Thematic plan of seminar-type classes
in discipline « General pharmaceutical chemistry »
for students of 2024 year of admission
under the educational programme
33.05.01 Pharmacy,
specialisation (profile) Pharmacy
(Specialist's degree),
form of study full-time
for the 2025-2026 academic year

№	Thematic blocks	Practical training in the framework of the thematic block[3]	Hours (academic)[4]
	4 term		
1.	Safety precautions when working in the pharmaceutical chemistry laboratory. Verification of residual knowledge[1]. Fundamentals of legislation. Terminology in pharmaceutical chemistry, nomenclature. Methodological foundations of the classification of medicines. Classification of medicinal products[2].	-	4
2.	Medicinal products of various origins[1]. Medicinal products of plant, animal, and microbial origin. Medicinal products of mineral, synthetic origin[2].	-	4
3.	The reasons for the creation of new medicines[1]. The main stages of research and development of medicines. International standards. Search and construction of leading substances[2].	-	4
4.	Computer modeling as a method of designing medicines. Targeted design of new drugs[1]. Design of new molecular structures with specified properties – drag design[2].	-	4
5.	The procedure and features of intra-pharmacy quality control of medicines. Equipment of the control and analytical cabinet (table)[1]. Professional and job requirements for a pharmacist-analyst of a pharmacy. Nomenclature of titrated solutions, reagents and tracers[2].	PT	4
6.	Pharmaceutical analysis[1]. Features of pharmaceutical analysis. Classification of the method. Criteria of the analysis. Types of activities carried out during pharmaceutical analysis[2].	-	4
7.	Chemical methods of pharmacopoeial analysis – authenticity of medicinal products of inorganic nature[1]. Identification of cations of medicinal products of inorganic nature[2].	PT	4
8.	Chemical methods of pharmacopoeial analysis – authenticity of medicinal products of inorganic nature[1]. Identification of anions of medicinal products of inorganic nature[2].	PT	4
9.	Control of knowledge, skills, and abilities in modular units 1 and 2[1].	PT	4
10.	Chemical methods of pharmacopoeial analysis – authenticity of medicinal products of organic nature (identification of functional groups)[1]. Identification of the primary aromatic group. Identification of the aromatic nitro group[2].	PT	4

11.	Chemical methods of pharmacopoeial analysis – authenticity of medicinal products of organic nature (identification of functional groups)[1]. Identification of the hydroxyl group. Identification of the aldehyde and keto group[2].	PT	4
12.	Chemical methods of pharmacopoeial analysis – authenticity of medicinal products of organic nature (identification of functional groups)[1]. Identification of carboxyl, ester, and amide groups[2].	PT	4
13.	Chemical methods of pharmacopoeial analysis – authenticity of medicinal products of organic nature (identification of functional groups)[1]. Identification of organoelement medicinal substances[2].	PT	4
14.	Sources and causes of poor quality of medicines[1]. Impurities of inorganic ions[2].	PT	4
15.	Chemical purity tests of medicinal substances. Impurities of inorganic ions[1]. Impurities. Heavy metal impurities. Arsenic impurity[2].	PT	4
16.	Research work. Determination of the purity of "Purified water"[1]. Determination of impurities in technical water[2].	PT	4
17.	Control of knowledge, skills, and abilities in the modular unit 3[1].	PT	4
	Total		68
5 term			
1.	Safety precautions when working in the pharmaceutical chemistry laboratory. Verification of residual knowledge. Chemical methods of analysis of medicinal substances[1]. Quantitative analysis. Classification of methods. The criteria of analysis[2].	-	4
2.	Chemical methods of pharmacopoeial analysis – quantitative assessment of medicinal products1. Classification of methods. Quantitative assessment of medicines. Gravimetry[2].	PT	4
3.	Solving situational and computational problems[1].	-	4
4.	Chemical methods of pharmacopoeial analysis – quantitative assessment of medicines. Titrimetric methods of analysis[1]. Classification. Requirements. Titration methods. Preparation of titrated solutions by precise suspension and fixation channel. Setting the titer of the working solution. The equivalence point. Computation[2].	PT	4
5.	Chemical methods of pharmacopoeial analysis – quantitative assessment of medicines. Determination of organic acids and bases[1]. Neutralization. Alkalimetry. Acidometry. Non-aqueous titration[2].	PT	4
6.	Precipitation titration. Argentometry[1]. The Mohr method. Folgard and Faience methods[2].	PT	4
7.	Chemical methods of pharmacopoeial analysis – sedimentation titration. Mercurimetry[1]. Titration conditions, working solution, indicator. Advantages and disadvantages of method[2].	PT	4
8.	Chemical methods of pharmacopoeial analysis – quantitative assessment of medicines. Complexometry[1]. Chemistry. Working solutions. Fixing the equivalence point[2].	PT	4
9.	Control of knowledge, skills, and abilities in the modular unit 4[1].	PT	4
10.	Chemical methods of pharmacopoeial analysis – quantitative assessment of medicines. Redox titration. Permanganometry[1]. Titration conditions, working solution, indicator. Advantages and disadvantages of the method[2].	PT	4
11.	Chemical methods of pharmacopoeial analysis – quantitative assessment of medicines. Redox titration. Cerimetry. Bichromometry[1]. Titration conditions, working solution, indicator. Advantages and disadvantages of	PT	4

	the method[2].		
12.	Chemical methods of pharmacopoeial analysis – quantitative assessment of medicines. Redox titration. Bromatometry[1]. Titration conditions, working solution, indicator. Advantages and disadvantages of the method[2].	PT	4
13.	Chemical methods of pharmacopoeial analysis – quantitative assessment of medicines. Redox titration. Iodometry[1]. Titration conditions, working solution, indicator. Advantages and disadvantages of the method[2].	PT	4
14.	Chemical methods of pharmacopoeial analysis – quantitative assessment of medicines. Redox titration. Iodochlorometrium[1]. Titration conditions, working solution, indicator. Advantages and disadvantages of the method[2].	PT	4
15.	Chemical methods of pharmacopoeial analysis – quantitative assessment of medicines. Redox titration. Nitritometry[1]. Titration conditions, working solution, indicator. Advantages and disadvantages of the method[2].	PT	4
16.	Elementary analysis. Determination of nitrogen in organic compounds[1]. Characteristics, methods of decomposition of substances. The method of combustion in a flask with oxygen. The Kjeldahl Method[2].	PT	4
17.	Control of knowledge, skills, and abilities in the modular unit 4[1].	PT	4
18.	Control of the level of formation of practical skills and abilities in modular units 4[1].	PT	4
	Total		72
	6 term		
1.	Safety precautions when working in the pharmaceutical chemistry laboratory. Verification of residual knowledge. Quality assurance system of medicines[1]. Standardization of medicines. Validation[2].	-	4
2.	Basic concepts of metrology[1]. Metrological characteristics of the analysis results. Statistical processing of results[2].	-	4
3.	Quality control of medicines at all stages of drug production. GMP System[1]. Basic principles and provisions[2].	-	4
4.	Quality control of medicines in pharmacies at all stages of production and distribution. Intraapular control[1]. Types of control. The procedure and features of intra-pharmacy quality control of medicines[2].	PT	4
5.	Incompatible combinations of medicines[1]. Types of incompatibilities of medicines, ways to overcome them[2].	PT	4
6.	Stability of medicines[1]. Stability and shelf life of medicines[2].	PT	4
7.	Control of knowledge, skills, and abilities in modular units 2 and 3[1].	PT	4
8.	Viruses. Classification. Life cycle[1]. Features of chemotherapy of viral infections. Targets for antiviral agents[2].	-	4
9.	HIV. Structure, pathology. General pharmaceutical analysis of drugs for the treatment of HIV infection[1]. Inhibitors of attachment and fusion: maraviroc, enfuvirtide. Pharmacokinetic enhancers: cobicistat, ritonavir[2].	-	4
10.	General pharmaceutical analysis of drugs for the treatment of HIV infection[1]. Reverse transcriptase inhibitors (nucleoside analogues): zidovudine, stavudine, salzitabine, didanosine, abacavir. Non-nucleoside reverse transcriptase inhibitors: efavirenz, delavirdin[2].	-	4
11.	General pharmaceutical analysis of drugs for the treatment of HIV infection[1]. Protease inhibitors: saquinavir, indinavir, ritonavir. Integrase inhibitors: raltegravir, dolutegravir, elvitegravir[2].	-	4

12.	The flu virus. Structural features. Pathology. Neuraminidase inhibitors[1]. General pharmaceutical analysis of anti-influenza drugs: oseltamivir, zanamivir, amantadine, remantadine, favipiravir[2].	-	4
13.	The coronavirus. Structure, pathology[1]. General pharmaceutical analysis of anti-coronavirus drugs: remdisivir, halidesivir, molnupiravir[2].	-	4
14.	Hepatitis B virus Structure, pathology[1]. General pharmaceutical analysis of hepatitis B drugs: ribavirin, lamivudine[2].	-	4
15.	Hepatitis C virus. Structure, pathology[1]. General pharmaceutical analysis of drugs for the treatment of hepatitis C virus: sofosbuvir, daclatasvir, ledipasvir, velpatasvir[2].	-	4
16.	Viruses of the herpesviride family. Structure, pathology[1]. General pharmaceutical analysis of antiherpetic agents: iodoxuridine, acyclovir, valacyclovir, vidarabine, flacoside, chelepin D, poludan[2].	-	4
17.	Cytomegalovirus[1]. General pharmaceutical analysis of anti-cytomegalovirus agents: ganciclovir, foscarnet, letermovir, maribavir[2].	-	4
18	Control of knowledge, skills, and abilities in the modular unit 5[1].	-	4
	Total	-	72
	TOTAL	-	212

[1] - topic
[2] – essential content
[3] – PT (practical training)
[4] – one thematic block includes several classes, the duration of one class is 45 minutes, with a break between classes of at least 5 minutes.

Considered at the department meeting Pharmaceutical, Toxicological Chemistry, Pharmacognosy and Botany, protocol of «30» ___may___ 2025 г. № _10_.

Head of the Department  A. Ozerov