

**Thematic lesson plan of seminar'classes  
in the discipline "Organic Chemistry"  
for students of 2025 the educational program  
specialist in the specialty 33.05.01 Pharmacy,  
direction (profile) Pharmacy,  
form of study full time  
for the 2025-2026 academic year**

№	Тематические блоки	Практическая подготовка в рамках тематического блока <sup>3</sup>	Часы (академ.) <sup>4</sup>
<b>2 семестр</b>			
1.	The structure and classification of organic compounds. <sup>1</sup> The Butlerov`s theory of organic compounds structure. <sup>2</sup> Classification of organic compounds according to molecular framework and according to the nature of functional group. <sup>2</sup> Nomenclature of organic compounds. <sup>2</sup>	ППП	4
2.	The structure of organic compounds. Stereoisomerism. <sup>1</sup> Types of isomerism: structural isomerism and stereoisomerism. <sup>2</sup> Stereoisomerism. Conformations of alkanes and cycloalkanes. <sup>2</sup> Enantiomers and Diastereomers. Relative and absolute configurations. <sup>2</sup>	ППП	4
3.	Electronic effects of molecules. <sup>1</sup> Inductive effect. <sup>2</sup> Mesomeric effects. Conjugated systems. $p,\pi$ - and $\pi,\pi$ -conjugation. <sup>2</sup>	ППП	4
4.	Acidity and basicity of organic molecules. <sup>1</sup> The types and theories of acids and bases in organic chemistry. <sup>2</sup>	ППП	4
5.	Concluding test 1.	ППП	4
6.	Classification of organic reactions. <sup>1</sup> Substitution reactions. The free-radical chain mechanism ( $S_R$ ). Nucleophilic substitution mechanisms <sup>2</sup> . The mechanism of electrophilic aromatic substitution $S_E$ Elimination reaction mechanism $E_1$ and $E_2$ . Substitution and elimination in competition. <sup>2</sup> Mechanisms of addition (free-radical, nucleophilic, electrophilic). <sup>2</sup>	ППП	4
7.	Saturated hydrocarbons. Alkanes. Cycloalkanes. Classification, nomenclature. Chemical properties of saturated hydrocarbons – alkanes. <sup>2</sup>	ППП	4
8.	Unsaturated hydrocarbons. Alkenes and alkydienes. <sup>1</sup> Chemical properties of unsaturated hydrocarbons – alkenes and alkydienes. <sup>2</sup> Unsaturated hydrocarbons. Alkynes. <sup>1</sup> Chemical properties of unsaturated hydrocarbons – alkynes. <sup>2</sup>	ППП	4
9.	Aromatic hydrocarbons. Arenes. <sup>1</sup> Chemical properties of aromatic hydrocarbons – arenes. <sup>2</sup>	ППП	4

10.	Concluding test 2.	III	4
11.	Halogen derivatives. <sup>1</sup> Preparation, structure, chemical properties of halogen derivatives. <sup>2</sup>	III	4
12.	Aliphatic alcohols. <sup>1</sup> Preparation, structure, classification, chemical properties of ethylene glycol and glycerol (glycerine) and their using in medicine and in life. <sup>2</sup>	III	4
13.	Ethers, epoxides, organic peroxides. <sup>1</sup> Preparation, structure, nomenclature, chemical properties of ethers, epoxides, organic peroxides. <sup>2</sup>	III	4
14.	Concluding test 3.	III	4
15.	Amines. <sup>1</sup> Preparation, chemical properties of amines: Basic character, substitution reactions, reactions to nitrous acid. <sup>2</sup>	III	4
16.	Azo- and diazocompounds. <sup>1</sup> Preparation, structure, nomenclature, chemical properties of azo- and diazocompounds. <sup>2</sup>	III	4
17.	Aldehydes and ketones. <sup>1</sup> Preparation, classification, structure, nomenclature, chemical properties of aldehydes and ketones. <sup>2</sup>	III	4
18.	Concluding test 4.		
		total	72

### 3 семестр

1.	Carboxylic acids. <sup>1</sup> Preparation, classification, structure, nomenclature, chemical properties of carboxylic acids. <sup>2</sup>		
2.	Dicarboxylic acids. <sup>1</sup> Preparation, classification, structure, nomenclature, chemical properties of aldehydes and ketones		
3.	Heterofunction compounds. Aminoalcohols. <sup>1</sup> Preparation, classification, structure, nomenclature, chemical properties of aminoalcohols. <sup>2</sup> Heterofunction compounds Hydroxyacids. Oxoacids. <sup>1</sup> Preparation, classification, structure, nomenclature, chemical properties of hydroxyacids and oxoacids. <sup>2</sup>		
4.	Amino acids. <sup>1</sup> Preparation, classification, structure, nomenclature, chemical properties of aminoacids. <sup>2</sup>		
5.	Peptides. <sup>1</sup> Structure of peptide bond. The primary, secondary, tertiary, quaternary structure of proteins.		
6.	Concluding test 5.		
7.	Carbohydrates. <sup>1</sup> Preparation, classification, structure, nomenclature, chemical properties of monosaccharides. <sup>2</sup>		

8.	Carbohydrates. <sup>1</sup> Preparation, classification, structure, nomenclature, chemical properties of disaccharides. <sup>2</sup> Preparation, classification, structure, nomenclature, chemical properties of polysaccharides. <sup>2</sup>		
9.	Heterocyclic compounds. <sup>1</sup> Their classification and nomenclature. <sup>2</sup> Five-membered heterocycles with one heteroatom: preparation, classification, structure, nomenclature, chemical properties. <sup>2</sup> Five-membered heterocycles with two heteroatoms: preparation, classification, structure, nomenclature, chemical properties. <sup>2</sup>		
10.	Heterocyclic compounds. <sup>1</sup> Six-membered heterocycles with one heteroatom: preparation, classification, structure, nomenclature, chemical properties. <sup>2</sup> Heterocyclic compounds. <sup>1</sup> Six-membered heterocycles with two heteroatoms: preparation, classification, structure, nomenclature, chemical properties. <sup>2</sup>		
11.	Heterocyclic compounds. <sup>1</sup> Fused-ring heterocycles: preparation, classification, structure, nomenclature, chemical properties. <sup>2</sup>		
12.	Concluding test 6.		
13.	Nucleic acids. <sup>1</sup> The general structure of nucleic acids. The primary and secondary structure of nucleic acids. <sup>2</sup>		
14	Lipids. Saponifiable and nonsaponifiable lipids. Terpenes and terpenoids		
15	Lipids. <sup>1</sup> Saponifiable and nonsaponifiable lipids. Steroids and sterols. <sup>2</sup>		
16	Concluding test 7.		
17	Final testing. Identification of organic compounds. <sup>1</sup> Isolation and purification methods. <sup>2</sup>		
		total	68
<b>Total</b>			140

<sup>1</sup> -Subject

<sup>2</sup> - Essential content (if necessary)

Considered at the meeting of the department of chemistry "31" may 2024, protocol No10

Head of the Department

A.K.Brel'