SYLLABUS OF THE EDUCATIONAL COMPONENT

BIODIVERSITY CONSERVATION AND CHEMICALS IN THE EU

specialty	**H6 Veterinary medicine**	**mandatory discipline**	**selective**
educational program	**«Veterinary medicine»**	**faculty**	**veterinary medicine**
educational level	**Unlimited**	**department**	**physiology and biochemistry of animals**

TEACHER

Olha Denysova

Higher education – speciality biologist, teacher of biology and chemistry
Scientific degree – Candidate of Biological Sciences 03.00.19 Cryobiology
Academic title – Associate Professor of the Department Physiology and Biochemistry of Animal
Work experience – more than 18 years
Indicators of professional activity on the subject of the course:

- **author of more than 20 methodological developments;**
- **co-author of a textbook on biological chemistry;**
- **co-author of a textbook on the basics of cryobiology and cryomedicine;**
- **co-author of more than 30 thematic publications;**
- **participant of scientific and methodological conferences.**

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

GENERAL INFORMATION ABOUT THE EDUCATIONAL COMPONENT

Goal	**Understanding the importance of preserving biodiversity for ecosystems and human society; becoming familiar with the diversity of chemicals and their impact on biological systems; studying the legislative regulation of the use and circulation of chemicals in the European Union. Ability to explain the relationship between biodiversity loss and the use of chemicals. Ability to analyze information about chemicals and their impact on biodiversity from the perspective of sustainable decisions and responsible use of resources.**
Format	**lectures, practical classes, independent work, individual tasks.**
Detailing of learning results and forms of their control	• **Ability to abstract thinking, analysis, synthesis. Ability to apply knowledge in practical situations. (GC1, GC2, PLO20)/ individual practical classes.** • **The desire to preserve the environment. The ability to follow the rules of labor protection, asepsis and antiseptics during professional activities. The ability to protect the environment from pollution by livestock waste, as well as materials and means for veterinary purposes. (GC12, SC3, SC16, PLO17)/ individual practical classes.** • **Knowledge and understanding of the subject area and profession. Ability to apply knowledge of biosafety, bioethics and animal welfare in professional activities. (GC2, GC3, SC11, PLO1, PLO10)/ individual practical classes.**
Scope and forms of control	**3 ECTS credits (90 hours): 12 hours of lectures, 18 hours of practical classes, 60 hours of independent work; test control by sections; final control - differentiated assessment.**
Teacher requirements	**timely completion of tasks, activity, teamwork.**
Enrollment conditions	**according to the curriculum**

COMPLEMENTS THE STANDARD OF EDUCATION AND THE EDUCATIONAL PROGRAM

Competencies	**GC1. Ability for abstract thinking, analysis and synthesis.** **GC2. Ability to apply knowledge in practical situations.** **GC3. Knowledge and understanding of the subject area and profession.** **GC12. The desire to preserve the environment environment.** **SC3. Ability to comply with the rules of labor protection, asepsis and antisepsis during professional activities.** **SC11. Ability to apply knowledge of biosafety, bioethics and animal welfare in professional activities.** **SC16. Ability to protect the environment from pollution by livestock waste, as well as materials and veterinary products.**	**Program learning outcomes**	**PLO1. Know and correctly use the terminology of veterinary medicine.** **PLO10. Propose and use appropriate innovative methods and approaches to solving problem situations of professional origin.** **PLO17. Know the rules and requirements of biosafety, bioethics, and animal welfare.** **PLO20. Possess specialized software tools to perform professional tasks.**

STRUCTURE OF THE EDUCATIONAL COMPONENT

Section 1. BIODIVERSITY PROTECTION AND CONSERVATION

Lecture 1.	**The concept of "Biodiversity" and its systematization:** 1. Genetic biodiversity.	**Practical classes PC 1.**	**Measures to protect and preserve biodiversity:** 1. National and international programs;	**Indepen dent**	**1. Conservation of rare and endangered species:** Study of strategies and programs aimed at

	2. Species biodiversity. 3. Ecosystem biodiversity.		2. Reserve fund; 3. Protected areas.		protecting rare and endangered species. **2. Impact of invasive species on local ecosystems:** Research into how invasive species affect biodiversity and what strategies are used to control their spread. **3. Assessment of the state of biodiversity in protected areas:** Analysis of biodiversity in national parks or nature reserves.
		PC 2.	**Chemicals and their impact on the environment:** 1. Classification of pesticides 2. Impact of pesticides on the environment.		
Lecture 2.	**The relationship between chemical pollutants and their impact on biodiversity:** 1. Types of chemicals that have a negative impact on the environment (pesticides, heavy metals, toxic substances). 2. Effects of chemical pollution on water resources, air and soil.	**PC 3.**	**Chemicals in food and their impact on health:** 1. Risks of using chemicals in food: pesticides, fertilizers, preservatives, etc. 2. The impact of chemicals on human health: carcinogenicity, mutagenicity, teratogenicity. 3. Methods of product quality control and monitoring of hazardous chemicals.		
Lecture 3.	**EU initiatives aimed at preserving biodiversity and regulating the use of chemicals:** 1. European and 2. National legislative framework.				
Section 2. GREEN INFRASTRUCTURE AND ITS ROLE IN BIODIVERSITY CONSERVATION					
Lecture 4.	**Green infrastructure and its role in biodiversity conservation and pollution reduction:** 1. What is green infrastructure and how does it affect biodiversity? 2. Basic principles of “green chemistry”. 3. Directions for the development of “green chemistry”.	**PC 4.**	**Green infrastructure in urban environments:** 1. How does green infrastructure affect the quality of the urban environment and the lives of residents? 2. What are the opportunities to use green infrastructure to create a healthier and more sustainable urban environment?	**Independent work**	**1. The role of local communities in biodiversity conservation:** Analysis of the impact of local community participation in nature conservation programs and their role in biodiversity conservation. **2. Preserving biodiversity in the face of climate change:** Research into how climate change affects biodiversity and what adaptation strategies may be effective. **3. Biodiversity and Ecotourism:** Research into the impact of ecotourism on biodiversity and how to ensure a
Lecture 5.	**The impact of animal by-products and livestock farms on the environment:** 1. Generation and management of animal by-products. 2. Emissions of pollutants from livestock farms.	**PC 5.**	**Green infrastructure and biodiversity in rural areas:** 1. How does green infrastructure affect the conservation of natural resources and biodiversity in rural areas? 2. How does green infrastructure help to reduce the impact of agricultural activities on the environment and ecosystems?		

		PC 6.	**Characterization of renewable energy sources:** 1. What are the main types of renewable energy sources and how do they work (solar, wind, hydropower, biomass, geothermal energy)? 2. What principles of energy conversion underlie the operation of each type of RES?		balance between tourism development and nature conservation. **4. The role of restoring ecosystems in biodiversity conservation** : Analysis of ecosystem restoration projects and their impact on biodiversity restoration. **5. Biodiversity conservation in agroecosystems:** Assessing the impact of agricultural practices on biodiversity and opportunities for integrating ecological methods.
Lecture 6.	**The role of chemistry in developing solutions for sustainable biodiversity management:** 1. Chemical methods of biodiversity analysis (analysis of genetic diversity, determination of chemical contaminants in natural environments); 2. Biochemistry and biotechnology for biodiversity conservation; 3. Chemical analysis and monitoring of the environment.	**PC 7.**	**Impact of RES on the environment and reduction of greenhouse gas emissions:** 1. How does the use of RES help reduce CO2 and other greenhouse gas emissions? 2. What are the opportunities and limitations associated with the introduction of RES from an environmental point of view?		
		PC 8.	**International experience and cooperation in the field of renewable energy:** 1. What are the examples of successful RES implementation in different countries? 2. What are the possibilities of cooperation between countries in the field of RES to achieve global goals of reducing the use of hydrocarbons and preserving the environment?		
		PC 9.	**The final lesson of the course. Discussion of the material studied. Reflection.**		

BASIC LITERATURE AND METHODOLOGICAL MATERIALS

References

1. **Nature Conservation in Europe: Approaches and Lessons. - edited by Graham Tucker, Cambridge University Press, 2023. - 593 p.**
2. **Dudgeon D, Arthington AH, Gessner MO, Kawabata Z, Knowler DJ, Lévêque C, Naiman RJ, Prieur-Richard AH, Soto D, Stiassny ML, Sullivan CA. Freshwater biodiversity: importance, threats, status and conservation challenges. Biol Rev Camb Philos Soc. 2006 May;81(2):163-82. doi: 10.1017/S1464793105006950.**
3. **Aszalós R, Thom D, & Keeton WS. Natural disturbance regimes as a guide for sustainable forest management in Europe. Ecol Appl. 2022 Jul;32(5):e2596. doi: 10.1002/eap.2596.**
4. **Kim H, Lazurko A, & Harrison PA. Understanding the role of biodiversity in the climate, food, water, energy, transport and health nexus in Europe. Sci Total Environ. 2024 May 15;925:171692. doi: 10.1016/j.scitotenv.2024.171692.**

Methodological support

1. European Commission. Ecosystem services and Green Infrastructure. URL: https://ec.europa.eu/environment/nature/ecosystems/index_en.htm
2. https://www.youtube.com/watch?v=yJX1Te0jey0
3. https://www.youtube.com/watch?v=Qtr7bQDuJMs
4. http://moodle.btu.kharkiv.ua/login/index.php

EVALUATION SYSTEM

SYSTEM		POINTS	ACTIVITY TO BE EVALUATED
Final assessment (different credit, exam)	100 points ECTS (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)

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.