

Confirmed by the Chair session  
 Protocol No. 1 dated «31» August 2023  
 The Head of the department \_\_\_\_\_ Prof. L.Kobylińska

**THEMATIC SCHEDULE**  
**of practice and laboratory studies on biological chemistry for the 2<sup>nd</sup> year students of medical faculty during the autumn term of 2023 – 2024 academic year**

| No  | The topic  | Number of hours | Dates |
|---|--|-----------------|-------|
| <b><i>Thematic module 1. “Biochemistry as a science. Structure and features of enzymes. Medical enzymology”</i></b> |  |                 |       |
| 1.  | Control of knowledge initial level. Objectives and assignments of biochemistry. Aims and methods of biochemical investigations, their clinical and diagnostic significance.        | 2               | 7.09  |
| 2.  | Structure and physico-chemical properties of enzymes. Study of mechanisms and kinetics of enzymatic reaction.  | 3               | 14.09 |
| 3.  | Regulation of enzymatic reactions and mechanisms of enzymopathias appearance. Medical enzymology.  | 3               | 21.09 |
| <b><i>Thematic module 2. “Molecular principles of bioenergetics”</i></b>  |  |                 |       |
| 4.  | Metabolic pathways and bioenergetics. Tricarboxylic acid cycle and its regulation.   | 3               | 28.09 |
| 5.  | Biological oxidation and oxidative phosphorylation. Mechanisms of ATP synthesis. Inhibition and uncoupling of oxidative phosphorylation  | 3               | 5.10  |
| <b><i>Thematic module 3. “Metabolism of carbohydrates and its regulation”</i></b>                                   |  |                 |       |
| 6.  | Glucose oxidation under aerobic conditions and alternative metabolic pathways of monosaccharides metabolism.   | 3               | 12.10 |
| 7.  | Breakdown and biosynthesis of glycogen. Regulation of glycogen metabolism, biosynthesis of glucose – gluconeogenesis.  | 3               | 19.10 |
| 8.  | Studies on mechanisms of metabolic and humoral regulation of carbohydrate metabolism. Diabetes mellitus.   | 3               | 26.10 |
| <b><i>Thematic module 4. “Metabolism of lipids and its regulation”</i></b>  |  |                 |       |
| 9   | Intracellular lipolysis and molecular mechanisms of its regulation. $\beta$ -.   | 3               | 2.11  |
| 10  | Oxidation and biosynthesis of fatty acids. Metabolism of fatty acids and ketone bodies   | 3               | 9.11  |
| 11.   | Biosynthesis and biotransformation of cholesterol. Disorders of lipid metabolism: steatorrhea, atherosclerosis, obesity. Transport forms of lipids – lipoproteins of blood plasma. | 3               | 16.11 |
| <b><i>Thematic module 5. “Metabolism of amino acids and its regulation”</i></b>                                     |  |                 |       |
| 12.   | Studies on amino acid metabolism (deamination, transamination, decarboxylation). Detoxification of ammonia and urea biosynthesis   | 3               | 23.11 |
| 13.   | Metabolism of individual amino acids   | 3               | 30.11 |
| <b>Totally:</b>   |  | <b>38</b>       |       |

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**THEMATIC SCHEDULE OF LECTURES**  
 on biological chemistry for the 2<sup>nd</sup> year students of medical faculty  
 during the autumn term of 2023 – 2024 academic year

| No  | Topics and contents of lectures   | Lecturer               | Hours     | Dates |
|---|---|------------------------|-----------|-------|
| <b><i>Thematic module 1. "Biochemistry as a science. Structure and features of enzymes. Medical enzymology"</i></b> |   |                        |           |       |
| 1   | Enzymes: structure, properties, classification.<br>Regulation of metabolic processes            | Prof. Lesya Kobylinska | 2         | 1.09  |
| <b><i>Thematic module 2. "Molecular principles of bioenergetics"</i></b>  |   |                        |           |       |
| 2   | Bioenergetics. Tricarboxylic acid cycle.<br>Biological oxidation and oxidative phosphorylation. | Prof. Lesya Kobylinska | 2         | 15.09 |
| <b><i>Thematic module 3. "Metabolism of carbohydrates and its regulation"</i></b>                                   |   |                        |           |       |
| 3   | Metabolism of carbohydrates, its regulation, changes in pathology.                              | Prof. Lesya Kobylinska | 2         | 29.09 |
| <b><i>Thematic module 4. "Metabolism of lipids and its regulation"</i></b>  |   |                        |           |       |
| 4   | Metabolism of lipids, its regulation, changes in pathology                                      | Prof. Lesya Kobylinska | 2         | 27.10 |
| <b><i>Thematic module 5. "Metabolism of amino acids and its regulation"</i></b>                                     |   |                        |           |       |
| 5   | Metabolism of amino acids, its regulation, changes in pathology                                 | Prof. Lesya Kobylinska | 2         | 10.11 |
| <b><i>Totally</i></b>   |   |                        | <b>10</b> |       |

**THEMATIC SCHEDULE of individual work on biological chemistry for the 2<sup>nd</sup> year students of medical faculty during the autumn term of 2018 – 2019 academic year**  
**6. Thematic plan of individual students' work in the discipline "Biological chemistry"**

| №  | Topic  | Number of hours | Kind of control                      | f |
|----|--|-----------------|--------------------------------------|---|
| 1  | Modern biochemical methods of investigation. Contribution of scientists from the department of biochemistry of Danylo Halytsky Lviv National Medical University into the development of biological chemistry.  | 2               | Current control on practical classes |   |
| 2  | Mechanism of catalytic action of chymotrypsin and acetylcholinesterase.  | 1               |                                      |   |
| 3  | Application of enzymes in the disorders of the digestive system, in purulent-necrotic processes as fibrinolytic drugs etc. Changes of physico-chemical properties of catalase under conditions of oxidative stress in different pathological conditions. | 2               |                                      |   |
| 4  | Modern vitamin preparations and their preventive and therapeutic use in medical practice. Biologically active supplements.   | 3               |                                      |   |
| 5  | Role of the most important metabolites of amphibolic pathways (glucose-6-phosphate, pyruvate, $\alpha$ -ketoglutarate, acetyl-S-CoA, succinyl-S-CoA etc) in the integration of metabolism.   | 2               | Current control on practical classes |   |
| 6  | Alteration of ATP synthesis under the effect of pathogenic factors of chemical, biological and physical origin on the organism. Role of cytochromes and coenzyme Q in metabolic processes in the cell.   | 2               |                                      |   |
| 7  | Peculiarities of regulation of glucose turnover in health and disease. Molecular basis of Krebs and Pasteur effects  | 2               |                                      |   |
| 8  | Causes and manifestations of inborn and inherited alterations of the pentose-phosphate pathway. Causes, manifestations and diagnostics of congenital disturbances of fructose and galactose metabolism.  | 1               |                                      |   |
| 9  | Hereditary disorders of the exchange of glycoconjugates. Mucopolisaccharidosis.  | 1               |                                      |   |
| 10 | Methods of diagnosis and principles of biochemical correction of diabetes mellitus. Biochemical bases of modern methods of diagnostics and treatment of diabetes mellitus.   | 2               |                                      |   |
| 11 | Metabolism of sphingolipids in norm and in pathology; clinical significance, violation of the metabolism of sphingolipids. Biological functions of polyunsaturated fatty acids, their sources and use in clinical practice                               | 3               | Current control on practical classes |   |
| 12 | Congenital and acquired lipid metabolism disorders. Primary and secondary deficiency of carnitine, their symptoms and treatment  | 2               |                                      |   |
| 13 | Oxidative stress, its causes, manifestations and the possibility of correction.  | 2               |                                      |   |
| 14 | Clinical diagnostic significance of determination of aminotransferase activity. Synthesis and breakdown of biogenic amines.  | 2               |                                      |   |
| 15 | Urea cycle, hereditary defects of enzymes involved in urea synthesis. Specific pathways of metabolism of phenylalanine and tyrosine, their disorders   | 2               | Current control on practical classes |   |
| 16 | Hereditary disorders of sulfur containing amino acids metabolism.  | 2               |                                      |   |
|    | <b>Totally ISW in Biological Chemistry</b>   | 32              |                                      |   |