Thematic lesson plan of lectures
in the discipline "Biochemistry"
for students of the educational program
specialist degree in the specialty of training 31.05.01 General medicine,
direction (profile) General medicine,
form of study full - time
for the 2024-2025 academic year

№	Topics of lectures	Hours (academic)
2d semester		
1.	Introduction. The subject and tasks of biochemistry. Physico-chemical bases of biochemical processes. Structural organization and physico-chemical properties of proteins.	2
2.	Enzymes. Biological role. Mechanism and features of enzymatic catalysis. Cofactors and coenzymes. Kinetics of enzymatic reactions.	2
3	Principles of determining the activity of enzymes. Regulation of enzyme activity. Medical enzymology (enzyme diagnostics, enzyme therapy, enzymes in biotechnology). Regulation of intracellular metabolism by external signals.	2
4	Biological oxidation. High-energy compounds. Substrate and oxidative phosphorylation. Mitochondrial electron transport chain. ATP synthase. Regulation of oxidative phosphorylation. Disorders of energy metabolism.	2
5	Chemistry and metabolism of carbohydrate. Digestion and absorption of carbohydrates of food. Synthesis and breakdown of glycogen. Regulation of glycogen storage and mobilization. Anaerobic and aerobic breakdown of glucose. Glycolysis. Gluconeogenesis. Fermentation. Regulation of carbohydrate metabolism processes. Disorders of carbohydrate metabolism.	2
6	Lipids: structure, biological role, classification. Digestion and absorption of lipids of food. Transport of lipids. Lipoproteins. Storage and mobilization of fats in adipose tissue. Regulation of lipogenesis and lipolysis. β-oxidation and biosynthesis of fatty acids. Oxidation of glycerol.	2
7	Synthesis and utilization of ketone bodies in the body. Overproduction of ketone bodies ketonemia. Ketoacidosis. The biological role of cholesterol. Cholesterol biosynthesis. Regulation. Disorders of lipid metabolism in humans.	2
3d semester		
8	Toxic substances and the mechanism of their neutralization. Microsomal oxidation system. Conjugation reactions.	2
9	Metabolism of nucleotides. Biosynthesis and degradation of purine nucleotides. Hyperuricemia and gout. Biosynthesis and	2

	degradation of pyrimidine nucleotides. Formation of deoxyribonucleotides.	
10	Template synthesis. DNA replication. Stages of replication. Enzymes involved in this process in eukaryotes. DNA damage repair.	2
11	Template synthesis. Transcription and translation. Processing and splicing of mRNA. The main stages of translation, regulation.	2
12	The main systems of intercellular communication. Mechanisms of transmission of hormonal signals to cells. Classification of hormones.	2
13	Regulation of energy metabolism. The role of insulin and counterregulatory hormones in ensuring homeostasis.	2
14	Blood biochemistry. Metabolism of erythrocytes. Blood plasma proteins. Enzyme diagnostics.	2
	Total	28

[1] -Subject
[2] - essential content (if necessary)

Considered at the meeting of the Department of Fundamental and Clinical Biochemistry on 17 June 2024, protocol № 11.

Head of the Department  O.V. Ostrovskij.