



Лектор курсу Лаврик Р.В.
Контактна інформація
лектора (e-mail)

Сторінка курсу в eLearn

СИЛАБУС ДИСЦИПЛІНИ "GENERAL AND INORGANIC CHEMISTRY"

Ступінь вищої освіти - Бакалавр

Спеціальність Біотехнології та біоінженерія

Освітня програма « «Бакалавр» (денної форми навчання) »

Рік навчання 1 , семестр 1

Форма навчання денна (денна, заочна)

Кількість кредитів ЄКТС 6

Мова викладання англійська (українська, англійська, німецька)

 Лаврик Р.В.

 ruslan_lav@ukr.net

<https://elearn.nubip.edu.ua/course/view.php?id=1201>

ОПИС ДИСЦИПЛІНИ

(до 1000 друкованих знаків)

The natural sciences fall into two general categories – the biological sciences and the physical ones. The biological sciences are concerned primarily with the living things, and the physical sciences are concerned primarily with nonliving things, including rocks, the stars, electricity, the weather, energy from the sun, and the composition of all materials. Chemistry is a physical science.

In general, **Chemistry** is the study of the composition, structure, and the properties of substances and the changes they undergo. This definition may suggest to you that chemistry has little to do with everyday life. This is not true. Your way of life would be radically different without the practical applications of chemistry. Imagine a supermarket offering only fruits and vegetables grown without manufactured fertilizers and pesticides. The quantities and varieties offered would be far fewer. Imagine drinking water from your tap that had not been purified. The unpurified water would probably make you sick. Try to imagine a world without gasoline or heating oil. It would be very different from the world we live in.

Chemistry is a very broad subject. Most chemists would describe themselves as working in one of the following major areas of the science:

Organic chemistry - the study of substances containing carbon and hydrogen, and their derivatives;

Inorganic chemistry – the study of all substances not classified as organic chemicals, which includes the chemistry of all substances containing elements other than organic carbon;

Physical chemistry – the study of the properties, transformations, and interrelationships of energy and matter;

Biochemistry – the study of all substances and processes that occur in living things;

Analytical chemistry – the identification of substances and the qualitative and quantitative determination of the composition of materials.

A relative new direction of inorganic chemistry is *Bioinorganic chemistry*. Advances in bioinorganic chemistry since the 1970s have been driven by three factors: rapid determination of high-resolution structures of proteins and other bio-molecules, utilization of powerful spectroscopic tools for studies of both structures and dynamics, and the widespread use of macromolecular engineering to create new biologically relevant structures. Today, very large molecules can be

manipulated at will, with the result that certain proteins and nucleic acids themselves have become versatile model systems for elucidating biological function.

Oxidation-reduction processes continue to be a central theme of biological inorganic chemistry. Well over half of the papers in this special feature deal with biological red-ox reactions in one way or another.

So, to study a course of bioinorganic chemistry is to understand the basic principles of acid-base processes, reactions in the water medium (dissociation, hydrolysis), red-ox reactions, complexing reactions and so on.

СТРУКТУРА КУРСУ

Тема	Години (лекції/ лабораторні роб.)	Результати навчання	Завдання	Оцінювання
1 семестр				
Модуль 1				
Lecture # 1. Introduction to Chemistry & the Nature of Science	2/4	What is necessary to know, What one should be able to do, What one should be concerned in: The natural sciences fall into two general categories – the biological sciences and the physical ones. The biological sciences are concerned primarily with the living things, and the physical sciences are concerned primarily with nonliving things, including rocks, the stars, electricity, the weather, energy from the sun, and the composition of all materials. Chemistry is a physical science.	LABORATORY TRAINING № 1. CHEMICAL NAMES AND FORMULAS. OXIDATION NUMBERS. GENERAL NOTIONS OF ATOMIC-MOLECULAR STUDY	-Control of lab works preparation ; - Theoretical control tests; -Control experimental problems;
Lecture # 2. The Structure of the Atom	2/4	What is necessary to know, What one should be	Laboratory Training #2	-Control of lab works preparation ;

		able to do, What one should be concerned in: The Structure of the Atom	CLASSIFICATION OF INORGANIC SUBSTANCES. TYPES OF THE CHEMICAL REACTIONS	- Theoretical control tests; -Control experimental problems;
Lecture # 3. The Organization of the Elements	2/4	What is necessary to know , What one should be able to do, What one should be concerned in: With all of the compounds of all of the elements to be identified, systematic methods for writing formulas and naming compounds are necessary. In this section you will be introduced to the rules that apply to simple chemical compounds.	LABORATORY TRAINING № 3. ATOMIC STRUCTURE. CHEMICAL BONDING -Theoretical control tests	-Control of lab works preparation ; - Theoretical control tests; -Control experimental problems;
Модуль 2				
Lecture # 4. The main classes of inorganic compounds	2/4	What is necessary to know , What one should be able to do, What one should be concerned in:	LABORATORY TRAINING № 4. REACTIONS IN AQUEOUS SOLUTIONS - control tests	-Control of lab works preparation ; - Theoretical control tests; -Control experimental problems;
Lecture # 5. Types of Chemical Bonds	2/4	What is necessary to know , What one should be able to do, What one should be concerned in: Types of	LABORATORY TRAINING № 5. Hydrolysis of salts	-Control of lab works preparation ; - Theoretical control tests;

		Chemical Bonds		-Control experimental problems;
Lecture # 6. General Properties of Aqueous Solutions	2/4	What is necessary to know , What one should be able to do, What one should be concerned in: General Properties of Aqueous Solutions	LABORATORY TRAINING № 6. Complex compounds - control tests	-Control of lab works preparation ; - Theoretical control tests; -Control experimental problems;
Lecture # 7. Chemical equilibrium	2/4	What is necessary to know , What one should be able to do, What one should be concerned in: Chemical equilibrium	LABORATORY TRAINING № 7. Chemical equilibrium- control tests	-Control of lab works preparation ; - Theoretical control tests; -Control experimental problems;
• Модуль 3				
Lecture # 8. Arrhenius's classification of compounds. Features of reactions in aqueous solutions	2/4	What is necessary to know , What one should be able to do, What one should be concerned in: Arrhenius's classification of compounds. Features of reactions in aqueous solutions	LABORATORY TRAINING № 8. OXIDATION-REDUCTION REACTIONS SKILL-DEVELOPING EXERCISES	-Control of lab works preparation ; - Theoretical control tests; -Control experimental problems;
Lecture # 9. Hydrolysis of salts	2/4	What is necessary to know , What one should be able to do, What one should be	LABORATORY TRAINING № 9. VII-A group of chemical elements The Halogens- control tests	-Control of lab works preparation ; - Theoretical control

		concerned in: Hydrolysis		tests; -Control experimental problems;
Lecture # 10. Oxidation-reduction reactions	2/4	What is necessary to know , What one should be able to do, What one should be concerned in: Oxidation-reduction reactions	- control tests LABORATORY TRAINING. RED -OX Reactions.	-Control of lab works preparation ; - Theoretical control tests; -Control experimental problems;
Lecture # 11. Coordination compound	2/4	What is necessary to know , What one should be able to do, What one should be concerned in: Coordination CHEMISTRY	- control tests LABORATORY TRAINING. Coordination CHEMISTRY	-Control of lab works preparation ; - Theoretical control tests; -Control experimental problems;
• Модуль 4				
Lecture # 12. Halogens	4/4	What is necessary to know , What one should be able to do, What one should be concerned in: Halogens	- control tests LABORATORY TRAINING. Property of Halogens	-Control of lab works preparation ; - Theoretical control tests; -Control experimental problems;
Lecture # 13. Chalcogens	4/4	What is necessary to know , What one should be able to do, What one should be concerned in: Chalcogens	LABORATORY TRAINING. Chalcogens	-Control of lab works preparation ; - Theoretical control tests;

				-Control experimental problems;
Lecture # 14. VA group of elements	4/6	What is necessary to know , What one should be able to do, What one should be concerned in:	- control tests LABORATORY TRAINING. VA group of elements	-Control of lab works preparation ; - Theoretical control tests; -Control experimental problems;
Lecture # 15. IVA group of elements	3/6	What is necessary to know , What one should be able to do, What one should be concerned in:	LABORATORY TRAINING. IVA group of elements	-Control of lab works preparation ; - Theoretical control tests; -Control experimental problems;
Lecture # 16. Chemistry of iron	4/6	What is necessary to know , What one should be able to do, What one should be concerned in: Chemistry of iron	- control tests LABORATORY TRAINING. Chemistry of iron	-Control of lab works preparation ; - Theoretical control tests; -Control experimental problems;
Lecture # 17. Alkali and Alkaline Earths Metals	4/5	What is necessary to know , What one should be able to do, What one should be concerned in: Alkali and Alkaline Earths Metals	- control tests LABORATORY TRAINING. Chemistry of iron and Alkaline Earths Metals	-Control of lab works preparation ; - Theoretical control tests; -Control experiment

				al problems;
Total	45/75			
Practice	30			70/30
Всього за 1 семестр				70
Екзамен				30
Всього за курс				100

ПОЛІТИКА ОЦІНЮВАННЯ

<i>Політика щодо дедлайнів та перескладання:</i>	Роботи, які здаються із порушенням термінів без поважних причин, оцінюються на нижчу оцінку. Перескладання модулів відбувається із дозволу лектора за наявності поважних причин (наприклад, лікарняний або довідка з деканату).
<i>Політика щодо академічної доброчесності:</i>	Списування під час контрольних робіт та екзаменів заборонені (в т.ч. із використанням мобільних девайсів). Курсові роботи, реферати повинні мати коректні текстові посилання на використану літературу
<i>Політика щодо відвідування:</i>	Відвідування занять є обов'язковим. За об'єктивних причин (наприклад, хвороба, міжнародне стажування) навчання може відбуватись індивідуально (в он-лайн формі за документальним погодженням із деканом факультету)

ШКАЛА ОЦІНЮВАННЯ СТУДЕНТІВ

Рейтинг здобувача вищої освіти, бали	Оцінка національна за результати складання екзаменів заліків	
	екзаменів	заліків
90-100	відмінно	зараховано
74-89	добре	
60-73	задовільно	
0-59	незадовільно	не зараховано