

**Thematic plan of seminar-type classes
in discipline « Toxicological chemistry »
for students of 2022 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
7 term			
1.	Safety precautions in the chemical-toxicological laboratory. Chemical-toxicological analysis. Legal and methodological foundations of chemical-toxicological analysis.	-	4
2.	Organization of forensic chemical examination in the Russian Federation. Main documents regulating work in the field of forensic chemical examination.	PT	4
3.	Classification of poisons. Classification of poisonings. Physicochemical characteristics of xenobiotics. Theories of toxicity. Stages of acute poisoning	-	4
4.	General patterns of xenobiotic behavior in the body. Intake, distribution, excretion. Factors influencing the distribution of xenobiotics in the body. Toxicokinetics. Main toxicokinetic parameters of distribution.	PT	4
5.	Biotransformation of xenobiotics in the body. Factors influencing the metabolism of xenobiotics.	-	4
6.	Metabolites and toxicity. Lethal synthesis. Postmortem changes. Main reactions of secondary metabolism.	-	4
7.	Detoxification methods (enhancement of natural detoxification, artificial detoxification, antidote therapy).	-	4
8.	Control of knowledge, skills, and abilities in module No. 1 "General issues of toxicological chemistry".	-	4
9.	Chemical-toxicological analysis for a group of substances isolated by mineralization. Preparation of biological samples for research. Isolation methods. Mineralization technique. Denitration of mineralizate.	PT	4
10.	Arsenic test. Writing an expert opinion	PT	4
11.	Chemical and toxicological analysis of organic and inorganic mercury compounds.	PT	4
12.	Chemical and toxicological analysis of organic and inorganic fluorine compounds.	PT	4
13.	Carbon monoxide. Methods of chemical-toxicological analysis. Spectrophotometric determination of carboxyhemoglobin in blood	PT	4
14.	Chemical-toxicological analysis of a group of substances isolated by distillation. "Volatile" poisons. Features of isolation. Chemical-toxicological analysis of hydrocyanic acid derivatives.	PT	4
15.	Chemical and toxicological analysis of alcohols (methyl, ethyl, ethylene glycol, amyl alcohols)	PT	4
16.	Expertise of alcohol intoxication. Solution of a practical problem on detection of ethanol and higher alcohols in blood and urine by gas-liquid chromatography.	PT	4
17.	Chemical and toxicological analysis of alkyl halides, phenols, aldehydes.	PT	4
18.	Control of knowledge, skills, abilities in module No. 2 "Special issues of toxicological chemistry" (part 1). Chemical analysis of heavy metals, carbon	-	4

	monoxide, fluorine compounds, volatile poisons.		
8 term			
1.	Safety precautions in the chemical-toxicological laboratory. Chemical-toxicological analysis of a group of substances isolated by extraction and sorption.	-	4
2.	Isolation of medicinal substances, general and specific isolation methods.	PT	4
3.	Chemical-toxicological analysis of barbituric acid derivatives. Toxicological significance, metabolism, objects of study, isolation. Identification, quantitative assessment, interpretation of results.	PT	4
4.	Chemical-toxicological analysis of opium alkaloids (morphine, codeine, heroin, etc.). Toxicological significance, metabolism, objects of study, isolation. Identification, quantitative assessment, interpretation of results.	PT	4
5.	Chemical-toxicological analysis of alkaloids of tropane and ecgonine derivatives. Toxicological significance, metabolism, objects of study, isolation. Identification, quantitative assessment, interpretation of results.	PT	4
6.	Chemical-toxicological analysis of natural and synthetic phenylalkylamines. Identification, quantitative assessment, interpretation of results.	PT	4
7.	Chemical and toxicological analysis of 1,4-benzodiazepine derivatives based on hydrolysis products and native substances.	PT	4
8.	Chemical and toxicological analysis of phenothiazine derivatives.	PT	4
9.	Chemical-toxicological analysis of cannabinoids. Analytical diagnostics of narcotic intoxication with cannabinoids.	PT	4
10.	Synthetic analogues of morphine (promedol, tramadol, methadone, fentanyl)	PT	4
11.	. Control of knowledge, skills, abilities in module No. 2 "Special issues of toxicological chemistry" (part 2). Chemical analysis of poisons isolated by extraction and sorption. Solving situational problems	-	4
12.	Basics of general (non-targeted) analysis of xenobiotics. TLC screening of xenobiotics. Immune methods for diagnostics of acute poisoning and drug addiction	PT	4
13.	Analytical diagnostics of drug addiction and toxicomania. Features of analysis and interpretation of research results	PT	4
14.	Analytical diagnostics of acute poisoning. Features of analysis and interpretation of research results.	PT	4
15.	A group of toxicologically important substances isolated by water extraction. Chemical-toxicological analysis of mineral acids, alkalis and salts	PT	4
16.	Ecotoxicants. Concept, classification. Peculiarities of their determination in biosystems.	-	4
17.	Biological hazard and biological terrorism. Basic concepts. Natural toxins: sources, classification, toxic effects, methods of determination.	-	4
18.	Control of knowledge, skills, and abilities in modular unit No. 2 "Special issues of toxicological chemistry" (part 3).	-	4
	Total		72

Considered at the department meeting Pharmaceutical, Toxicological Chemistry, Pharmacognosy and Botany, protocol of «30» may 2025 г. № 10 .

Head of the Department



A.A. Ozerov