Додаток 3
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COURSE SYLLABUS
«INORGANIC CHEMISTRY»

Degree of higher education - Master
Specialization 211 Veterinary Medicine
Educational programme «Veterinary Medicine»
Academic year the 1st, semester the 1st
Form of study full-time
Number of ECTS credits_4_
Language of instruction English

Lecturer of the course	**Docent, Cand Chem Sci Larysa V. Voitenko**
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Course page on eLearn	**https://elearn.nubip.edu.ua/course/view.php?id=3629**

COURSE DESCRIPTION

The discipline studies the theoretical foundations of modern inorganic chemistry, including the chemical properties and transformations of macronutrients, micronutrients, toxic elements and their compounds. Chemical properties are described in terms of atomic-molecular studies, acid-base chemistry, redox processes and complexation. The chemical nature of endemic non-infectious diseases of humans and animals as a result of the abnormal distribution of chemical elements in the environment is shown. Laboratory training includes qualitative testing of bioactive elements and their use in the practice of veterinary medicine.

Competencies of the educational programme:

Integrated competency (IC): *The ability to solve complex tasks and problems in the field of* veterinary medicine, which involves conducting research and/or implementing innovations and is characterized by the uncertainty of conditions and requirements.

General competencies (GC):

GC 1. Ability to abstract thinking, analysis and synthesis.

GC 5. Ability to communicate in a foreign language.

GC 7. Ability to conduct research at an appropriate level.

GC 11. Ability to evaluate and ensure the quality of the work performed

Professional (special) competencies (PC):

PC 7. Ability to organize and conduct laboratory and special diagnostic studies and analyze their results.

Program learning outcomes (PLO) of the educational programme:

PLO 1. Know and correctly use the terminology of veterinary medicine.

PLO 3. Determine the essence of physico-chemical and biological processes that occur in animal bodies in normal and pathological states.

COURSE STRUCTURE

Topic	Hours (lecture/laboratory)	Learning outcomes	Tasks	Assess-ment, points
Module the 1st. General foundations of Inorganic Chemistry				
Topic 1. Introduction. Subject and tasks of Inorganic Chemistry. Chemistry for veterinary medicine.	2/4	**To know** the safe rules in chemical laboratory; classification of the inorganic substances; stoichiometric chemical laws; types of chemical reactions; relations of the chemical transformations and veterinary practice.	Introduction testing Lab test tube experiment – properties of the main classes of	10

Atomic-molecular study. The mole concept in chemical calculations. General stoichiometric laws. Allotropy. Types of chemical reactions in inorganic chemistry.		**To know how** to organize the working place and realize the lab techniques of semimicro tube tests; to work with educational literature and to organize own independent study. **To understand** the importance of the chemistry as a science about principles of the Universe existing and development; the criticism of chemophobia.	inorganic substances. Control test	
Topic 2. The atomic theory and chemical bonding for inorganic compounds. Electron formulas. Valence as a function of electron structure. Types of chemical bonding. Biological role of hydrogen bonding. Mendeleev Periodical Table of the chemical elements and Periodical Law.	4/6	**To know** the modern theory of atomic structure; structure of electron shells; the dual properties of an electron; the mechanism of the chemical bonding of atoms one with other; concept of valence and oxidation number of an atom as a function of the outer electron shell composition. **To have skills** to determine the possible valences and oxidation numbers of the elements based of their electron configuration; to calculate type of chemical bonding based of electronegativity; to determine the metallic or non-metallic or metalloid properties of chemical elements. **To understand** the correlation of chemical properties of compounds and the structure of their electron configuration and type of chemical bonding**.**	Module control test Elern testing	5
Total 1st module	**6/10**			15
Module the 2d. Acid-Base Chemistry				
Topic 1. Expression of Concentration; recalculations of concentration units. Preparation of solu-tions. Acid-base chemistry of water solutions. Hydrolysis of salts.	4/18	**To know** the content and math expression of the basic concentration units; the nature of chemical transformations in water solutions (electrolytic dissociation, hydrolysis); a concept of a pH. **To know how** to determine a pH of a medium; to regulate a pH using buffer solutions; compile an ionic equation; to predict the pathway of the chemical interaction in solutions; to use dissociation constant of electrolytes in Ostwald's dilution Law; to influence of ionic composition in body fluids using electrolytic drinks; **To have skills** of acid-basic indicators application of a pH measuring; how to prepare of solutions of a taken concentration. **To understand** how to apply the concentration units at veterinary practice.	Lab test tube experiments. Volumetric determination of the temporary water hardness. Module control tests Elern testing	18
Total 2d module	**4/18**			18
Module the 3d. Properties of inorganic substances in RedOx reactions and complexes				
Topic 1. Theory and practice of RedOx processes	2/10	**To know** the concept of redistribution of electrons at RedOx transformations; typical reduction and oxidating agents among inorganic substances; influence of a pH into RedOx processes; the quantitative parameters of RedOx processes (electrode potential, EMF). **To understand** the methodology of a product predicting for RedOx reactions based on electronegativity of elements; function the chemical source of electricity. **To apply** the method of electron balancing; **To know how** to act the disinfectant agents (e.g., free chlorine, ozone, hydrogen peroxide); **To have practical skills** in realization of redox processes between typical inorganic	Lab test tube experiments. Module control testing. Elern testing	12

		RedOx agents.		
Topic 2. Verner's Theory of Complex compounds, their chemical nature, type of chemical bonding, isomerism, rules of naming. Coordinative compounds in chemical qualitative analysis. Preparation. Coordinative compounds in nature. Bioinorganic systems as complex compounds.	2/7	**To know** the concept of Verner's Theory of Complex compounds; donate (coordinative) chemical bonding in formation of complex compounds; stability constant; isomerism, biological activity of complex compounds, including the anticancer drugs; bioinorganic systems as complex compounds**.** **To have skills** of compilation of reaction equations with complex compounds; realization of qualitative tests used complex compounds; **To understand** the concept of multidental ligands and their using in medicine practice (e.g., ferroine, DisodiumEDTA).	Lab test tube experiments. Module control testing. Elern testing	20
Topic 3. Biogeochemical zoning. Chemical nature of human and animal endemic noninfectious diseases as the results of the abnormal distribution of the chemical elements in the environment.	1/0	**To know** the concepts of biogeochemical zoning and biogeochemical chains; **To have skills** of visual symptoms of endemic noninfectious diseases of humans and animals; **To understand** the concept of human and animal endemic diseases as the results of the abnormal distribution of the chemical elements in the environment; the chemical way of prophylactic actions.		5
Total the 3d module	**5/17**			**37**
Total				**70**
Exam				**30**
Total for course				**100**

ASSESSMENT POLICY

Policy regarding deadlines and results:	Works that are submitted in violation of deadlines without good reason are evaluated at a lower grade. Retake of tests takes place with the lecturer's permission if there are good reasons (for example, student was sick and has the hospital sheet).
Academic honesty policy:	Cheating during tests and exams is strictly prohibited (including the use of mobile devices).
Attendance policy:	Attendance is a mandatory component of the grade for which points are earned. For objective reasons (such international internship, sickness), teaching may be provided on-line, in agreement with the Dean.

SCALE OF ASSESSMENT OF STUDENT KNOWLEDGE

Student rating, points	**National grade based on exam results**	
	exams	**credits**
90-100	excellent	passed
74-89	good	
60-73	satisfactory	
0-59	unsatisfactory	not passed

RECOMMENDED SOURCES OF INFORMATION

1. Chambers, C., Holliday A.K. Modern Inorganic Chemistry. Available at: https://library.uoh.edu.iq/admin/ebooks/12489-chambers---modern-inorganic-chemistry.pdf
2. Inorganic Chemistry: a laboratory workbook for the English-speaking Master Students in 211 Veterinary Medicine / N.M. Prokopchuk, V.A. Kopilevich, R.V. Lavryk, L.V. Voitenko. – Kyiv: Expo-Druk, 2021. – 164 pp.
3. Workbook for specialist' student in veterinary medicine. Subject Bio-Inorganic chemistry and examples of tests (part I). –NUBIP Publish., 2010. – 120 pp.

4. Workbook for specialist' student in veterinary medicine. Subject Bio-Inorganic chemistry and examples of tests (part II). –NUBIP Publish., 2010. – 100 pp.

Supplemental

1. Nelson, Peter G. Introduction to Inorganic Chemistry. Key ideas and their experimental basis. Peter G. Nelson & Ventus Publishing ApS, 2011.. – 177 p. Available at: http://197.14.51.10:81/pmb/CHIMIE/introduction-to-inorganic-chemistry.pdf.
2. Fenyes, Maria. Applied Chemistry Chemistry 101 Laboratory Manual: Los Angeles Mission College. – 191 p. Available at: https://mymission.lamission.edu/userdata%5Cpaziras%5CChem101%5CLab_Manual.pdf.

Normatives

1. ISO 6353-2:1983 Reagents for chemical analysis - Part 2: Specifications - First series.
2. ISO 6353-2:1983/Add.2:1986(en) Reagents for chemical analysis - Part 2: Specifications — First series ADDENDUM 2.
3. Codex Alimentarius. General Standard For Food Additives Codex STAN 192-1995. https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXS%2B192-1995%252FCXS_192e.pdf.

IT resources

1. VIPEr. Virtual inorganic pedagogical electronic resource: a community for teachers and students of inorganic chemistry. HTTPS://WWW.IONICVIPER.ORG/VIRTUAL-INORGANIC-PEDAGOGICAL-ELECTRONIC-RESOURCE
2. Periodical Table - http://www.webqc.org/periodictable.php.
2. Calculator of Molar weight (FW) - http://www.graphpad.com/quickcalcs/Molarityform.cfm
3.Units convertor - http://www.webqc.org/unitconverters.php.
4. pH calculator - http://www.webqc.org/phsolver.php.
8. Sigma-Aldrich reagents - https://www.sigmaaldrich.com/