6. Independent comparative analysis of histopreparations without and with the presence of histostructural disturbances and artifacts.
L 3	Methods of staining histological sections for light microscopy.	**PI 5**	The technique of making histological preparations for light microscopy: methods of staining the preparations.		
		PI 6	Technique of light microscopy.		
L 4	Methods of light microscopy. Light microscopy of cells and tissues of the animal body.	**PI 7**	Interpretation of the results of light microscopy of histological preparations.		
		PI 8	Interpretation of histological examination results: description of histopreparations of parenchymal organs.		
L 5	Interpretation of histological examination results. Artifacts and their causes in histological preparations.	**PI 9**	Interpretation of histological examination results: description of histological preparations of tubular organs.		
		PI 10	Final lesson from chapter 1.		
Chapter 2. Special methods of histological research.					
L 6	Special methods of histological research. Histochemical research methods.	**PI 11**	Electron microscopic research methods. General characteristics.		2.1Using reference literature and methodical instructions, choose a method of fixation and staining of histochemical preparations for histochemical examination of a given organ (Individual task). 2.2. Perform measurements of given microscopic structures using an object-ruler and biometric processing of the results. 2.3. Determining the area of specified microscopic objects on tissue samples and conducting biometric processing of the results.
		PI 12	Special methods of staining histological preparations.		
L 7	Methods of quantitative analysis in histological studies.	**PI 13**	Staining blood cells.		
		PI 14	Morphometric research methods.		
		PI 15	Final lesson from chapter 2.		
BASIC LITERATURE AND METHODOLOGICAL MATERIALS					

Основна література	1. Albanese Francesco. Canine and Feline Skin Cytology. Springer International Publishing Switzerland, 2017. 535 p. 2. Burton AG Clinical atlas of small animal cytology. 2018. 380 3. Dellmann's Textbook of Veterinary Histology (6th Edition), Blackwell Publishing, Iowa, USA, 2006. 4. Francesco C., Freeman KP Veterinary Cytology: Dog, Cat, Horse, and Cow. Taylor & Francis Group, LLC, 2017. 240 p. 5. *Hans-Georg Liebig. Veterinary Histology of Domestic Mammals and Birds 5th Edition, 5M Books, 2019.* 6. Lorenzo R., Wiley J. Normal cell morphology in canine and feline cytology: an identification guide. Ressel & Sons Ltd, 2018. 7. Pawlina, Wojciech, and Ross, Michael H.. Histology: A Text and Atlas: With Correlated Cell and Molecular Biology. USA, Wolters Kluwer Health, 2018. 8. Raskin RE, Meyer DJ, Atlas of Canine and Feline Cytology . Saunders , Elsevier , St. Louis . 2016. 240. 9. Ross, Michael H, et al. Atlas of Descriptive Histology. GB, Sinauer, 2009. 10. Wolfgang Kuehnel. Color Atlas of Cytology, Histology, and Microscopic Anatomy, Thieme Stuttgart · New York, 2003.	**Методичне забезпечення**	1. Byrka O., Kushch M., Zhigalova O. Album of histology for students of the faculty of veterinary medicine on specialty 211: Veterinary Medicine, 212: Veterinary hygiene, sanitation and expertise. Part I. Kharkiv. 2022. 56 p. (Україна). 2. Byrka O., Kushch M., Zhigalova O. Album of histology for students of the faculty of veterinary medicine on specialty 211: Veterinary Medicine, 212: Veterinary hygiene, sanitation and expertise. Part II. Kharkiv. 2022. 58 p. (Україна). 3. Kushch M., Byrka O., Zhigalova O. Cytology, histology, embryology: Manual for students of the Faculty of Veterinary Medicine. Part I. Basics of cytology. Kharkiv. 2021. 64 p.(Україна). 4. Byrka O., Kushch M., Zhigalova O. Cytology, histology, embryology. Part I. Textbook for students on specialty 211: Veterinary Medicine, 212: Veterinary hygiene, sanitation and expertise. Kharkiv. 2021. 240 p. ELECTRONIC RESOURCES Veterynary cytology https://veterinarycytology.org/ https://www.youtube.com/@francescocian226/videos

EVALUATION SYSTEM

SYSTEM		POINTS	ACTIVITY THAT IS ASSESSED
Final assessment (different credit, exam)Final evaluation	100 ECTS points (standard)	up to 100	40 % - Final testing
			60 % - student's current work during the semester
Final assessment (non-differential credit)	100 points ECTS (standard)	up to 100	100 % - average grade for sections
Rating of section	100 points total	up to 30	30 % - answers to test questions
		up to 30	30 % - the result of mastering the block of independent work
		up to 40	40 % - student activity in class (oral answers)

NORMS OF ACADEMIC ETHICS AND INTEGRITY

All participants in the educational process (including students) must adhere to the code of academic integrity and the requirements stipulated in the regulation "On Academic Integrity of Participants in the Educational Process of SBTU": to demonstrate discipline, good manners, respect each other's dignity, show kindness, honesty, and responsibility.