

MINISTRY OF HIGHER AND SECONDARY SPECIAL
EDUCATION OF THE REPUBLIC OF UZBEKISTAN
CHIRCHIK STATE PEDAGOGICAL UNIVERSITY



Field of knowledge 100 000 - Pedagogy
Field of education: 110 000 - Pedagogy
Direction of education: 60110800 - Chemistry (day department)

Code and name of the specialty:	Chem 1226
Academic year:	2022/2023
Semester :	I/2
Department :	Scientific and Methodological Chemistry
Dedicated hours:	360
Credit ECTS:	6/6
Subject:	required
E-mail / phone:	chdipi@mail.uz / (70)-712-27-55
Business hours:	Based on the approved schedule of the department
Hours distribution	
Semestr	
	I
Total teaching load	180
Total classroom hours	90
Theoretical (lecture)	30
Practical	-
Seminar	-
Laboratory training	60
Independent work	90

The working curriculum for the discipline was approved by the Academic Council of the Chirchik State Pedagogical University (CSPU), protocol No. ____ from " ____ " ____ 2022.

Compiled by:

N.M. Kutlimuradov
D.A. Eshtursunov

Art. Rev. Department "Chemistry" CSPU
Art. Rev. Department "Chemistry" CSPU

Reviewers:

D.Zh. Bekchanov

Doctor of Chemical Sciences, associate professor of the department chemistry of polymers NUUz.

O.Yu. Iskandarov

Head of the Department of Methods of Teaching Chemistry, Tashkent State Pedagogical University named after Nizami

This Work Program was discussed and recommended for approval at the meeting of the Educational and Methodological Council of the Faculty of Physics and Chemistry, Protocol No. ____ dated ____ 2022.

Dean of the Faculty



I.G. Tursunov

This Work Program was discussed and approved at a meeting of the Department of Scientific and Methodological Chemistry of the Faculty of Physics and Chemistry of the Chirchik State Pedagogical University, protocol No. ____ dated ____ 2022.

Head of the department



Ph.D., M.M. Juraev

15. Toshpolatov Yu.T., Maksmatullaev NG, Iskandarov A.Yu. Solving problems in inorganic chemistry. Tashkent-2003.

16. Parpiev NA, Muftaxov AG, Raksimov XR Inorganic chemistry. Tashkent: Uzbekistan. -2003.

17. Umarov B. Organic chemistry / Tashkent. - Economics - finance. - 2007. - 398

Websites

18. www.gov.uz - Government portal of the Republic of Uzbekistan.

19. www.lex.uz - National database of legislation of the Republic of Uzbekistan.

20. www.tdpu.uz - portal of TDPU named after Nizami.

21. www.Ziynet.uz

22. www.edu.uz

23. tdpu-INTRANET.Ped.

24. www.chemistry.ru

25. www.labchem.ru

7. Basic and additional educational literature and sources of information.

Main literature

1. Bozorov N.I., General chemistry. Tashkent: Sparks of Literature. 2017 Nov.
2. Parpiev N.A., Raksimov Kh.R., Muftaksov A.G. Theoretical foundations of inorganic chemistry. Tashkent: Uzbekistan. 2000 year
3. K. Aksmerov, A. Jalilov, R. Sayfutdinov. General and inorganic chemistry. Tashkent: Uzbekistan. 2003 r.
4. Toshpulatov Yu.T., Ishokov Sh.S. Inorganic chemistry. Tashkent: Teacher. 1992 year
5. Yoriev O.M. and b. A set of tasks and exercises in general and inorganic chemistry. Tashkent: 2008.
6. E. Kodirov, A. Muftaksov, Sh. Norov. Practical lessons in inorganic chemistry. Tashkent: Uzbekistan, 1996.
7. Sobirov Z. Organic chemistry. Tashkent: Communicator. 2005 year

Additional literature

8. Mirziyoyev Sh. M. Together we will build a free and prosperous democratic state of Uzbekistan. Speech at a joint meeting of the chambers of the Oliy Majlis, dedicated to the inauguration of the President of the Republic of Uzbekistan / Sh.M. Mirziyoyev. - Tashkent: Uzbekistan, 2016. -- 56 p.
9. Mirziyoyev Sh.M. . Critical analysis, strict discipline and personal responsibility should be the daily rule of the activity of every leader. Report of the enlarged meeting of the Cabinet of Ministers on the main results of the country's socio-economic development in 2016 and the most important priorities of the economic program for 2017, January 14, 2017 / Sh.M. Mirziyoyev. - Tashkent: Uzbekistan, 2017. -- 104 p.
10. Mirziyoyev Sh. M. The rule of law and protection of human interests are the key to the development of the country and the well-being of people. Speech at a ceremony dedicated to the 24th anniversary of the adoption of the Constitution of the Republic of Uzbekistan. December 7, 2016 / Sh.M. Mirziyoyev. - Tashkent: "Uzbekistan", 2017. - 48 p.
11. Mirziyoyev Sh.M. Together with our brave and noble people, we will build our great future. The book presents the speeches of the President of the Republic of Uzbekistan. Shavkat Mirziyoyev at pre-election meetings with voters of the Republic of Karakalpakstan, regions and the city of Tashkent from November 1 to 24, 2016. / Sh.M. Mirziyoyev. - Tashkent: "Uzbekistan", 2017. - 488 p.
12. DECREE OF THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN. On the strategy for the further development of the Republic of Uzbekistan... (Legislation of the Republic of Uzbekistan
Collection, 2017, No. 6, article 70)
13. Raymond Chang. General Chemistry: Basic Concepts, 5th Edition, McGraw-Hill Education; England 2013.
- FOURTEEN. V.Yu. Gankin, Yu.V. Gankin. General chemistry. Institute for Theoretical Chemistry, Boston, USA, 2012

Subject / Module Code Chem 1226	Academic year 2022-2023	Semester 1-2	ECTS credits 6	
Subject / Module Code Mandatory	Type of training Russian		Lesson hours per week 3	
1.	Item name	Classroom lessons (watch)	Self-education (watch)	General study load (watch)
	General and inorganic chemistry	180	180	360
2.	Subject content The purpose of teaching the subject - Undergraduate students study concepts, laws of general and inorganic chemistry, types of chemical reactions, atomic structure, periodic table of elements, classes of inorganic compounds, chemical kinetics and chemical equilibrium, direction and energy of chemical reactions, chemical bonds and structure of matter, water, its general properties, dispersed systems, solutions and processes in them, electrochemical processes, chemistry of metals, non-metals, chemistry and environmental protection are widely described and presented. The main objective of the subject is to form and educate a new generation of chemists in the republic, teaching students a course in chemistry based on an integrated innovative approach and giving deep knowledge.			
3.	Basic theoretical part (lectures) Lecture topics 1 semester			
1.	Introduction. Chemistry subject. Foundations of atomic-molecular theory.			2
2.	Basic laws of stoichiometry.			2
3.	Periodic law of D.I. Mendeleev and the periodic table of elements.			2
4.	The theory of the structure of the atom. Atomic nucleus.			2
5.	Chemical bond and molecular structure.			2
6.	The most important classes of inorganic compounds and the relationship between them			2
7.	Disperse systems. Solutions. Types of solutions.			2
8.	Electrolyte solutions. Properties of solutions of non-electrolyte substances. Hydrogen exponent.			2
9.	Salt hydrolysis. Solubility product. Salt effect.			2.
10.	Chemical kinetics and chemical equilibrium.			2

11.	Chemical energy and direction of reactions.	2
12.	Acid-base theory. Hard and soft acid-base theory.	2
13.	Redox reactions and their types.	2
14.	Fundamentals of Electrochemistry. Galvanic cells. Electrolysis. Electrolysis laws.	2
15.	Fundamentals of Organic Chemistry. Organic compounds.	2
	General: 30 hours	
16.	General properties of elements and their basic connections. s-, p-, d-, f-elements.	2
17.	Chemistry of non-metals. Chemistry of the elements of the carbon group.	2
18.	General description of the elements of group V (XV) of the nitrogen group.	2
19.	General description of the main elements of group VI (XVI)	
20.	General description of the main elements of group VII (XVII)	2
21.	General properties of metals. Method of obtaining and application	2
22.	General description of the main group elements of the first group.	2
23.	The second group is a general description of the main elements of the group.	2
24.	d- elements. General description of the additional elements of the group. Elements of the scandium, titanium and vanadium group and their compounds.	2
25.	General description of the elements of group I B.	2
26.	General description of the elements of the zinc group	2
27.	General description of the elements of the chromium group.	2
28.	General description of the elements of the manganese group.	2
29.	General description of the elements of the iron group.	2
30.	... f - elements. Inorganic chemistry and ecology.	2
	General: 30 hours	
4.	Lab Topics	Volume, academic hour
	I semester	
1.	Technical safety rules in a chemical laboratory. Rules to be followed by students in a chemical laboratory. Rules for working with chemical containers, tools, equipment and scales.	4
2.	Basic laboratory methods: grinding, melting, heating, evaporation, filtration, recrystallization, sublimation, driving techniques.	4

	say, not knowing.	Assessment types	Transfer time
		Intermediate control	
		The midterm exam is based on the answer to written work or test questions (the lecture is taken by the teacher).	8-15 weeks
		Final control	
		Written work, test or closed test The form of the final control is coordinated with the faculty council and approved by the order of the rector.	16-18 weeks

34.	Applications and important compounds Se, Te and Po.	2
35.	Applications and important compounds Br, I and At.	2
36.	Problems and prospects of inorganic chemistry	2
37.	Scientific research in the field of inorganic chemistry in the world.	2
38.	Schemes of industrial enterprises for the extraction and production of inorganic compounds in Uzbekistan and the classification of the reactions carried out in them.	2
39.	Directions of study and the level of coverage of "general and inorganic" chemistry in schools and academic lyceums.	2
	General: 90 hours	

Self-directed learning consists of lectures and laboratory sessions that students learn on their own. Self-directed learning helps to strengthen the theoretical knowledge of students, broaden their horizons, develop their ability to understand and assimilate topics.

Students prepare abstracts on independently mastered topics and organize their presentations.

Coursework in science is not planned.

6. Assessment of students' knowledge in the field of natural sciences and control criteria

Assessment methods	Rapid tests, written work, oral questions, presentations
Criteria for evaluation	5 "excellent" ratings - general and inorganic chemistry, conclusions and solutions; creative thinking; independent supervision; practical use; understanding the essence; know, tell; have an idea. 4 ratings "good" - Independent supervision in general and inorganic chemistry; practical use; understanding the essence; know, tell; have an idea. 3 ratings "satisfactory" - to understand the essence of general and inorganic chemistry; know, tell; have an idea. 2 ratings "unsatisfactory" - to understand the essence of general and inorganic chemistry; not knowing, not having a clear idea of what to

3.	Experiments to determine metal equivalents.	4
4.	Work with gaseous substances. Experiments on gassing reactions.	4
5.	Experiments on the preparation and general properties of oxides and acids	4
6.	Experiments on the preparation and general properties of bases and salts.	4
7.	Experiments on the preparation of solutions of substances of a certain concentration.	4
8.	Experiments on the effect of temperature on the solubility of salts.	4
9.	Experiments to determine the percentage, molar, normal and molar concentrations of acidic and alkaline solutions.	6
10.	Experiments on the reactions of ion exchange and hydrolysis of salts.	4
11.	Chemical experiments with factors affecting the rate of a chemical reaction.	6
12.	Experiments on redox reactions.	4
13.	Chemical Equilibrium Experiments.	4
14.	Experiments on electrolysis.	4
15.	Experiments related to the plate	4
	General: 60 hours	
	II semester	
16.	To study the interaction of elements of the s, p, d, f family of the periodic table with water, acids (concentrated and diluted), alkalis and organic compounds.	4
17.	Experiments on the preparation and properties of hydrides, oxides, acids and salts of carbon and silicon.	4
18.	Experiments on the preparation and properties of hydrides, oxides, acids and salts of nitrogen and phosphorus.	4
19.	Experiments on the preparation of Group IV elements, oxides, hydrides, acids and salts and their properties.	4
20.	Experiments on the preparation of Group VII elements, oxides, hydrides, acids and salts and their properties.	4
21.	Experiments with a series of metal stresses. Experiments with metal oxides and hydroxides.	4
22.	Experiments on the chemical properties of alkali metals	4
23.	Experiments on the chemical properties of alkaline earth metals	4

24.	Experiments on the chemical properties of Group IB metals.	4
25.	Experiments on the chemical properties of Group II B metals.	4
26.	Experiments on the chemical properties of Group III and IV B metals	4
27.	Experiments on compounds of chromium	4
28.	Experiments on compounds of manganese	4
29.	Experiments on compounds of iron, cobalt and nickel	4
30.	Isolation of metal ions from artificial solutions during the operation of ion exchangers, as well as determination of the content of metal ions in solution using a UV spectrophotometer.	4
General: 60 hours		
When conducting laboratory classes, the goal is clearly defined, students are interested in the possibility of deepening the teacher's knowledge of innovative pedagogical activities, the student is given the opportunity to achieve results on his own, laboratory classes are a clear topic. from.		
5.	Self-study topics	Volume, academic hour
	I semester	
1.	History of General Chemistry	2
2.	The history of the discovery of stoichiometric laws	2
3.	Determination of molecular weights of gaseous substances	2
4.	The reality of atoms and molecules	2
5.	Nuclear theory of the structure of the atom by E. Rutherford	4
6.	E. Schrödinger's equation	2
7.	The concept of kinetics	2
8.	Finnes and Soddy's Law	2
9.	The use of nuclear energy	2
10.	Single, double and multiple links	2
11.	Van der Waals forces between molecules	2

12.	Molecular orbital method	2
13.	The structure of the water molecule, the chemical properties of water, water purification.	2
14.	Vapor pressure of solutions. Raoult's and Henry's Law	4
15.	Dilution law	2
16.	Arrhenius and the theory of decision systems	4
17.	Semi-reaction method	2
18.	Garcia and Garashenko method	2
19.	Batteries and fuel cells	2
20.	Hydrides, sulfides, oxides,	2
21.	Scopes of metals.	2
22.	Applications and important compounds Rb, Cs and Fr	4
23.	Applications and important compounds Be, Sr and Ra	4
24.	Applications and important compounds of Sv, Y and lanthanides	4
25.	Areas of application and the most important compounds of actinides.	2
26.	Applications and important compounds of Ti, Zr and Hf.	2
27.	Applications and important compounds V, Nb and Ta.	2
28.	Applications and important compounds Mo, W, TC and Re.	2
29.	Applications and important compounds of Ru, Rh, Pd, Ir and Pt.	2
30.	Extraction and properties of inert gases. Their important connections and applications.	2
31.	Applications and important compounds of Ga, In and Tl.	2
32.	Applications and important compounds of Ge, Sn and Pb.	2
33.	Applications and important compounds As, Sb and Bi.	2