SILABUS EDUCATIONAL COMPONENT

AQUACHEMISTRY

specialty	**211 veterinary medicine**	**compulsory nature of the discipline**	**selective**
educational program	**veterinary medicine**	**faculty**	**veterinary medicine**
educational level	**Not limited**	**department**	**animal physiology and biochemistry**

TEACHER

Hladka Nataliia

Higher education - specialty veterinary medicine
Scientific degree - Candidate of Agricultural Sciences, specialty 03.00.04 - Biochemistry
Academic rank - associate professor
Over 20 years of experience
Indicators of professional activity on the course topics:

- author of more than 5 methodological developments;
- over 20 years of scientific experience;
- co-author of the workshop on biological chemistry;
- co-author of more than 2 thematic publications;
- participant of scientific and methodological conferences.

telephone	**0667116892**	**e-mail**	**gladkaya_75@ukr.net**	**remote**	http://moodle.btu.kharkiv.ua/course/view.php?id=3900

Associate Professor, Candidate of Agricultural Sciences Vita Prykhodchenko is involved in teaching the discipline

GENERAL INFORMATION ABOUT THE EDUCATIONAL COMPONENT (DISCIPLINE)

Objective	understanding the chemical processes that occur in water, studying the patterns of temporal and spatial changes in the chemical composition of natural waters that occur under the influence of biotic (vital processes of aquatic organisms) and anthropogenic (under the influence of human activity) factors.
Format	lectures, laboratory and practical classes, independent work, individual assignments.
Detailing learning outcomes and forms of their control	• Ability to abstract thinking, analysis, synthesis. Ability to make informed decisions. (GC1, GC9, PLO20)/ individual practical classes. • • Desire to preserve the environment. Ability to comply with the rules of labor protection, asepsis and antiseptics during professional activities. Ability to protect the environment from contamination by livestock waste, as well as materials and means for veterinary purposes. (GC12, PC3, PC16, PLO17)/ individual practical classes. • • Ability to apply knowledge in practical situations. Knowledge and understanding of the subject area and profession. (GC2, GC3, PLO1, PLO10)/ individual practical classes.
Scope and forms of control	3 ECTS credits (90 hours): 12 hours of lectures, 18 hours of laboratory and practical classes, 60 hours of independent study; current control (2 sections); final control - differentiated credit.
Teacher requirements	timely completion of tasks, activity, teamwork.
Terms of enrollment	"free enrollment".

COMPLEMENTS THE EDUCATION STANDARD AND EDUCATIONAL PROGRAM

Competencies	GC1. Ability to think abstractly, analyze and synthesize. GC2. Ability to apply knowledge in practical situations. GC3. Knowledge and understanding of the subject area and profession. GC9. Ability to make informed decisions. GC12. Desire to preserve the environment. PC3. Ability to comply with the rules of labor protection, asepsis and antiseptics during professional activities. PC16. Ability to protect the environment from pollution by livestock waste, as well as materials and means for veterinary purposes.	**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. Own specialized software tools to perform professional tasks.

STRUCTURE OF THE EDUCATIONAL COMPONENT (DISCIPLINE)

Section 1: Theoretical foundations of aquachemistry					
Lecture 1.	**The role and significance of aquachemistry as a science. Concepts of dispersed systems, solutions, solubility.**	**Laboratory and practical class 1 (LPC 1).**	**Structure of a water molecule. Intermolecular and internal bonds in a water molecule**	**Independent work**	**Methods for determining heavy metals in natural waters: atomic absorption method; spectral method; photometric method; extraction-photometric method; gravimetric method. Methods of softening water in industry and everyday life: • thermal method; • reagent method; • ion-exchange method; Types of cation exchangers used for water softening. Calculation of the amount of salts. Determination of dry residue. Calculation of mineralization.**
		LPC 2.	**Water sample collection and preparation for analysis. Physical, physicochemical, and organoleptic indicators of water properties: temperature, transparency, color, turbidity, taste, odor**		
		LPC 3.	**Determination of pH of natural waters by potentiometric method. Redox potential of water.**		
Lecture 2.	**Hydrochemical studies of water bodies.**	**LPC 4.**	**Determination of pollutant concentration.**		
Lecture 3.	**Classification of waters by chemical composition. Mineralization.**	**LPC 5.**	**Final lesson (1 SECTION)**		
Section 2: Aquachemistry of atmospheric precipitation, rivers, lakes, seas and groundwater.					
Lecture 4.	**Aquachemistry of rivers, lakes, reservoirs.**	**LPC 6.**	**Aquachemistry of atmospheric precipitation.**		

				Independent work	Processes of transformation of organic substances in a series of surface-soil-underground waters. Seasonal dynamics and vertical heterogeneity of production-destructive processes in surface waters as a factor of instability of their chemical composition. The problem of acid precipitation: processes in the atmosphere, in the watershed, in the reservoir. Effects of "spring acid shock" for watercourses and lakes. Calculation of the sum of salts. Determination of dry residue. Calculation of mineralization. Registration of water analysis results.
Lecture 5.	Aquachemistry of seas and oceans.	LPC 7.	Wastewater. Assessment of pollution of water bodies.		
		LPC 8.	Features of the analysis of the chemical composition of groundwater.		
Lecture 6.	Chemical composition of groundwater.	LPC 9.	Final lesson (2 SECTION). The final lesson of the course. Discussion of the material studied (student reports). Reflection.		

BASIC LITERATURE AND METHODOLOGICAL MATERIALS

Literature

1. Interesting about chemical elements and their compounds / Ref. O.Karetnikova, G.Malchenko. – K.: Editorial Board of General Pedagogical Newspapers, 2004. – 128 p.
2. Biotechnologies in ecology: a textbook / A.I. Gorova, S.M. Lysytska, A.V. Pavlychenko, T.V. Skvortsova. – D.: National Mining University, 2012. – 184 p.
3. Khilchevsky V.K. Fundamentals of hydrochemistry: a textbook / V.K. Khilchevsky, V.I. Osadchy, S.M. Kurylo.- K.: Nika-Center, 2012.-312 p.
4. Hydrochemical reference book / V.I. Osadchy, B.Y. Nabyvanets, N.M. Osadcha, Yu.B. Nabyvanets. – K.: Nika-Center, 2008. – 655 p.
5. Analytical chemistry of surface waters / B.Y. Nabyvanets, V.I. Osadchy, N.M. Osadcha, Yu.B. Nabyvanets. – K.: Naukova Dumka, 2007. – 455 p.

Methodological support

1. Field and laboratory studies of the chemical composition of the water of the Ros River: Textbook / V.K. Khilchevsky, V.M. Savytsky, L.A. Krasova, O.M. Gonchar. – Kyiv: VPC "Kyiv University", 2012. – 150 p.
2. https://www.youtube.com/watch?v=QIqKC5ScMEc
3. http://moodle.btu.kharkiv.ua/course/view.php?id=3900

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 on test questions
		up to 30	30% - the result of mastering the block of independent work

		up to 40	40% - student activity in classes (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 set forth in the Regulation "On Academic Integrity of Participants in the Educational Process of SBU": to be disciplined, well-mannered, respect each other's dignity, show goodwill, honesty, and responsibility.