

SILABUS EDUCATIONAL COMPONENT



BIOORGANIC CHEMISTRY

speciality	211 veterinary medicine	mandatory discipline	mandatory
educational programme	Veterinary medicine	faculty	veterinary medicine
educational level	second (master's) level	department	physiology and biochemistry of animals

TEACHER

Vita Prykhodchenko



Higher education – specialty veterinary medicine
Scientific degree – Candidate of Agricultural Sciences, specialty 03.00.13 – Human and Animal Physiology
Academic title – associate professor
Work experience – more than 15 years
Indicators of professional activity on the subject of the course:

- author of more than 5 methodological developments;
- more than 15 years of scientific work experience;
- co-author of the workshop on biological chemistry;
- co-author of more than 2 thematic publications;
- participant in scientific and methodological conferences.

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The following are involved in teaching the discipline: Associate Professor, Candidate of Agricultural Sciences Nataliia Hladka

GENERAL INFORMATION ABOUT THE EDUCATIONAL COMPONENT

Objective	formation of students' competencies in modern concepts of bioorganic chemistry, which allow them to acquire in-depth theoretical knowledge necessary for the study of related and applied disciplines. In addition, it allows you to understand the structure of animal tissues and chemical processes occurring in living systems.
Format	lectures, laboratory and practical classes, independent work, individual assignments.
Detailing learning outcomes and forms of their control	<ul style="list-style-type: none"> • Be able to solve complex tasks and problems that arise in professional activities (GC2, SC2) / individual practical training. • Ability to comply with the rules of labor protection, asepsis and antisepsis during professional activities. Ability to organize and conduct laboratory and special diagnostic tests and analyze their results (GC2, SC3) / individual practical classes. • Ability to think abstractly, analyze, synthesize, search, process information from various sources (GC2, PLO14) / individual practical classes.
Scope and forms of control	6 ECTS credits (180 hours): 30 hours of lectures, 60 hours of laboratory and practical classes, 90 hours of independent study; current control (2 chapters); final control – exam.
Teacher requirements	timely completion of tasks, activity, teamwork.
Terms of enrollment	«Free enrollment».

COMPLIANCE WITH THE EDUCATION STANDARD AND EDUCATIONAL PROGRAM

Competencies	<p>CG2. Ability to apply knowledge in practical situations.</p> <p>SC2. Ability to use tools, special devices, instruments, laboratory equipment and other technical means to carry out the necessary manipulations in the performance of professional tasks.</p> <p>SC3. Ability to comply with the rules of labor protection, asepsis and antisepsis during professional activities.</p>	Program learning outcomes	PLO14. Understand the essence of the processes of manufacturing, storage and processing of biological raw materials.
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STRUCTURE OF THE EDUCATIONAL COMPONENT

Chapter 1. HYDROCARBONS. OXYGEN-CONTAINING ORGANIC COMPOUNDS.

Lecture 1.	Subject, methods and importance of bioorganic chemistry. Hydrocarbons. Alkanes – saturated hydrocarbons.	LC 1	Labor organization and safety measures in a chemical laboratory. Hydrocarbons. Alkanes.	Independent work	High molecular weight compounds (polymers): 1. The main types of biopolymers. 2. Polymeric materials.
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Lecture 2, 3.	Unsaturated hydrocarbons – alkenes, alkadiene, alkynes.	LC 2	Unsaturated hydrocarbons - alkenes, alkadienes.		Terpenes: 1. General characteristics of terpenes. 2. Classification. 3. Meaning and use. 4. Properties. Polyhydric alcohols: 1. Triatomic alcohols (glycerols). 2. Homologous series. Isomerism, nomenclature. Methods of preparation. 3. Physical and chemical properties. 4. Characterization, practical significance. Simple esters: 1. Characterization of the class. 2. Isomerism and nomenclature. 3. Methods of preparation. 4. Physical properties. 5. Chemical properties: interaction with concentrated halogenated acids, addition of halogenated hydrogen, formation of peroxides. 6. Characterization of individual representatives.
Lecture 4.	Aromatic hydrocarbons – arenes.	LC 3	Unsaturated hydrocarbons - alkynes.		
Lecture 5.	Hydrocarbon derivatives with homogeneous functions. Alcohols and phenols.	LC 4	Aromatic hydrocarbons (arenes).		
Lecture 6.	Aldehydes and ketones.	LC 5	Alicyclic hydrocarbons (theoretical lesson).		
Lecture 7.	Monocarboxylic acids.	LC 6	Laboratory work “Methods of obtaining and chemical properties of hydrocarbons”.		
Lecture 8.	Dicarboxylic acids and fats.	LC 7	Final lesson in the section “Hydrocarbons”.		
Lecture 9.	Chemistry of lipids.	LC 8	Alcohols and phenols.		
		LC 9	Aldehydes and ketones.		
		LC 10	Laboratory work “Alcohols and phenols, aldehydes, ketones”.		
		LC 11	Monocarboxylic acids.		
		LC 12	Dicarboxylic acids.		
		LC 13	Fats.		
		LC 14	Laboratory work “Carboxylic acids and fats”.		
		LC 15	Chemistry of lipids.		
		LC 16	Final lesson on the topic “Oxygen-containing compounds”.		

Chapter 2. MIXED FUNCTION COMPOUNDS. NITROGEN-CONTAINING ORGANIC COMPOUNDS.

Lecture 10.	Compounds with mixed functional groups. Hydroxy acids.	LC 17	Hydroxy acids (alcohol acids).	Independent work	Carbohydrate derivatives: 1. Uronic acids and their biological role. 2. Amino sugars and their derivatives. Biological role. 3. Pectin compounds, gums, agar: their structure and biological role. 4. Heteroglycosides. Their structure, distribution and biological role. Antibiotics:
Lecture 11.	Simple carbohydrates. Monosaccharides.	LC 18	Carbohydrates. Monosaccharides (simple carbohydrates).		
Lecture 12.	Complex carbohydrates. Di- and polysaccharides.	LC 19	Carbohydrates. Disaccharides (complex carbohydrates).		
Lecture 13.	Amines.	LC 20	Carbohydrates. Polysaccharides (complex carbohydrates).		
Lecture 14.	Amino acids.	LC 21	Laboratory work on the topic “Carbohydrates”.		

Lecture 15.	Heterocyclic compounds.	LC 22	Final lesson on the section "Mixed function compounds".	<ol style="list-style-type: none"> 1. Chemical basis of antibacterial action of penicillins. 2. Cephalosporins. 3. Tetracyclines. 4. Peptide antibiotics. 5. Aminoglycoside antibiotics. 6. Antibiotics-nucleosides. <p>Introduction to vitaminology:</p> <ol style="list-style-type: none"> 1. Bioflavonoids and their biomedical significance. 2. Vitamins of group K. 3. Ubiquinones. <p>Organic chemistry and food industry:</p> <ol style="list-style-type: none"> 1. Food additives. 2. Substances that improve the appearance of products. 3. Sweeteners. 4. Preservatives and food antioxidants (antioxidants). 5. Flavors.
		LC 23	Amines.	
		LC 24-25	Amino acids.	
		LC 26	Peptides and proteins (theoretical lesson).	
		LC 27	Laboratory work on the topic "Amino acids".	
		LC 28	Heterocyclic compounds.	
		LC 29	Alkaloids (theoretical lesson).	
		LC 30	Final lesson on the topic "Nitrogen-containing and heterocyclic compounds".	

BASIC LITERATURE AND METHODOLOGICAL MATERIALS

References	<ol style="list-style-type: none"> 1. Organic Chemistry (third edition): student study guide and solutions manual / David Klein, 2016. – 711 p. 2. Chemistry (third edition): introducing inorganic, organic and physical chemistry / A. Burrows, J. Holman, A Parsons, G. Pilling, G. Price – Oxford, 2017. – 1432 p. 3. General, Organic and Biological Chemistry (seventh edition) / H. Stephan Stoker – Boston, 2014. – 1232 p. 4. Organic Chemistry by T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder. – January 20, 2016. – 1293 p. 5. Textbook of Organic Chemistry Paperback by V.K. Ahluwalia, Rakesh K. Parashar – 1 January 2012. – 504 p. 6. Organic Chemistry (second edition) / Jonathan Clayden, Nick Greeves, Stuart Warren. – Oxford, 2012. – 1187 p. 	Methodological support	<ol style="list-style-type: none"> 1. Chemistry [Text] : lecture workbook for foreign students 211 Veterinary medicine / V. Prichodchenko, N. Hladka, O. Denysova. - Kharkiv : EPC KSZA, 2021. - 142 p. 2. http://moodle.btu.kharkiv.ua/course/view.php?id=458 3. Hydrocarbons [Text]: study guide for applicants for the second (master's) level of higher education of full-time education in the specialty 211 Veterinary Medicine / V. Prykhodchenko, N. Hladka, O. Denysova; Kharkiv, 2021. – 36 p. 4. Oxygen-Containing Compounds [Text]: study guide for applicants for the second (master's) level of higher education of full-time education in the specialty 211 Veterinary Medicine / V. Prykhodchenko, N. Hladka, O. Denysova; Kharkiv, 2021.– 32 p. 5. Mixed function compounds [Text]: study guide for applicants for the second (master's) level of higher education of full-time education in the specialty 211 Veterinary Medicine / V. Prykhodchenko, N. Hladka, O. Denysova; State Biotechnology University - Kharkiv, 2023. – 44 p. 6. Nitrogen-containing compounds [Text]: study guide for applicants for the second (master's) level of higher education of full-time education in the specialty 211 Veterinary Medicine / V.O. Prykhodchenko, N.I. Hladka, O.M. Denysova; State Biotechnology University - Kharkiv, 2023. – 32 p.
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GRADING SYSTEM

SYSTEM		MARKS	ACTIVITIES BEING EVALUATED
Final assessment	100 ECTS points (standard)	to 50	50% of the average grade for the chapters
		to 50	final test
Rating of section	100 points total	to 50	answers to test questions
		to 20	oral answers at laboratory and practical classes
		to 30	result of mastering the block of independent work

STANDARDS OF ACADEMIC ETHICS AND INTEGRITY

All participants in the educational process (including students) must adhere to the code of academic integrity and the requirements set out in the Regulation “On Academic Integrity of Participants in the Educational Process of BSTU”: to be disciplined, well-mannered, respect each other's dignity, show goodwill, honesty, responsibility.