The thematic plan of seminar-type classes in the discipline "General pharmaceutical chemistry" for students enrolled in 2023 according to the educational program 33.05.01 Pharmacy, Pharmacy profile (specialty), the form of study is full-time for the 2024 – 2025 academic year

N⁰	Thematic blocks	Hours
		(academic)
	4 term	l
1.	Safety precautions when working in the laboratory of pharmaceutical chemistry. Verification of residual knowledge ¹ .	2
	Fundamentals of legislation ¹ . Terminology in pharmaceutical chemistry, nomenclature. Methodological foundations of the classification of medicines. Classification of medicines ² .	2
	Medicinal products of plant, animal, and microbial origin ¹ .	2
Ζ.	Medicinal products of mineral and synthetic origin ² .	2
3.	The reasons for the creation of new medicines ¹ . The main stages of research and development of medicines. International standards ² .	2
	Search and design of medicinal substances-leaders ² .	2
4.	Computer modeling as a method of designing medicines. Targeted design of new $drugs^1$.	2
	The construction of new molecular structures with specified properties – drug design ² .	2
5.	The procedure and features of intra-pharmacy quality control of medicines ¹ . Professional and official requirements for the pharmacist-analyst of the pharmacy ² .	2
	Equipment for the control and analytical room (table) ¹ . Nomenclature of titrated solutions, reagents, indicators ² .	2
6.	Pharmaceutical analysis ¹ . Features of pharmaceutical analysis. Classification of the method. Analysis criteria ² .	2
	Pharmaceutical analysis ¹ . The types of activities carried out during the pharmaceutical analysis ² .	2
7.	Chemical methods of pharmacopoeial analysis – Identification of inorganic drugs ¹ .	2
	Identification of cations of drugs of inorganic nature ² .	2
8.	Chemical methods of pharmacopoeial analysis – Identification of inorganic drugs ¹ .	2
	Identification of anions of medicinal products of inorganic	2

	nature ² .	
9.	Solving test problems.	2
	Control of knowledge, abilities, skills in thematic blocks 1-8.	2
	Chemical methods of pharmacopoeial analysis – identification	
	of drugs of organic nature (identification of functional	2
10.	groups) ¹ .	
	Identification of the primary aromatic group. Identification of	r
	the aromatic nitro group ² .	L
	Chemical methods of pharmacopoeial analysis – identification	
	of drugs of organic nature (identification of functional	2
11.	groups) ¹ .	
	Identification of the hydroxyl group. Identification of	2
	aldehyde and ketogroups ² .	2
	Chemical methods of pharmacopoeial analysis – identification	_
12.	of drugs of organic nature (identification of functional	2
	groups) ¹ .	-
	Identification of carboxyl, ester and amide groups ² .	2
	Chemical methods of pharmacopoeial analysis – identification	2
13.	of drugs of organic nature (identification of functional	2
	groups) ² .	2
	Identification of organoelement drugs ² .	2
14.	Sources and causes of poor quality of medicines ² .	2
	Impurities of inorganic ions ² .	Z
	properties ¹ Impurities ²	2
15.	Impurities of inorganic ions ¹ Impurities of heavy metals	
	Arsonic impurities ²	2
	Arsenic impurities . Research work Determining the purity of "Purified water" ¹	2
16.	Determination of impurities in service water ²	2
	Solving test problems	2
17	Control of knowledge abilities skills in thematic blocks 10-	
17.	16	2
	Control of the level of formation of practical skills and	
1.0	abilities.	2
18.	Control of the level of formation of practical skills and	2
	abilities.	2
	5 term	
1.	Safety precautions when working in the laboratory of	
	pharmaceutical chemistry. Verification of residual	2
	knowledge ¹ .	
	Chemical methods of drug analysis ¹ . Quantitative analysis.	2
	Classification of methods. Analysis criteria ² .	Δ.
2.	Chemical methods of pharmacopoeial analysis - quantitative	2
	assessment of medicines ¹ . Classification of methods.	

	Quantitative assessment of medicines. Gravimetry ² .	2
3.	Solving situational and computational problems.	2
	Solving situational and computational problems.	2
4.	Chemical methods of pharmacopoeial analysis – quantitative assessment of medicines ¹ . Titrimetric methods of analysis. Classification. Requirements. Methods of titration ² .	2
	Preparation of titrated solutions by accurately weighed quantity and by Fixanal. Determination of the titre of the working solution. Equivalence point. Calculations ² .	2
5.	Preparation of titrated solutions by accurately weighed quantity and by Fixanal. Determination of the titre of the working solution. Equivalence point. Calculations ² .	2
	Determination of organic acids and bases ¹ . Non-aqueous titration ² .	2
6.	Precipitation titration ¹ . Argentometry. Mohr's method ² .	2
	Precipitation titration ¹ . Argentometry. Folgard and Fayans methods ² .	2
7.	Chemical methods of pharmacopoeial analysis – precipitation titration ¹ .	2
	Mercurometry ¹ . Titration conditions, working solution, indicator. Advantages and disadvantages of the method ² .	2
8.	Chemical methods of pharmacopoeial analysis - quantification of drugs. Complexonometry ¹ . Chemistry ² .	2
	Complexonometry ¹ . Working solutions. Fixing the point of equivalence ² .	2
9.	Solving test problems.	2
	Control of knowledge, abilities, skills in thematic blocks 1-8.	2
10.	Chemical methods of pharmacopoeial analysis – quantitative assessment of medicines ¹ .	2
	Redox titration ¹ . Permanganatometry. Titration conditions, working solution, indicator. Advantages and disadvantages of the method ² .	2
11.	Chemical methods of pharmacopoeial analysis – quantitative assessment of medicines ¹ . Redox titration ² .	2
	Cerimetry. Bichromatometry ¹ . Titration conditions, working solution, indicator. Advantages and disadvantages of the method ² .	2
12.	Chemical methods of pharmacopoeial analysis – quantitative assessment of medicines ¹ . Redox titration ² .	2
	Bromatometry ¹ . Titration conditions, working solution, indicator. Advantages and disadvantages of the method ² .	2
13.	Chemical methods of pharmacopoeial analysis – quantitative assessment of medicines ¹ . Redox titration ² .	2
	Iodometry ¹ . Titration conditions, working solution, indicator.	2

	Advantages and disadvantages of the method ² .	
14.	Chemical methods of pharmacopoeial analysis – quantitative	2
	assessment of medicines ¹ . Redox titration ² .	Δ
	Iodochlorometry ¹ . Titration conditions, working solution, indicator. Advantages and disadvantages of the method ² .	2
15.	Chemical methods of pharmacopoeial analysis – quantitative assessment of medicines ¹ . Redox titration ² .	2
	Nitritometry ¹ . Titration conditions, working solution, indicator. Advantages and disadvantages of the method ² .	2
16.	Elemental analysis ¹ . Characteristics, methods of decomposition of substances. Method of combustion in a flask with oxygen ² .	2
	Determination of nitrogen in organic compounds ¹ . Kjeldahl method ² .	2
17.	Solving test problems.	2
	Control of knowledge, abilities, skills in thematic blocks 10- 16.	2
18.	Control of the level of formation of practical skills and abilities.	2
	Control of the level of formation of practical skills and abilities.	2
	6 term	
1.	Safety precautions when working in the laboratory of pharmaceutical chemistry. Verification of residual knowledge ¹ .	1
	System for quality assurance of medicines ¹ . Standardization of medicines. Validation ² .	1
2.	Basic concepts of metrology ¹ .	1
	Metrological characteristics of the analysis results. Statistical processing of results ² .	1
3.	Quality control of medicines at all stages of drug production ¹ . GMP system ² .	1
	GMP system ¹ . Basic principles and provisions ² .	1
4.	Quality control of medicines in pharmacies at all stages of product manufacturing and distribution ¹ . Intra-pharmacy control ² .	1
	Intra-apical control ¹ . Types of intra-pharmacy control. The procedure and features of intra-pharmacy quality control of	1
	medicines ² .	
5.	medicines ² . Incompatible combinations of medicines ¹ .	1
5.	medicines ² . Incompatible combinations of medicines ¹ . Types of incompatibilities of medicines. Ways to overcome incompatible combinations of medicines ² .	1
5. 6.	 medicines². Incompatible combinations of medicines¹. Types of incompatibilities of medicines. Ways to overcome incompatible combinations of medicines². Stability of medicines¹. 	1 1 1

	Stability and shelf life of medicines ² .	1
7.	Solving test problems.	1
	Control of knowledge, abilities, skills in thematic blocks 1-6.	1
8.	Viruses. Classification. Life cycle ¹ .	1
	Features of chemotherapy for viral infections. Targets for antiviral agents ² .	1
9.	HIV ¹ . Structure, pathology. General pharmaceutical analysis of drugs for the treatment of HIV infection ² .	1
	Attachment and fusion inhibitors: maraviroc, enfuvirtide ¹ . Pharmacokinetic enhancers: cobicistat, ritonavir ² .	1
10.	General pharmaceutical analysis of drugs for the treatment of HIV infection ¹ . Reverse transcriptase inhibitors ² .	1
	Reverse transcriptase inhibitors (nucleoside analogues): zidovudine, stavudine, zalcitabine, didanosine, abacavir. Nonnucleoside reverse transcriptase inhibitors: efavirenz, delavirdine ² .	1
11.	General pharmaceutical analysis of drugs for the treatment of HIV infection ¹ . Protease inhibitors: saquinavir, indinavir, ritonavir ² .	1
	General pharmaceutical analysis of drugs for the treatment of HIV infection ¹ . Integrase inhibitors: raltegravir, dolutegravir, elvitegravir ² .	1
12.	Influenza virus ¹ . Peculiarities of structure. Pathology. Neuraminidase inhibitors. General pharmaceutical analysis of anti-influenza drugs: oseltamivir, zanamivir ² .	1
	General pharmaceutical analysis of anti-influenza drugs: amantadine, remantadine, favipiravir ² .	1
13.	Coronavirus ¹ . Structure, pathology ² .	1
	General pharmaceutical analysis of anticoronavirus drugs: remdisivir, halidesivir, and molnupiravir ² .	1
14.	Hepatitis B virus ¹ . Structure, pathology ² .	1
	General pharmaceutical analysis of anti-hepatitis B drugs: ribavirin, lamivudine ² .	1
15.	Hepatitis C virus ¹ . Structure, pathology ² .	1
	General pharmaceutical analysis of anti-hepatitis C drugs: sofosbuvir, daclatasvir, ledipasvir, velpatasvir ² .	1
16.	Viruses of the family Herpesviridae ¹ . Structure, pathology ² .	1
	General pharmaceutical analysis of anti-herpetic agents: iodoxuridine, acyclovir, valacyclovir, vidarabine, flacoside, chelepin D, poludan ² .	1
17.	Cytomegalovirus ¹ . General pharmaceutical analysis of anticytomegalovirus drugs: ganciclovir, foscarnet ² .	1
	General pharmaceutical analysis of anticytomegalovirus	1

	drugs: letermovir, maribavir ² .	
18.	Solving test problems.	1
	Control of knowledge, abilities, skills in thematic blocks 8-17.	1
	Intermediate certification	36
	Total	216
1 0 1		

¹ - Subject
² - Essential content

Reviewed at the meeting of the department of Pharmaceutical and Toxicological Chemistry, Pharmacognosy and Botany on «28» august, 2024, protocol № 1.

Head of the Department

AMP

A. Ozerov