

**NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES OF
UKRAINE**

Department of Analytical and Bioinorganic Chemistry and Water quality



"APPROVED"

Dean of the Faculty of Veterinary Medicine

(prof. Mykola I. Tsvilikhovskiy)

" " _____ 2024

"APPROVED"

at the meeting of Department
of Analytical and Bioinorganic Chemistry
and Water Quality

Minutes №. 11 of "23" May 2024

Head of the Department

(prof. Volodymyr A. Kopilevich)

"REVIEWED"

Guarantor of the AP "Veterinary medicine"

(prof. Natalia G. Grushanska)

**CURRICULUM OF ACADEMIC DISCIPLINE
INORGANIC CHEMISTRY**

Field of knowledge 21 – Veterinary

Specialty 211 - "Veterinary medicine"

Academic programme Veterinary medicine"

Faculty of Veterinary Medicine

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Kyiv – 2024

Description of the discipline Inorgani chemistry

(name)

Academic degree, specialty, academic programme		
Academic degree	<i>master's</i>	
Specialty	<i>211- Veterinary medicine</i>	
Academic programme	<i>Veterinary medicine</i>	
Characteristics of the discipline		
Type	compulsory	
Total number of hours	120	
Number of ECTS credits	4	
Number of modules	2	
Course project (work) (if any)	-	
Form of assessment	<i>exam</i>	
Indicators of the discipline for full-time and part-time forms of university study		
	Full-time	Part-time
Year of study	1	
Semester	1	
Lectures	<i>15 hours</i>	<i>hours</i>
Practical classes and seminars	<i>hours</i>	<i>hours</i>
Laboratory classes	<i>45 hours</i>	<i>hours</i>
Self-study	<i>60 hours</i>	<i>hours</i>
Number of hours per week for full-time students	<i>4 hours</i>	

1. Aim, objectives, competences and expected learning outcomes of the discipline

Aim the course of inorganic chemistry is to acquire knowledge about chemical laws and regularities of chemical transformations (the chemical form of the movement of matter) with an orientation to the processes taking place in the environment and the formation of skills for performing a chemical experiment

Objectives:

- studying the basics of the discipline as a component of the fundamental training of specialists in the field of science;
- creation of a scientific base for the study of a number of professionally oriented and special disciplines;
- mastering the basic methods of performing chemical reactions using the semi-micro method;
- use laboratory equipment and make observations to identify chemical and physical changes.

Acquisition of competences:

Integral competence (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 competences (GC):

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

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

GC 11. The ability to evaluate and ensure the quality of work performed works

Special (professional) competences (SC):

SC7. Ability to organize and conduct laboratory and special diagnostic studies and analyze their results.

Expected Learning Outcomes (ELO):

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

ELO 3. To determine the essence of physico-chemical and biological processes that occur in the body of animals in normal and pathological conditions.

2. Programme and structure of the discipline for:

- full-time (part-time) form of study;

Modules and topics	Number of Hours													
	Full time							Part time form						
	Weeks	Total	including					Total	including					
			1	p	lab	ind	S st		1	p	lab	ind	S st	
2	3	4	5	6	7	8	9	10	11	12	13	14		
Module №1. Chemical reactions without a change in oxidation state														
Topic #1. Classification of inorganic compounds: a modern view.	2	14	2	-	6	-	6							
Topic #2. Atomic structure and Chemical Bond	2	16	2	-	4	-	10							
Topic #3. Theory of electrolytic dissociation	2	16	2	-	6	-	8							
Topic #4. Hydrolysis of salt	2	14	2	-	6	-	6							
Total hours (module 1)	60 hours		8	-	22	-	30							
Module №2. Chemical transformations with change of oxidation number of elements or their valence														
Topic #5. Solutions. Concentration of solutions	2	12	2	-	4	-	6							
Topic #6. Red-Ox reactions	2	20	2	-	10	-	8							
Topic #7. Coordination compounds	2	12	2	-	4	-	6							
Topic #8. Chemical properties of elements of VIA and VIIA groups	1	16	1	-	5	-	10							
Total hours (module 2)	60 hours		7	-	23	-	30							
Total hours	120		30	-	45	-	60							

3. Topics of laboratory (practical, seminar) classes

№ S/n	Topic title	Hours
Module №1. Chemical reactions without a change in oxidation state		
1.1	The main classes of inorganic compounds	4
1.2	Control work "Classes of inorganic compounds"	2
1.3	Control work "Atomic structure and Chemical bonds"	4
1.4	Solutions. Reactions of solutions of electrolytes. The chemical properties of electrolyte solutions	4
1.5	Control work "Electrolytic dissociation"	2
1.6	Hydrolysis of salt	4
1.7	Control work "Hydrolysis of salts"	2
Module №2. Chemical transformations with change of oxidation number of elements or their valence		
2.1	"Solutions. Ways of expressing the concentration of solutions"	4
2.2	Redox reactions. Experimental study of the influence of the environment on the course of redox reactions.	8
2.3	Control work "Redox reactions"	2
2.4	Coordination compounds. Experimental study of methods of their preparation and study of chemical properties.	4
2.5	Control test "Coordination compounds"	2
2.6	Chemical properties of halogens and chalcogens	3
2.7	Control test "Chemical properties of VIA and VIIA groups"	2
<i>Total hours of "Inorganic chemistry": 45 hours.</i>		

4. Topics for self-study

№ s/n	Topic title	Hours
1	The modern concept of Atomic structure. Chemical bond.	20
2	Chemical transformations of metals and non-metals	20

5. Tools for assessing expected learning outcomes:

- exam;
- module tests;
- seminars;
- abstracts;
- lab work performing
- presentation of laboratory and practical works;
- other types.

6. Teaching methods:

- verbal method (lecture, discussion, interview, etc.);
- practical method (laboratory, practical classes);
- visual method (illustration, demonstration);
- processing learning resources (note-taking, summarising, reviewing, writing

an abstract);

- video method (remote, multimedia, web-based, etc.);
- self-study (completing assignments);
- individual research work;
- other types.

7. Assessment methods:

- exam;
- oral or written assessment;
- module tests;
- team projects;
- essays and reports;
- presentation of laboratory and practical works;
- presentations at academic events
- other types.

8. Distribution of points received by students

The assessment of students' knowledge and skills is conducted by means of a 100-point scale and is converted into national grades according to Table 1 of the current *Exam and Credit Regulations at NULES of Ukraine*.

Student's rating, points	National grading of exams and credits	
	exams	credits
90-100	excellent	pass
74-89	good	
60-73	satisfactorily	
0-59	unsatisfactorily	fail

To determine a student's rating in the discipline R_{DIS} (up to 100 points), the received assessment rating R_A (up to 30 points) is added to the academic performance rating R_{AP} (up to 70 points): $R_{DIS} = R_{AP} + R_A$.

9. Teaching and learning aids

- e-learning course of the discipline
(<https://elearn.nubip.edu.ua/course/view.php?id=3629>);
- lectures and presentations (in electronic form);
- textbooks, manuals, tutorials;
- guidelines for studying a discipline by full-time and part-time students;

10. Recommended sources of information

Technology and methodological requirements

1. Chambers, C., Holliday A.K. Modern Inorganic Chemistry - 459 P.
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, 2023. – 164 pp.
3. Workbook for specialist' student in veterinary medicine. Subject Bio-Inorganic chemistry and examples of tests (part I). –NUBIP Publish., 2020. – 120 pp.
4. Workbook for specialist' student in veterinary medicine. Subject Bio-Inorganic chemistry and examples of tests (part II). –NUBIP Publish., 2020. – 100 pp.

Required and recommended literature

1. General and Inorganic Chemistry : textbook / V.O. Kalibabchuk, V.V. Ohurtsov, V.I. Halynska et al.; edited by V.O. Kalibabchuk. — Kyiv : AUS Medicine Publishing, 2019. — 456 p.
2. Introduction in General, Organic and [Biochemistry](#), 7th Edition, by Morris Hein, Leo R. Best, Scott Pattison and Susan Arena, Brooks/Cole Publishing Co., 2021, 872 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.
2. Fenyés, Maria. Applied Chemistry Chemistry 101 Laboratory Manual: Los Angeles Mission College. – 191 p. Available at: <https://mymission.lamission.edu/userdata%5Cpaziras%5CChem101%5CLabManual.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
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. Introduction to inorganic chemistry: <https://bit.ly/3IAEddt> ;
2. Khan Academy about Chemical Reactions: <https://bit.ly/3IDtn6u>
3. Analytical chemistry. Laboratory Manual: <bit.ly/3QeFM5E>
4. Virtual lab for Chemistry <https://chemcollective.org/vlabs>
5. Units convertor - <http://www.webqc.org/unitconverters.php>
6. pH calculator - <https://www.omnicalculator.com/chemistry/ph> ;
7. Sigma-Aldrich reagents - <https://www.sigmaaldrich.com/>