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

№	Thematic blocks	Practical training (PT) [3]	Hours (academic)[4]
	3 Semester		
1.	Theoretical foundations of analytical chemistry. [1] Analytical reactions of cations of the I (first) analytical group.[2]	PT	4
2.	Acid is the basic classification of cations.[1] Basic concepts in analytical chemistry. Analytical reactions of cations of the II analytical group. [2]	PT	4
3.	The main provisions of the theory of electrolytic dissociation. [1] Theory of electrolytic dissociation. Strong, weak electrolytes. Analytical reactions of group III cations. [2]	PT	4
4.	Heterogeneous equilibria in analytical chemistry.[1] Heterogeneous solution-precipitate equilibrium. The product of solubility, the molar solubility of insoluble electrolytes. Analysis of a mixture of cations of groups I-III (ERWS №. 1). [2]	PT	4
5.	Protolytic equilibrium in solutions. [1] Protolytic equilibrium in solutions of acids, bases, salts, buffer solutions. Test control №. 1. [2]	PT	4
6.	Concluding test №. 1. Analytical reactions of group IV cations. [1]	PT	4
7.	Redox equilibria in analytical chemistry.[1] Redox systems, calculation of EMF. The Nernst equation. Qualitative reactions of cations of analytical group V.[2]	PT	4
8.	Equilibria in solutions of complex compounds.[1] Structure and properties of complex compounds, equilibria in solutions of complex compounds. Calculation of the concentration of the complexing agent in different systems. Qualitative reactions of cations of the VI analytical group.[2]	PT	4
9.	Organic reagents in analytical chemistry.[1] Analysis of a mixture of cations of analytical groups IV-VI. (ERWS № 2). Test control №. 2. [2]	PT	4
10.	Concluding test №. 2. Analytical groups of anions and their characteristics. [1]	PT	4
11.	Analysis of the anion mixture. (ERWS № 3). Test control №. 3.[1]	PT	4
12.	Extraction.[1] Single and multiple iodine extraction. Extraction as a method of isolation, purification, and concentration of components. Familiarization with the stages and techniques of extraction of compounds of various properties.[2]	PT	4
13.	Extraction.[1] Single and multiple extraction of zinc cations. Extraction as a method of isolation, purification, concentration of cations. Working out the working method of small groups. [2]	PT	4

14.	Chromatography.[1] Chromatography as a method of separation and purification of substances. Paper and thin-layer chromatography of a mixture of amino acids and a mixture of cations. [2]	PT	4
15.	Chromatography.[1] Chromatography in a thin layer. Paper and thin-layer chromatography. Development of knowledge on terminology and conditions of the chromatography process.[2]	PT	4
16.	Analysis of salt or a mixture of dry salts. (ERWS No. 4).[1] Skills in selecting and using group, selective and specific reagents during analysis, skills in conducting qualitative reactions.[2]	PT	4
17.	Concluding test № 3[1]	PT	4
	4 Semester		
18.	Gravimetric method of analysis.[1] Gravimetric method of analysis, basic concepts. Deposited and gravimetric forms, their requirements. The essence of the method.[2]	PT	4
19.	Gravimetric method of analysis. ERWS №5 [1] Development of skills of weighing, dissolution, precipitation, filtration, calcination of substances, mathematical calculations. Working in small groups. [2]	PT	4
20.	Titrimetric analysis.[1] Acid-base titration, basic concepts, the essence of the method. Determination of the mass of alkali and carbonate in their combined presence. [2]	PT	4
21.	Acid-base titration.[1] Determination of ammonium salt by the formal method.[2]	PT	4
22.	Redox titration. Permanganometry. [1] The essence of the method. Implementation of ERWS №. 6 Determination of the mass of iron (II) in solution. Determination of H_2O_2 in the preparation by the small group method.[2]	PT	4
23.	Redox titration. Iodometry. [1] Features of iodometry and iodometry. The technique of performing laboratory work to determine the active ingredients of medicinal products of ERWS №. 7 . [2]	PT	4
24.	Redox titration. Bromometry, bromatometry. [1] The essence of the method, the ability to draw up diagrams of the course of analysis in the methods of bromatometry. ERWS № 8 "Determination of the mass fraction of sodium salicylate in a preparation".[2]	PT	4
25.	Redox titration. Nitritometry. [1] The essence of the method. Development of surgical skills in the nitritometric determination of drugs. ERWS №. 9 "Determination of the mass fraction of a sulfonamide preparation". [2]	PT	4
26.	Concluding test № 4[1]	PT	4
27.	Titrimetric analysis. Complexometry.[1] Complementometry, the essence of the method, basic concepts ERWS № 10 1) Determination of the total hardness of water. 2) Determination of calcium and magnesium in mineral water 3). Determination of calcium in calcium gluconate Calculation skills and registration of work protocols.[2]	PT	4
28.	Titrimetric analysis. Precipitation titration.[1] Precipitation titration, the essence of the method, basic concepts, types of precipitation titration. ERWS № 11 "Preparation and standardization of silver nitrate and ammonium thiocyanate".[2]	PT	4
29.	Concluding test № 5.[1]	PT	4
30.	Optical methods of analysis. Photoelectrocolorimetry.[1] The essence and features of optical analysis methods. Development of the calibration schedule method. Construction of the calibration curve. ERWS № 12 Determination of the mass of Cu2+ in solution. Development of experimental data processing skills.[2]	PT	4
31.	Optical methods of analysis. Spectrophotometry. [1] Spectrophotometry as a method of optical analysis, the essence of the method, calculations. ERWS № 13 1) Determination of the mass of caffeine in a medicinal product	PT	4

	2) Determination of the mass of papaverine (with mathematical processing of the analysis results).[2]		
32.	Optical methods of analysis. Spectrophotometry. ERWS № 14 Determination of papaverine mass (with mathematical processing of the analysis results).[1]	PT	4
33.	Electrochemical methods of analysis. Potentiometric titration. [1] Conditions of non-aqueous titration. The ability to select solvents and indicators for titration in non-aqueous media. ERWS №. 15 "Determination of the mass fraction of a substance in a medicinal product by non-aqueous potentiometric titration".[2]	PT	4
34.	Gas-liquid chromatography.[1] The device and the principle of operation of the chromatograph. The main structural components and components of the device. Chromatographic columns, their design. Conditions of gas-liquid chromatography.[2]	PT	4
35.	Concluding test № 6. Final testing.[1]	PT	4
		Total	140

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 chemistry protocol of «30»_May 2025 г. № 10.

Head of the Department A.K.Brel’