Thematic plan of seminar-type classes
in discipline «Chemistry of biogenic elements»
for students of 2025 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	Hour (academ 3
1.	Safety rules in a Chemical Laboratory. Solutions[1] Methods expressing concentration. The Law of equivalent weights[2]. Labwork «Preparation of CuSO4 solution»	4
2.	Chemical equilibrium in an electrolyte solution[1]. Strong and weak electrolytes. Degree and conctant of ionization. The Ostwald's Law. Colligative properties[2]. Solving problems.	4
3.	pH and pOH[1]. Calculation in the solutions of strong and weak acids and bases. Solving problems. Hydrolysis. pH in a solution of hydrolyzed salts[2]. Calculation. Buffers. Blood buffers. pH of buffers[2]. Solving problems. Labwork «Preparation of buffer»	4
4.	**Control of knowledge, skills and abilities 1 (intermediate control)**	**4**
5.	Chemical thermodynamics[1]. Enthalpy and Gibbs' free energy calculation. Bioenergetics. Solving problems. Chemical equilibrium. Le Chatelier principle[2]. Solving problems. Labwork «Determination\study of neutralization heat»	4
6.	Red-ox reactions[1]. Balancing red-ox processes. EMF of red-ox processes. Solving problems[2]. Labwork «Red-ox reactions»	4
7.	Coordination compounds (Complexes)[1]. Stability of complexes. Complexes in medicine and clinical investigations. Chelatotherapy[2]. Labwork "Complexes and their properties".	4
8.	**Control of knowledge, skills and abilities2 (intermediate control)**	4
9.	Chemistry of biogenic elements[1]. Microelementosis. Basic chemistry of inorganic compounds as medicines[2]. Labwork «Basic chemistry of inorganic compounds as medicines».	4
10.	Ca^{2+} and Mg^{2+} in competition[1]. Heterogeneous equilibria. Solubility constant. Solving problems. Hardness of water. Effect of living organisms[2]. Solving problems. Labwork «Heterogeneous equilibria.»	4
11.	Chemistry of p- elements of the IV-V groups A subgroup of the Periodic Table[1]. Carbon[2]. Electron structure. Properties. Nitrogen[2]. Electron structure. Properties. Labwork «Properties of p-elements of the IVA and VA groups of the Periodic Table"	4
12.	Chemistry of p- elements of the VI groups A subgroup of the Periodic Table[1]. Oxygen and Sulphur[2]. Electron structure. Properties. Labwork «Properties of p-elements of the VI groups A subgroup of the Periodic Table".	4

13.	**Control of knowledge, skills and abilities3 (intermediate control)**	4
14.	Chemistry of d-elements of the VI and VII groups B subgroup of the Periodic Table (Chromium and Manganese) [1]. Chemistry of d-elements of the VI and VII groups B subgroup of the Periodic Table (Chromium and Manganese) [2]. Labwork «Properties of d-elements of the VI and VII group B subgroup of the Periodic Table".	4
15.	Chemistry of d-elements of the VIII groups B subgroup of the Periodic Table (Iron, Cobalt, Nickel) [1]. Labwork «Properties of d-elements of the VIII group B subgroup of the Periodic Table".	4
16.	Analysis of inorganic pharmaceuticals, containing biogenic elements in Pharmacopea[1]. Labwork "Analysis of an inorganic pharmaceutical in Pharmacopea"	4
17.	**Control of knowledge, skills and abilities 4 (intermediate control). Final testing**	4
	Итого	68

1 – topic
2 – essential content
3 – 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 of Chemistry, protocol of «30» May 2025 y. # 10.

Head of the Department of Chemistry  A.K. Brel