**THEMATIC PLAN**
"**Bioorganic chemistry**"
*Lectures for the first year students*
***Dentistry Faculty***
(autumn semester)

| № | Topic | Hours |
|---|---|---|
| 1 | Bioorganic chemistry. Classification of the chemical reagents and reactions. Reactivity of the hydrocarbons. Hydroxy derivatives of the hydrocarbons. Thioles. Amines. | 2 |
| 2 | Carbonyl-containig compounds. Carboxylic acids. Heterofunctional compounds. | 2 |
| 3 | Lipids. Proteinogenous aminoacids. Peptides & proteins. | 2 |
| 4 | Carbohydrates. | 2 |
| 5 | Heterocyclic compounds. Alkaloids. Nucleic acids. | 2 |
| | **Total hours** | 10 |

Head of Pharmaceutical, Organic
& Bioorganic Chemistry Chair, prof. R. Lesyk

**THEMATIC PLAN**

**"Bioorganic chemistry"**

*practical classesfor the first year students of the* ***Dentistry Faculty***

(autumn semester)

| № | Theme | Hours |
|---|---|---|
| **Part 1. Theoretical aspects of bioorganic chemistry. Hydrocarbons and their mono-functional derivatives** | | |
| 1 | Introduction. Classification and nomenclature of the bioorganic compounds. Classification of the chemical reactions and reagents. Structure of chemical bonds. | 2 |
| 2 | Structure of bioorganic compounds. Conjugated systems. Electron effects (mesomeric and inductive effects). Reactivity of hydrocarbons. | 2 |
| 3 | Acidic and basic properties of organic compounds. Reactivity of hydroxy derivatives of hydrocarbons, thiols, amines and carbonylic compounds. | 2 |
| 4 | Biologically important carboxylic acids and their derivatives. Control work "Theoretical aspects of bioorganic chemistry. Structure and properties of the hydrocarbons and their monofunctional derivatives" | 2 |
| **Part 2. Heterofunctional bioorganic compounds. Biopolymers and bioregulators** | | |
| 5 | Heterofunctional bioorganic compounds. | 2 |
| 6 | Amino-acids, peptides, proteins. | 2 |
| 7 | Saponifiable lipids. | 2 |
| 8 | Nonsaponifiable lipids. Control work "Heterofunctional bioorganic compounds. Lipids". | 2 |
| **Part 3. Structure and functions of carbohydrates** | | |
| 9 | Structure, chemical properties and functions of monosaccharides. | 2 |
| 10 | Structure, chemical properties and functions di- and polysaccharides. | 2 |
| 11 | Control work "Carbohydrates". | 2 |
| **Part 4. Structure and biological properties of heterocyclic compounds, alkaloids, nucleotides, nucleosides and nucleic acids.** | | |
| 12 | Biologically active 5-membered heterocyclic compounds. | 2 |
| 13 | Biologically active 6-membered heterocyclic compounds. | 2 |
| 14 | Biologically active fused heterocyclic compounds. Alkaloids. Nucleic acids. | 2 |
| 15 | Control work "Heterocyclic compounds, alkaloids, nucleic acid". | 2 |
| **Total** | | **30** |

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**"Bioorganic chemistry"**
*of out-classes work for the first year students of the*
***Dentistry Faculty***
(autumn semester)

| № | Theme | Hours |
|---|---|---|
| **Part 1. Theoretical aspects of bioorganic chemistry. Hydrocarbons and their mono-functional derivatives.** | | |
| 1 | Types of hybridisation of Carbon. Electronic structure of chemical bonds. Conjugated and aromatic systems. Reactivity of arens, alkanes, alkenes and cycloalkanes. | 5 |
| 2 | Reactions of polymerization and polycondensation of aldehydes and carboxylic acids. | 5 |
| **Part 2. Heterofunctional bioorganic compounds. Biopolymers and bioregulators.** | | |
| 3 | Transformation of keto- and hydroxyacids (reactions of oxidation, reduction, decarboxylation, aldol condensation). Keto-enol tautomerism. | 5 |
| 4 | Simple and complex saponifiable lipids. Low-molecular weight bio-regulators – terpenes, carotenoids, steroids, prostaglandins. | 7 |
| **Part 3. Structure and functions of carbohydrates.** | | |
| 5 | Stereo-isomerism and tautomerism of monosaccharides. D- & L-row of monosaccharides. Enantiomers and diastereomers. Anomers and epimers. Synthesis and hydrolysis of glicosides, ethers and esters of monosaccharides. | 5 |
| 6 | Reducing and nonreducing sugars. Structure and properties of homo- (starch, celulouse, inulin) and heteropolysacharides (Hyaluronic acid, chondroitin sulfate, heparin). | 5 |
| **Part 4. Structure and biological properties of heterocyclic compounds, alkaloids, nucleotides, nucleosides and Nucleic acids.** | | |
| 7 | Biologically active 5-membered heterocyclic compounds. Aromaticity. Reaction of nucleophilic and electrophilic substitution. Lactam-lactim and azole tautomerisms. | 5 |
| 8 | Pyridine-carboxylic acids based drugs. | 2 |
| 9 | Alakoilds: structure, classification, properties. | 6 |
| 10. | Nucleotides, nucleosides and nucleic acids. | 5 |
| **Total hours** | | **50** |

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