

SCHEDULE OF LECTURES, SEMINARS, PRACTICALS IN ACADEMIC 2024/2025.

Week	Lecture (3 classes), All, THURSDAY, Main building 8-10:30	Seminar (2 classes), 1 st and 2 nd group WEDNESDAY, Institute 15:00-16:30	Practical (3 classes) 1 st and 2 nd group, THURSDAY, Institute 15:30-18:00
I	<p>Tuesday, 1.10. 16-18, Institute of Physiology & Histology, Ground floor, Biochemical Labs I and II</p> <p>L-1. Water. The structure of water. Intra and intermolecular bonds. Covalent bond. Non-covalent interactions. The structure of biomolecules as a consequence of interaction with water. Aqueous solutions: solutions and colloids.</p>	<p>S-1. Concentrations of solutions: mass, molar, molal; ion concentrations; osmolarity of the solution. Calculations.</p>	<p>P-1. Basic laboratory techniques. Use of balance, pipettes. Preparing a solution of a particular concentration: by measuring the solid substance and diluting the solution.</p>
II	<p>Monday, 7.10. 16-18, Institute of Physiology & Histology, Ground floor, Biochemical Labs I and II</p> <p>L-2. Thermodynamic changes during chemical reactions in living systems. Chemical kinetics. Factors affecting the rate of reaction. Transition state, activation energy. Chemical equilibrium, equilibrium constant.</p> <p>Thursday, 10.10., Main building 8-10:30</p> <p>L-3. Electrolytes. Theories of acids and bases. Dissociation constant of acids and bases. Acid-base equilibrium. Amphoteric electrolytes. Ionic product of water, pH. Neutralization, salts, types of salts. Salt hydrolysis. Solubility product.</p>	<p>S-2. Energetics: enthalpy, entropy, free energy of biomolecules. Spontaneity of reactions. Kinetics of biologically important chemical reactions. Calculations.</p>	<p>P-2. Determination of the activation energy of sucrose hydrolysis in an acidic medium by colorimetric method.</p>
III	<p>Thursday, 17.10. Main building 8-10:30</p> <p>L-4. Structure and classification of organic molecules. Double bond reactivity, geometric isomerism. Aromatic and heterocyclic compounds. Resonance of aromatic compounds.</p>	<p>S-3. Equilibrium in aqueous solutions. Calculations.</p>	<p>P-3. Buffers, mechanism of action, capacity. Preparation of buffer solution. Calculation tasks from the buffer. Serial dilutions of solutions.</p>
IV	<p>Thursday, 24.10. Main building 8-10:30</p> <p>L-5. Reactivity of the hydroxy group in alcohols and phenols. Sulfhydryl group. Carbonyl group in aldehydes and ketones. Amines, aminoalcohols and biogenic amines.</p>	<p>S-4. Structure and isomerism of organic compounds. Repetition of general chemistry.</p>	<p>P-4. Serum electrolytes. Quantitative determination of Ca²⁺, Cl⁻, HCO₃⁻ ions.</p>

I colloquium, Saturday, (GENERAL CHEMISTRY) Saturday 26.10. 10-11, Institute

V	<p>Thursday, 31.10. Main building 8-10:30 L-6. Carboxylic acids. Derivatives of carboxylic acids. Derivatives of carbonic acid. Redox reactions of organic and biomolecules. Standard and biological redox potentials. Free radicals and antioxidants.</p>	<p>S-5. Reactivity of biologically important functional groups.</p>	<p>P-5. Reactions of hydroxy, amino, mercapto, carboxyl functional groups. Reactions of urea.</p>
VI	<p>Thursday, 7.11. Main building 8-10:30 L-7. Chemical reactions of amino acids. Peptide bond. Biologically important peptides. Structural levels: primary, secondary, tertiary and quaternary. Domains.</p>	<p>S-6. Structure, stereochemistry and reactivity of biologically important substituted acids (hydroxy, oxo).</p>	<p>P-6. Redox reactions of organic and biomolecules. Colloidal solutions of biomacromolecules.</p>
VII	<p>Thursday, 14.11. Main building 8-10:30 L-8. Protein-ligand interactions. Biomolecules as catalysts. Basics of proteomics technology. Carbohydrates. Stereochemistry and reactivity of monosaccharides. Reducing and non-reducing disaccharides. Polysaccharides. AM</p>	<p>S-7. Conformational <i>in vivo</i> and <i>in vitro</i> changes of proteins (denaturation, renaturation). Complex proteins. DK, NA</p>	<p>P-7. Colored and precipitation reactions of proteins. Bioinformatic (<i>in silico</i>) protein analysis. LIŽ, ZL</p>
VIII	<p>Thursday, 21.11. Main building 8-10:30 L-9. Structure and properties of purine and pyrimidine bases, nucleosides and nucleotides. Structure and properties of nucleic acids (RNA and DNA). Fatty acids. Structure and properties of simple and complex lipids.</p>	<p>S-8. Medically important reactions of carbohydrates. Glycoproteins and glucosaminoglucans in medicine.</p>	<p>P-8. Reduction reactions of mono- and disaccharides. Color reactions of monosaccharides. Sucrose inversion. Hydrolysis of starch with HCl. Bioinformatic (<i>in silico</i>) analysis of carbohydrates.</p>
IX	/	<p>S-9. Glycero and sphingophospholipids; structure of membranes. Sterols, steroids, bile acids, hormones, vitamins.</p>	<p>P-9. Hydrolysis of triglycerides and specific reactions of the obtained components. Addition to unsaturated fatty acids. Quantitative determination of cholesterol. Acid hydrolysis of nucleoproteins. Identifying building components of nucleoproteins. Bioinformatics (<i>in silico</i>) analysis of lipids.</p>
X	<p>II TEST (CHEMISTRY OF NATURAL PRODUCTS and ORGANIC CHEMISTRY) Saturday 7.12. 14-16, Institute</p>		